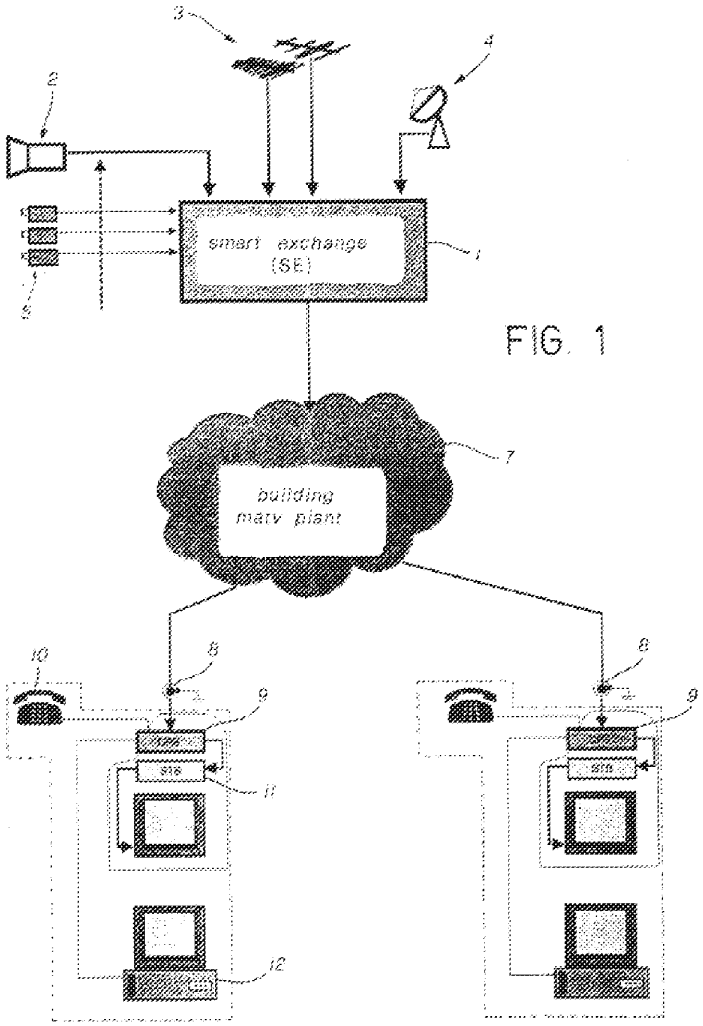
Asserted Claims	Ardemagni
	The invention relates to an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals (10, 11, 12) comprising a bi-directional switch exchange (1) connected to said peripheral node, a facility (7) for bi-directional distribution of signals connected to said exchange (1) and at least one user apparatus (9) connected to said user terminals (10, 11, 12), said exchange (1) receiving from said peripheral node the signals belonging to said television and telecommunication services and from said bi-directional distribution facility (7) a local upstream data sequence including the television channel selection signals, said exchange (1) selecting some input signals belonging to television services and reallocating and/or frequency transmodulating them in order to transmit them, in combination with a local downstream data sequence, to said signal bi-directional distribution facility (7), said user apparatus (9) processing said local downstream data sequence and generating said local upstream data sequence to be transmitted to said exchange (1) together with the upstream data and/or voice channels related to said telecommunication services. Ardemagni at 3:5–11: It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services. Ardemagni at 5:26–28: Further according to this invention, said signal bi-directional distribution facility is an apparatus for centralized distribution of land based television channels or a Master Antenna TV (MATV) facility.

Exhibit A1 – Ardemagni Invalidity Claim Chart

Asserted Claims	Ardemagni
	Ardemagni at 7:7–9: Exchange 1 is connected to the MATV plant 7 of the building which conveys the signal in bi-directional way between exchange 1 and the individual user sockets 8. Ardemagni at 17:18–23: The above exchange 1 is coupled, on one side, to the various input services outcoming from the antennas and/or from external cables, namely the land based television channels, the HFC telecommunication services, the satellite based television channels and, on the other side, namely the output side, to coaxial cable of said MATV distribution facility 7. Ardemagni at Fig. 1:

Asserted Claims	Ardemagni
	 FIG. 1

Asserted Claims	Ardemagni
	To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Ardemagni discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Ardemagni at 3:12–4:19: Specific subject matter of this invention is an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals, said television services including land based radio frequency broadcast television channels, satellite based radio frequency broadcast television channels and HFC network or cable based broadcast television channels, each of said telecommunication services including a downstream data and/or voice channel and an upstream data and/or voice channel, said system also including a bi- directional switch exchange connected to said peripheral node, a facility for bi-directional distribution of signals connected to said exchange and at least a user apparatus connected to said bi-directional facility as well as to said user terminals, said exchange comprising a filter, a frequency filtering and translating unit, a logic control unit, a combiner and a selector, said combiner and selector being connected to said bidirectional distribution facility, the signals belonging to said land based television channels being applied to the input of said combiner, said filter receiving the signals belonging to said cable based television channels and to said downstream data and/or voice

Asserted Claims	Ardemagni
	channels, said filter separating the signals belonging to said downstream data and/or voice channels from the signals belonging to said cable based television channels, said filter also reallocating the signals belonging to said downstream data and/or voice channels to pre-established frequencies and applying them to the input of said combiner, said filter also applying the signals belonging to said cable based television channels to said frequency filtering and translating unit, the signals belonging to said satellite based television channels being also applied to said frequency filtering and translating unit, said selector being connected to said bi-directional distribution facility in order to receive a local upstream data sequence therefrom and to apply it to said control logic unit and to receive the signals belonging to said upstream data and/or voice channels therefrom and to apply them to said peripheral node, said control logic unit generating the control signals to be applied to said frequency filtering and translating unit and a local downstream data sequence to be applied to the input of said combiner, said frequency filtering and translating unit selecting the input signals and frequency reallocating and/or translating them for applying them to the input of said combiner, said combiner mixing the input signals and applying them to said bi-directional distribution facility, said user apparatus including a demodulator, a logic unit, a modulator and a combiner, said logic unit processing said local downstream data sequence outcoming from said demodulator, said modulator modulating a local upstream data sequence related to said user apparatus, said combiner mixing the signals belonging to said local upstream data sequence as well as the signals belonging to upstream data and /or voice channels related to said user apparatus and applying them to said bidirectional distribution facility. Ardemagni at 4:24–27: Still according to this invention, said television services further comprise television channels related to closed circuit television systems (CCTV) that are coupled to the input of said combiner or to said frequency filtering and translating unit. Ardemagni at 4:28–35:

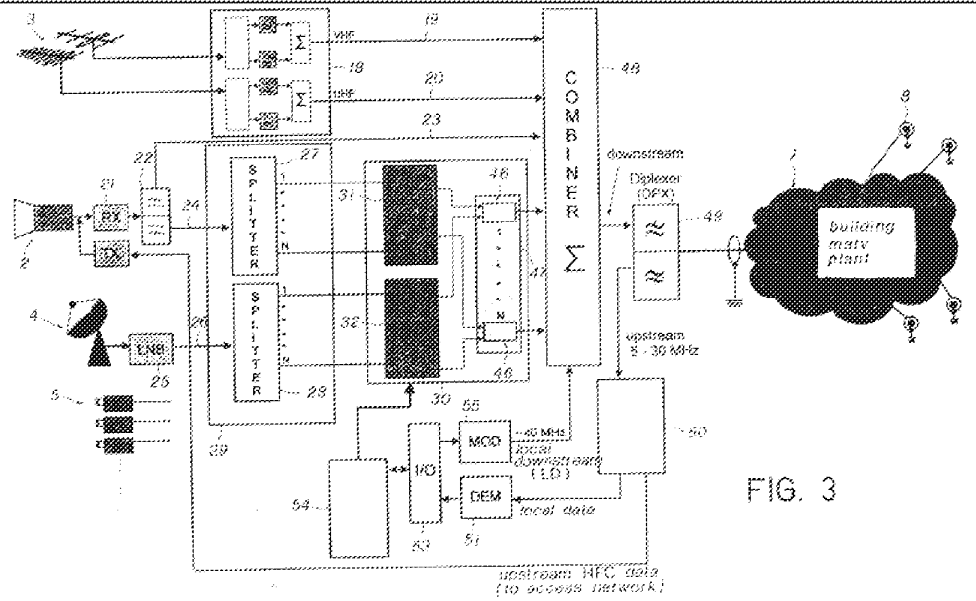
Asserted Claims	Ardemagni
	Further according to this invention, said frequency filtering and translating unit comprises a converter unit for conversion of HFC radio frequencies, a converter unit for conversion of satellite based radio frequencies as well as a switch unit, said converter units having N inputs and N outputs, said switch unit having 2*N inputs and N outputs, the homologous outputs of both said converter units being alternatively selected by said switch unit and transferred to said frequency filtering and translating unit. Ardemagni at 5:1–9: Still according to this invention, said HFC radio frequency converter unit comprises N converter-filters, each of which comprises a tuner having a constant amplitude pass band and tuneable central frequency, a mixer, a selectable frequency local oscillator, a band pass filter having a constant amplitude pass band and a tuneable central frequency, as well as a logic unit, said tuner filtering said input signal, said mixer, said local oscillator and said pass band filter translating the frequency of the filtered signal and said logic unit generating the control signals. Ardemagni at 5:10–18: Further according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a tuner having a constant amplitude pass band and tuneable central frequency, a mixer, a selectable frequency local oscillator, a band pass filter having a constant amplitude pass band and a tuneable central frequency, as well as a logic unit, said tuner filtering said input signal, said mixer, said local oscillator and said pass band filter translating the frequency of the filtered signal and said logic unit generating the control signals. Ardemagni at 9:29–26: Furthermore, since the same television program is broadcast both in band IV and in band V also in multiple frequency ranges, it is possible to drive said exchange 1 so as to perform a filtering function on the signals appearing in such bands in order to suppress all replicated

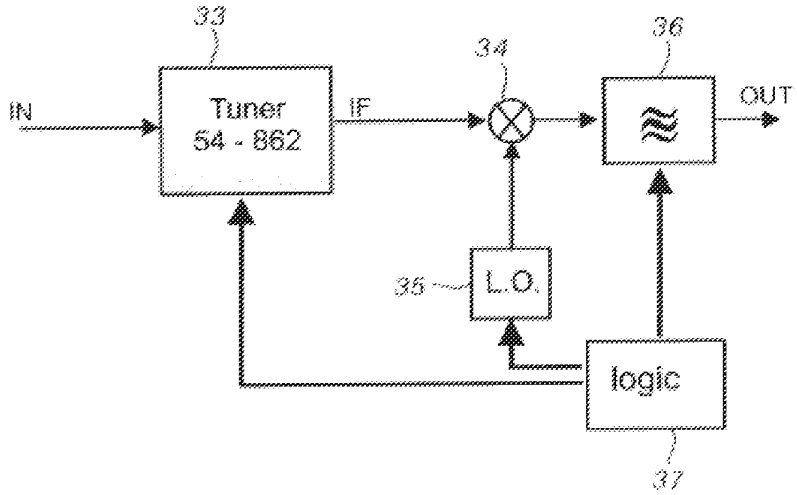
Asserted Claims	Ardemagni
	television signals having worst SNR, in such a way as to distribute the qualitatively best signal and to make further frequency ranges available for allocating the signals belonging to satellite based and/or cable based television channels. Ardemagni at 10:14–30: By referring to Figure 3, an exchange 1 according to a preferred embodiment of the system provides for those signals belonging to land-based television channels coming from the receiver system 3, which comprises one or more antennas, to be conveyed to a filter unit 18, comprising two combiner filters that operate in bands VHF and UHF, respectively. Output VHF 19 and output UHF 20 of said unit 18 convey one only signal for each television channel, thereby eliminating any replicated signals having the worst SNR. In order words, the land based television channels are introduced into system 7 with no frequency variation so as to be received by all users connected according the usual presently adopted method. In this way, exchange 1 exclusively provides for passively filtering the spectrum so as not to repeat the same television program several times, as it often occurs at present, but it exclusively delivers the qualitatively best signal selected among the available ones. Such an operation becomes necessary in order to "clean" the electromagnetic spectrum to the maximum possible extent, so as to make it available for conveying other services on said MATV facility 7. Ardemagni at 12:7–23: By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central

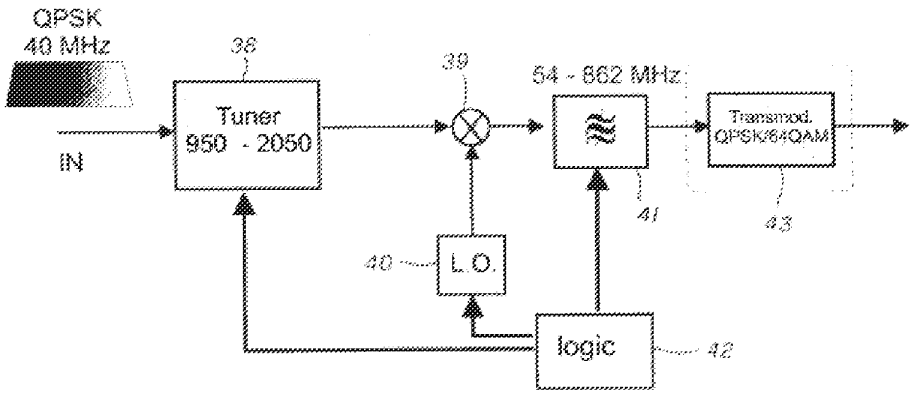
Asserted Claims	Ardemagni
	frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band). Ardemagni at 12:24–13:10: By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of 40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system. Ardemagni at 13:21–37:

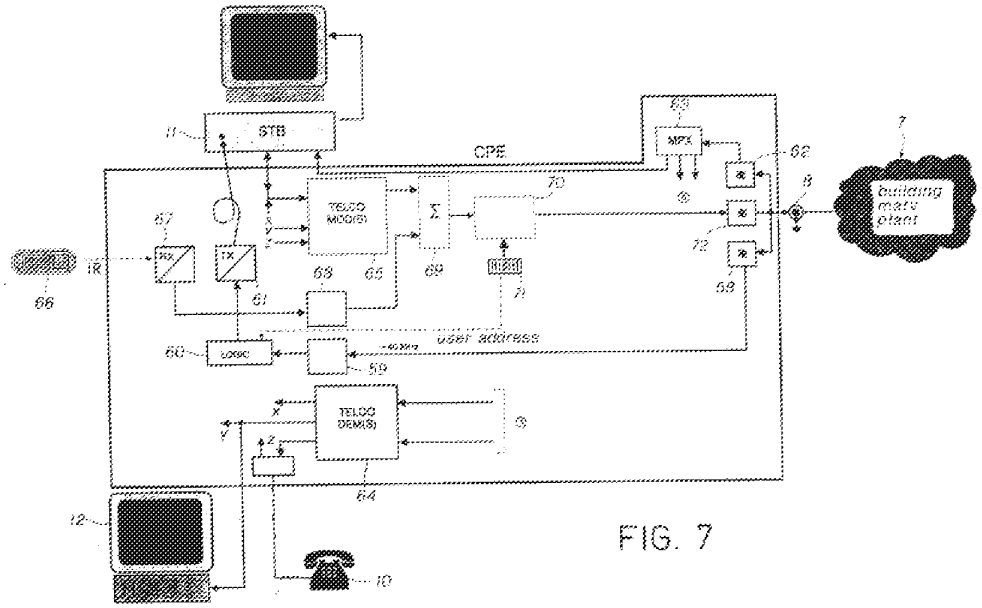
Asserted Claims	Ardemagni
	As it is shown in Figure 3, each one of said N pairs of homologous outputs of the radio frequency conversion units 31 and 32, respectively, is coupled to one of N switches 46 that form a N output switching unit 47. In particular, each switch 46 corresponds to a STB terminal 11. Obviously, a HFC or satellite based television signal is present at the output of each switch 46, according to the selection of the corresponding STB terminal 11. Anyway, it is also possible to implement the arrangement so that, when the terminals connected at a given time are M, where M < N, the outputs of (N - M) switches 46 are in a high impedance condition. The N outputs (or the M active outputs) of said switching unit 47 are added in combiner 48 to the signals on the VHF output 19 and on the UHF output 20 of said filter unit 18 and to the signals belonging to the downstream data and/or voice channels of the telecommunication services available on output 23 of said filter 22. The output of combiner 48 forms the downstream channel that is conveyed from the exchange 1 through a duplexer 49 as well as the MATV facility 7 to the sockets 8 and to the user apparatuses 9. Ardemagni 14:30–15:7: By referring to Figure 7, a user apparatus 9 connected to MATV facility 7 by means of a socket 8 comprises a first band pass filter 58 that transfers the signal belonging to the local downstream data sequence to a FSK demodulator 59. The resulting demodulated signal is then conveyed to a logic unit 60 that processes it, by decoding the local downstream data sequence, for recognition of the address 57 belonging to said STB terminal 11 and interpretation of the information content of the corresponding data 56. Based upon such decode operation, said logic unit 60 couples the control signals of said STB terminal 11 to a transmitter unit 61 that modulates them on an infrared ray (IR) carrier and transmits them to said STB terminal 11. It will be apparent to those skilled in the art that the transmission of decoded data 56 to STB terminal 11 can also be effected by means of other different methods, by utilizing corresponding architectures. Ardemagni at 15:8–17:

Asserted Claims	Ardemagni
	Furthermore, said user apparatus 9 can also be provided with a second band pass filter 62 that conveys any signals belonging to television channels as well as any signals belonging to data and/or voice downstream channels related to telecommunication services to a frequency multiplexer 63. Multiplexer 63 transmits all signals belonging to television channels to said STB terminal 11 and all signals belonging to data and /or voice downstream channels to a TELCO demodulator 64 for telecommunication services, which provider for conveying them to the corresponding terminals, such as a telephone set 10, a STB terminal 11 and a PC 12. Ardemagni at 15:18–37: The data and/or voice upstream channels corresponding to telecommunication services outcoming from said telephone set 10, from said STB terminal 11 and from said PC 12 are modulated by a TELCO modulator 65 for telecommunication services. The signal travelling on an IR carrier outcoming from a remote controller 66 for selection of the television program and control of said STB terminal 11 is received by a receiver 67 and sent to a FSK modulator 68 that generates the local upstream data sequence related to the STB terminal 11 connected to the concerned user apparatus 9. The signals outcoming from said TELCO modulator 65 and from said FSK modulator 69 are added together in a combiner unit 69 and relayed to a further modulator 70. Modulator 70 in combination with a local oscillator 71 tuned on the frequency allotted to the specific concerned STB terminal 11 generates the upstream channel related to the considered user apparatus 9 and conveys it through a band pass filter 72 to the MATV facility 7 to enable it to reach the exchange 1. Preferably, the frequency on which said local oscillator 71 is tuned is comprised in the frequency band which extends from 5 to 30 MHz and coincides with the pass band of said filter 72. In particular, said local oscillator 71 can also transmit the signal for acknowledging the address of said STB terminal 11 to logic unit 60. Ardemagni at Fig. 3:

Asserted Claims	Ardemagni
	 FIG. 3 Ardemagni at Fig. 4a:

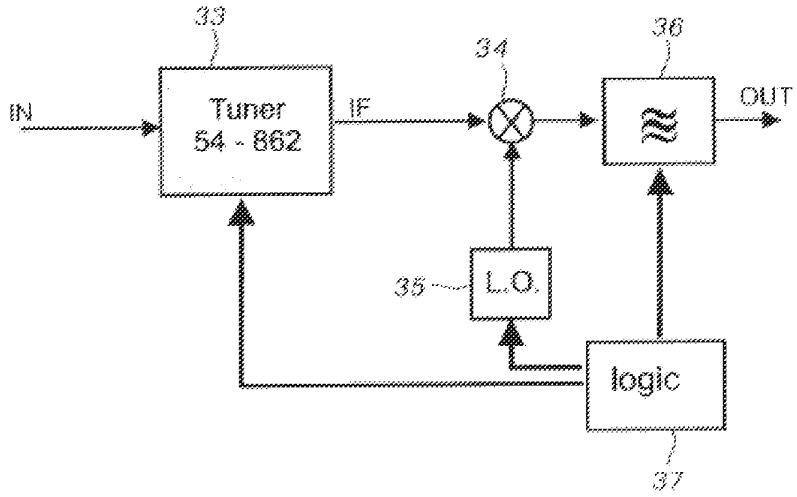
Asserted Claims	Ardemagni
	 FIG. 4a Ardemagni at Fig. 5a:

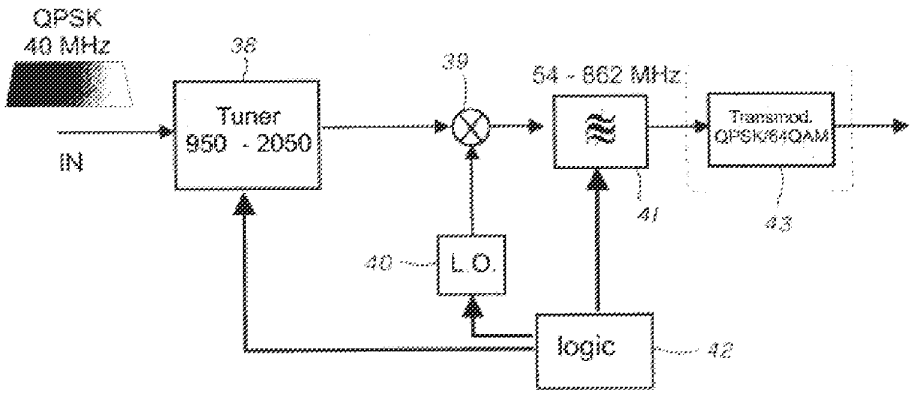
Asserted Claims	Ardemagni
	FIG. 5a  Ardemagni at Fig. 7:

Asserted Claims	Ardemagni
	 FIG. 7 To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Ardemagni discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*.

Asserted Claims	Ardemagni
	See, e.g.: Ardemagni at 5:22–25: Still according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a transmodulator and a control logic unit, said transmodulator filtering , transmodulating and frequency translating the input signal. Ardemagni at 12:7–23: By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band). Ardemagni at 12:24–13:10: By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the

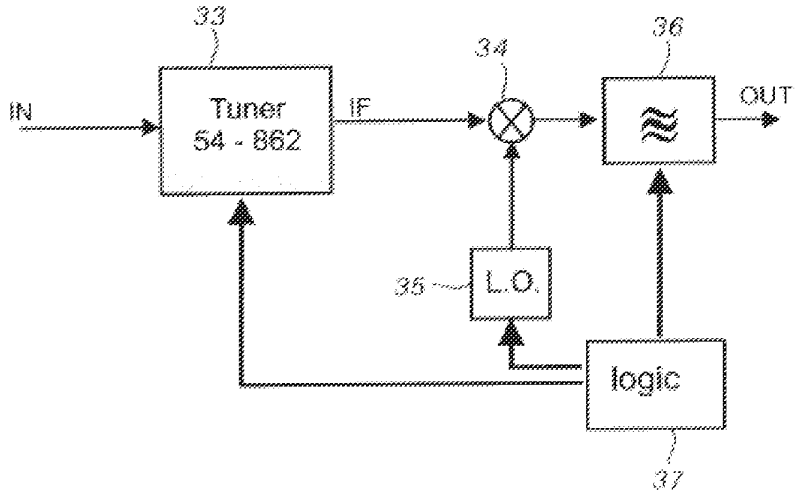
Asserted Claims	Ardemagni
	frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of 40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system. Ardemagni 14:11–25: The above mentioned local upstream data sequence, after demodulation by demodulator 5, is conveyed through an input/output (I/O) interface to a logic control unit 54 aimed at controlling said exchange 1 , which, by decoding them, provides for reading the address of the caller unit (identification of the STB terminal 11 formulating the request) as well as for construing the request. Based upon the requests, said logic unit 54 generates (if necessary) the control signals controlling said filtering and frequency translating unit 30 as well as the local downstream data sequence for controlling said STB terminal 11. Such local downstream data sequence, through said interface unit 53 and a modulator 55, preferably a binary frequency variation modulator (FSK = Frequency Shifting Keying), is coupled to the input of combiner 48 in order to be added to other signals by which the downstream

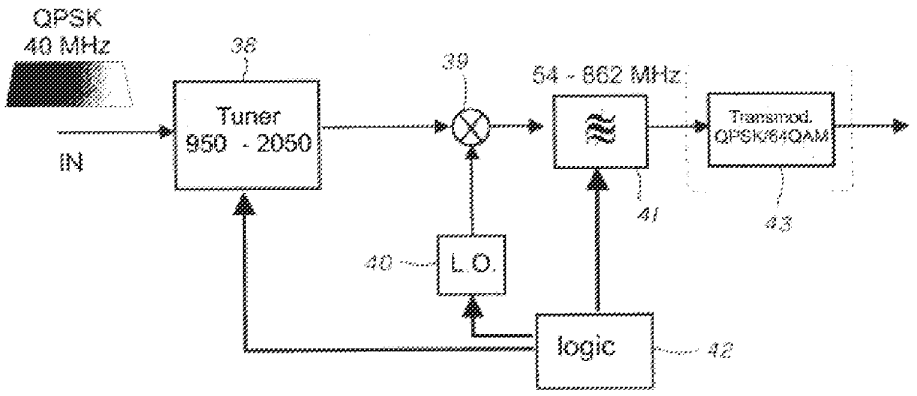
Asserted Claims	Ardemagni
	channel of said exchange 1 is formed. Preferably, the carrier of said local downstream data sequence is at a frequency of 40 MHz. Ardemagni at Fig. 4a:  FIG. 4a Ardemagni at Fig. 5a:

Asserted Claims	Ardemagni
	FIG. 5a  To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Ardemagni discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Ardemagni at 5:22–25:

Asserted Claims	Ardemagni
	Still according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a transmodulator and a control logic unit, said transmodulator filtering , transmodulating and frequency translating the input signal. Ardemagni at 12:7–23: By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band). Ardemagni at 12:24–13:10: By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of

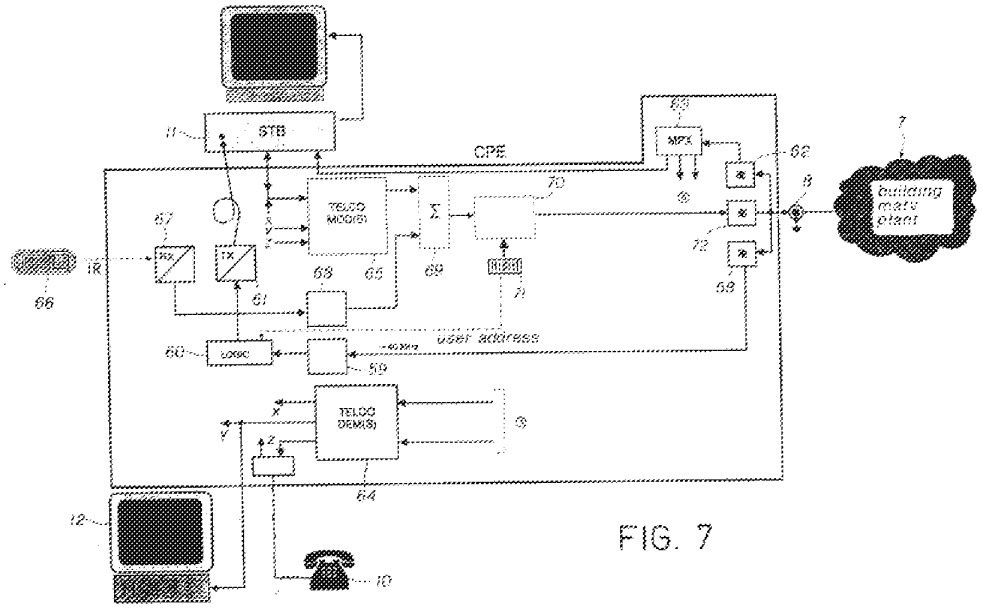
Asserted Claims	Ardemagni
	40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system. Ardemagni 14:11–25: The above mentioned local upstream data sequence, after demodulation by demodulator 5, is conveyed through an input/output (I/O) interface to a logic control unit 54 aimed at controlling said exchange 1 , which, by decoding them, provides for reading the address of the caller unit (identification of the STB terminal 11 formulating the request) as well as for construing the request. Based upon the requests, said logic unit 54 generates (if necessary) the control signals controlling said filtering and frequency translating unit 30 as well as the local downstream data sequence for controlling said STB terminal 11. Such local downstream data sequence, through said interface unit 53 and a modulator 55, preferably a binary frequency variation modulator (FSK = Frequency Shifting Keying), is coupled to the input of combiner 48 in order to be added to other signals by which the downstream channel of said exchange 1 is formed. Preferably, the carrier of said local downstream data sequence is at a frequency of 40 MHz. Ardemagni at Fig. 4a:

Asserted Claims	Ardemagni
	 FIG. 4a Ardemagni at Fig. 5a:

Asserted Claims	Ardemagni
	FIG. 5a  To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Ardemagni discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Ardemagni at 3:5–11:

Asserted Claims	Ardemagni
	It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services. Ardemagni at 7:16–31: As it will be detailedly described hereinafter, the system according to this invention allows to utilize a MATV plant or facility for conveying in bi-directional way the signals of all television and telecommunication services to the input of said exchange, thereby supplying them to all active user terminals (10, 11 , 12), by means of a selection operation, advanced up to the level of said exchange 1 , among the specific non land based television channels as requested by active STB terminals 11. In particular, when a user selects a specific satellite or cable based television channel on his STB terminal 11 , the selection signal returns to the exchange 1 in order to redefine its switching pattern and to supply the concerned STB terminal 11 with only the selected television channel, rather than all available channels. When it is considered that STB terminal 11 could also receive signals belonging to more than one television services, it evidently appears that a reduction is obtained in terms of occupation of the band of the transmission channel interposed between the building node and the individual socket 8. Ardemagni at 7:32–35: In other words, even if at least three television services are present at each user socket 8 and each service offers a big number of channels, each active user STB terminal 11 will select a single television channel. Ardemagni at 8:16–25:

Asserted Claims	Ardemagni
	This means that, even if hundreds television programs and data channels potentially amenable to be distributed are present at the input end of the concerned building node, in the assumption that the user terminals connected to the node are N, the channels that will engage the distribution facility 7 will be N. If N is estimated according to the well known formulas of the traffic theory, it will be possible to size the maximum capability of said facility 7 in terms of band width. Since the above mentioned number is not higher than a few tens, it appears to be evident that an installation of MATV type is sufficient to fulfil the requirement. Ardemagni at 11:22–25: The signals appearing on output 24 of filter 22 and on output 26 of the satellite receiver 25 are coupled to the inputs of two N-output replicators or splitters 27 and 28, respectively, which form a replication or splitting unit 29. Ardemagni at 11:26–29: The N outputs of splitters 27 and 28 are coupled to a frequency filtering and translating unit 30, comprising a unit 31 for HFC radio frequency conversion and a unit 32 for conversion of satellite radio frequencies. Ardemagni at Fig. 7:

Asserted Claims	Ardemagni
	 FIG. 7 To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Ardemagni discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Ardemagni
	Ardemagni at 1:7–12: More particularly, this invention relates to a system of the above mentioned kind that enables the already existing facilities designed for centralized distribution of land based television channels, also known as Master Antenna TV (MATV) to also be adapted, in economically convenient and reliable way, to simultaneously distribute other television and telecommunication services, also including the interactive services. Ardemagni at 3:5–11: It is an object of this invention, therefore, to enable in simple, economically convenient and reliable way to utilize a single plant for distributing the concerned signals, preferably a conventional, possibly already installed MATV plant, between the peripheral node and the user terminals connected thereto, for contemporaneous distribution of land based television channels as well as other television and/or telecommunication services, also including any interactive services. Ardemagni at 3:12–4:19: Specific subject matter of this invention is an optimized system for distribution of television and telecommunication services from a peripheral node to user terminals, said television services including land based radio frequency broadcast television channels, satellite based radio frequency broadcast television channels and HFC network or cable based broadcast television channels, each of said telecommunication services including a downstream data and/or voice channel and an upstream data and/or voice channel, said system also including a bi- directional switch exchange connected to said peripheral node, a facility for bi-directional distribution of signals connected to said exchange and at least a user apparatus connected to said bi-directional facility as well as to said user terminals, said exchange comprising a filter, a frequency filtering and translating unit, a logic control unit, a combiner and a selector, said combiner and selector being connected to said

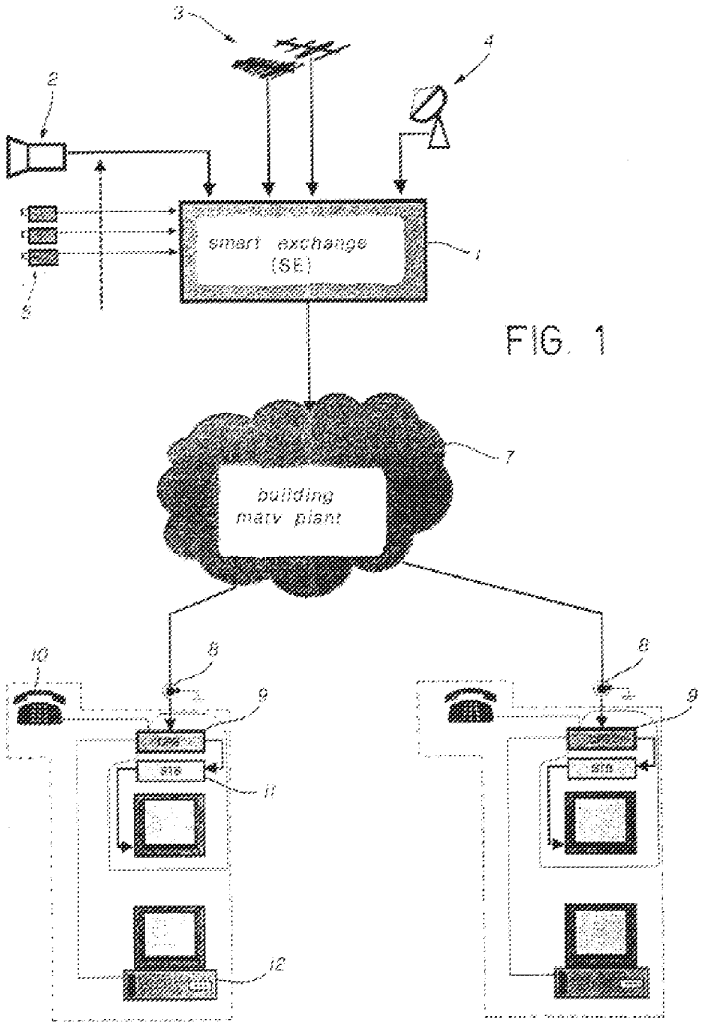
Asserted Claims	Ardemagni
	bidirectional distribution facility, the signals belonging to said land based television channels being applied to the input of said combiner, said filter receiving the signals belonging to said cable based television channels and to said downstream data and/or voice channels, said filter separating the signals belonging to said downstream data and/or voice channels from the signals belonging to said cable based television channels, said filter also reallocating the signals belonging to said downstream data and/or voice channels to pre-established frequencies and applying them to the input of said combiner, said filter also applying the signals belonging to said cable based television channels to said frequency filtering and translating unit, the signals belonging to said satellite based television channels being also applied to said frequency filtering and translating unit, said selector being connected to said bi-directional distribution facility in order to receive a local upstream data sequence therefrom and to apply it to said control logic unit and to receive the signals belonging to said upstream data and/or voice channels therefrom and to apply them to said peripheral node, said control logic unit generating the control signals to be applied to said frequency filtering and translating unit and a local downstream data sequence to be applied to the input of said combiner, said frequency filtering and translating unit selecting the input signals and frequency reallocating and/or translating them for applying them to the input of said combiner, said combiner mixing the input signals and applying them to said bi-directional distribution facility, said user apparatus including a demodulator, a logic unit, a modulator and a combiner, said logic unit processing said local downstream data sequence outcoming from said demodulator, said modulator modulating a local upstream data sequence related to said user apparatus, said combiner mixing the signals belonging to said local upstream data sequence as well as the signals belonging to upstream data and /or voice channels related to said user apparatus and applying them to said bidirectional distribution facility. Ardemagni at 5:26–28: Further according to this invention, said signal bi-directional distribution facility is an apparatus for centralized distribution of land based television channels or a Master Antenna TV (MATV) facility.

Asserted Claims	Ardemagni
	Ardemagni at 7:7–9: Exchange 1 is connected to the MATV plant 7 of the building which conveys the signal in bi-directional way between exchange 1 and the individual user sockets 8. Ardemagni at 7:16–31: As it will be detailedly described hereinafter, the system according to this invention allows to utilize a MATV plant or facility for conveying in bi-directional way the signals of all television and telecommunication services to the input of said exchange, thereby supplying them to all active user terminals (10, 11 , 12), by means of a selection operation, advanced up to the level of said exchange 1 , among the specific non land based television channels as requested by active STB terminals 11. In particular, when a user selects a specific satellite or cable based television channel on his STB terminal 11 , the selection signal returns to the exchange 1 in order to redefine its switching pattern and to supply the concerned STB terminal 11 with only the selected television channel, rather than all available channels. When it is considered that STB terminal 11 could also receive signals belonging to more than one television services, it evidently appears that a reduction is obtained in terms of occupation of the band of the transmission channel interposed between the building node and the individual socket 8. Ardemagni at 8:26–35: In this respect, the signals conveyed by said facility 7 from the exchange 1 to the various user apparatuses 9, by which the so-called "downstream" flow or channel i? formed, comprise all signals belonging to land based television channels, coming from the receiver system 3 for the land based television radio frequencies, all signals belonging to downstream data and/or voice channels corresponding to telecommunication services, the signals belonging to satellite based and/or cable based television channels as selected by

Asserted Claims	Ardemagni
	active user STB terminals 11 and lastly signals generated by exchange 1 for controlling said active STB terminals 11. Ardemagni at 10:14–30: By referring to Figure 3, an exchange 1 according to a preferred embodiment of the system provides for those signals belonging to land-based television channels coming from the receiver system 3, which comprises one or more antennas, to be conveyed to a filter unit 18, comprising two combiner filters that operate in bands VHF and UHF, respectively. Output VHF 19 and output UHF 20 of said unit 18 convey one only signal for each television channel, thereby eliminating any replicated signals having the worst SNR. In order words, the land based television channels are introduced into system 7 with no frequency variation so as to be received by all users connected according the usual presently adopted method. In this way, exchange 1 exclusively provides for passively filtering the spectrum so as not to repeat the same television program several times, as it often occurs at present, but it exclusively delivers the qualitatively best signal selected among the available ones. Such an operation becomes necessary in order to "clean" the electromagnetic spectrum to the maximum possible extent, so as to make it available for conveying other services on said MATV facility 7. Ardemagni at 16:12–21: It will also be apparent to those skilled in the art that a system according to this invention can easily be modified and/or adapted to process signals belonging to further television and/or telecommunication services. By way of exemplification, as it is shown in Figures 4 and 5, CCTV systems 5 can be provided such that, by suitable insertion of signals related to video and/or audio and/or control functions into channels upstream or downstream of said exchange 1 , they can be transmitted unaltered along said MATV facility 7 or they can be transmitted only if activated by the user and reallocated in frequency by said exchange 1.

Exhibit A1 – Ardemagni Invalidity Claim Chart

Asserted Claims	Ardemagni
	Ardemagni at Fig. 1:

Asserted Claims	Ardemagni
	 FIG. 1

Asserted Claims	Ardemagni
	To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Ardemagni discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Ardemagni discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Ardemagni discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs.

Asserted Claims	Ardemagni
	See claims 14, 18, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Ardemagni discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Ardemagni discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

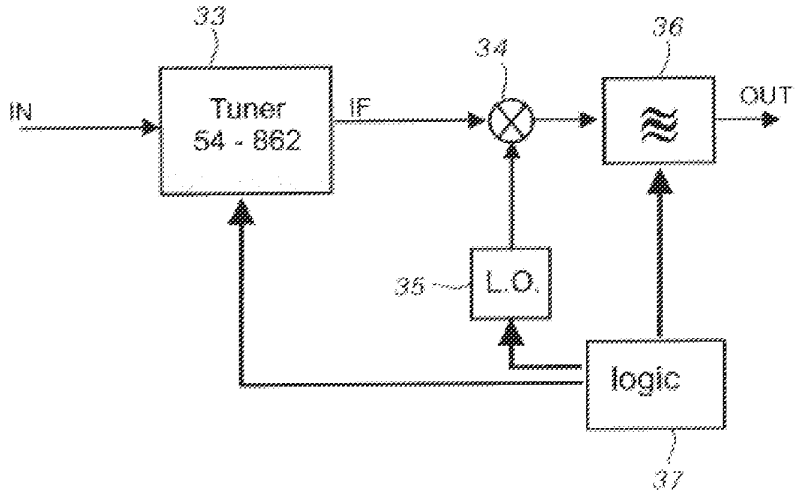
Asserted Claims	Ardemagni
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Ardemagni discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Ardemagni discloses, explicitly and/or inherently, converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Ardemagni discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Ardemagni at 5:34–6:9:

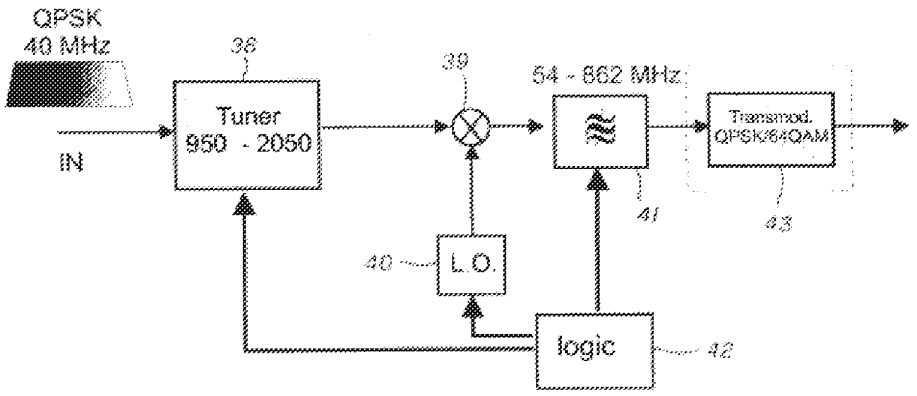
Asserted Claims	Ardemagni
	Still according to this invention, the local upstream or local downstream data sequences are modulated by digital modulation, preferably FSK and/or a PSK and/or QAM modulation and said user apparatus further comprises a digital demodulator arranged upstream of said logic unit, a frequency multiplexer and a TELCO demodulator for telecommunication services, arranged upstream of said user terminals, a TELCO modulator for telecommunication services, arranged downstream of said user terminals, a digital modulator which receives the television channel selection data from at least one user terminal as well as a combiner arranged downstream of said TELCO modulator and of said digital modulator and upstream of said bi-directional distribution facility. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Ardemagni discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. *See, e.g.*: Ardemagni at 5:1–9: Still according to this invention, said HFC radio frequency converter unit comprises N converter-filters, each of which comprises a tuner having a constant amplitude pass band and tuneable central frequency, a mixer, a selectable frequency local oscillator, a band pass filter having a constant amplitude pass band and a tuneable central frequency, as well as a

Asserted Claims	Ardemagni
	logic unit, said tuner filtering said input signal, said mixer, said local oscillator and said pass band filter translating the frequency of the filtered signal and said logic unit generating the control signals. Ardemagni at 5:10–18: Further according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a tuner having a constant amplitude pass band and tuneable central frequency, a mixer, a selectable frequency local oscillator, a band pass filter having a constant amplitude pass band and a tuneable central frequency, as well as a logic unit, said tuner filtering said input signal, said mixer, said local oscillator and said pass band filter translating the frequency of the filtered signal and said logic unit generating the control signals. Ardemagni at 12:7–23: By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band).

Asserted Claims	Ardemagni
	Ardemagni at 12:24–13:10: By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of 40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system. Ardemagni at 15:18–37: The data and/or voice upstream channels corresponding to telecommunication services outcoming from said telephone set 10, from said STB terminal 11 and from said PC 12 are modulated by a TELCO modulator 65 for telecommunication services. The signal travelling on an IR carrier outcoming from a remote controller 66 for selection of the television program and control of said STB terminal 11 is received by a receiver 67 and sent to a FSK modulator 68 that generates the local upstream data sequence related to the

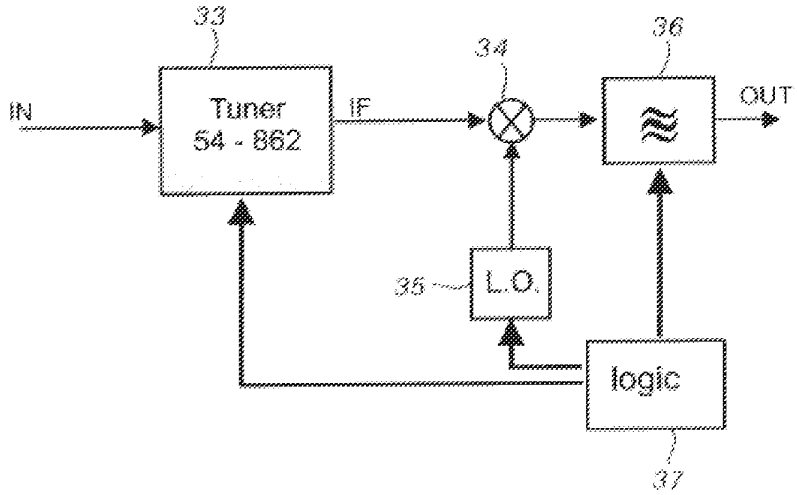
Asserted Claims	Ardemagni
	STB terminal 11 connected to the concerned user apparatus 9. The signals outcoming from said TELCO modulator 65 and from said FSK modulator 69 are added together in a combiner unit 69 and relayed to a further modulator 70. Modulator 70 in combination with a local oscillator 71 tuned on the frequency allotted to the specific concerned STB terminal 11 generates the upstream channel related to the considered user apparatus 9 and conveys it through a band pass filter 72 to the MATV facility 7 to enable it to reach the exchange 1. Preferably, the frequency on which said local oscillator 71 is tuned is comprised in the frequency band which extends from 5 to 30 MHz and coincides with the pass band of said filter 72. In particular, said local oscillator 71 can also transmit the signal for acknowledging the address of said STB terminal 11 to logic unit 60. Ardemagni at 16:1–5: In this way, the selection performed by a user is routed to the exchange 1 rather than directly to said STB terminal 1 , through said upstream channel by means of a combination of it with the TELCO data on a local oscillator of a frequency in the band of 5 to 30 MHz allotted to any individual user. Ardemagni at Fig. 4a:

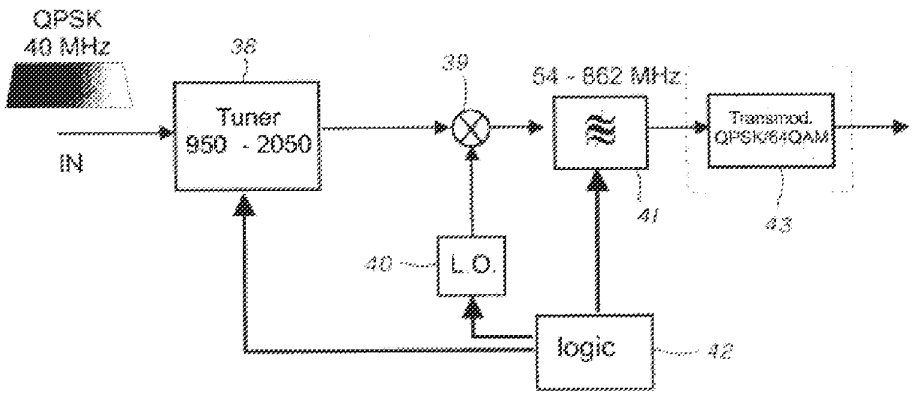
Asserted Claims	Ardemagni
	 FIG. 4a Ardemagni at Fig. 5a:

Asserted Claims	Ardemagni
	FIG. 5a  To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Ardemagni discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claim 14, *supra*. *See, e.g.*: Ardemagni at 5:22–25:

Asserted Claims	Ardemagni
	Still according to this invention, said satellite based radio frequency converter unit comprises N converter-filters, each of which comprises a transmodulator and a control logic unit, said transmodulator filtering , transmodulating and frequency translating the input signal. Ardemagni at 12:7–23: By referring to Figure 4a, each radio frequency filter-converter HFC is provided with a constant amplitude pass band and tuneable central frequency tuner 33, which filters the input HFC television signals, as allocated to frequency band extending between 54 and 862 MHz, and allows the HFC television signal selected by a STB terminal 11 to pass to the output. The output television signal is then frequency translated by means of a mixer 34 that mixes it with the signal of a selectable frequency local oscillator 35, as well as a band-pass filter 36, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 37 generates the control signals to be used to establish the central frequency of tuner 33, the frequency of oscillator 35 and the central frequency of filter 36. Figure 4b illustrates a schematic diagram showing the frequency distribution of the signal modulated with 64QAM modulation (64 symbol Quadrature Amplitude Modulation) with a band width of 8 MHz, as appearing at the output of the converter-filter of Figure 4a when the frequency translation operation reallocates the selected television signal to band 17 (extended S band). Ardemagni at 12:24–13:10: By referring to Figure 5a, a first embodiment of the satellite radio frequency converter-filters includes a tuner 38, having a pass band of constant amplitude and tuneable central frequency, which filters the input satellite based television signals, as allocated to the frequency band extending from 950 and 2050 MHz, and allows the satellite based television signal selected by STB terminal 11 to pass to the output. In particular, the input satellite based television signals are modulated with Quaternary Phase Shift Keying (QPSK) modulation with a band width of

Asserted Claims	Ardemagni
	40 MHz. The television signal outputted by tuner 38 is then frequency translated by means of mixer 39 that mixes it with the signal of a selectable frequency local oscillator 40, as well as a band-pass filter 41, having a constant amplitude pass band and tuneable central frequency. In particular, a logic unit 42 generates the control signals to be used to establish the central frequency of tuner 38, the frequency of oscillator 40 and the central frequency of filter 41. In this case, channel QPSK appears to be reallocated, for instance to band 17, but it still occupies a band of 40 MHz. This means that the satellite radio frequency converter-filter of Figure 5a has a simple and low cost construction, but it still entails a band occupation 5 times larger than the band occupied by a 64QAM modulated signal, thereby reducing the number N of television channels allocable to facility 7. Furthermore, since the QPSK modulation is not compatible with STB terminals 11 for HFC television channels, an additional STB terminal 43 is anyway needed downstream of socket 8 in order to perform the transmodulation from QPSK to 64QAM system. Ardemagni at Fig. 4a:

Asserted Claims	Ardemagni
	 FIG. 4a Ardemagni at Fig. 5a:

Asserted Claims	Ardemagni
	FIG. 5a  To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Ardemagni discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*: Ardemagni at 10:31–11:11:

Asserted Claims	Ardemagni
	The multicarrier signal comprising the signals belonging to television channels and to downstream data and/or voice channels of telecommunication services available on HFC network 2 is conveyed to a receiver unit 21 which translates it to base band having a frequency variable in the range of 54 to 862 MHz, in the preferred embodiment. In particular, the signals belonging to television channels available on network HFC 2 comprise Digital Video Broadcasting-Cable or DVB-C signals, each of which is formed by a packet of 6-8 digital programs, which are compressed in MPEG-2 and multiplexed in order to form the so- called "transponder stream" which, in turn, modulates in 64QAM the VHF or VHF carrier. The downstream data and/or voice channels of telecommunication services comprise data outcoming from the Internet Provider or ISP as well as downstream channels corresponding to narrow band services, such as the conventional telephone services or Plain Old Telephone Services (POTS), the Integrated Service Digital Network (ISDN) Basic Rate Interface (BRI) as well as the downstream data corresponding to pay television services transmitted to STB terminals 11. Ardemagni at 11:12–18: The base band multicarrier signal from the output of receiver 21 is conveyed to a filter 22 in order to separate the signals belonging to data and/or voice downstream channels, routed to output 23, from signals belonging to television channels routed to output 24. In particular, filter 22 allocates the signals belonging to data and/or voice downstream channels of telecommunication services to predetermined and fixed, namely not switched, frequency bands, distributed to all sockets 8. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Ardemagni
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Ardemagni discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Ardemagni discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Ardemagni discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*.

Asserted Claims	Ardemagni
	To the extent Ardemagni does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Ardemagni alone or it would have been obvious to combine Ardemagni with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Basawapatna

U.S. Patent No. 6,745,392 ("Basawapatna") was filed on September 8, 1999 and issued on June 1, 2004. Basawapatna therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Basawapatna invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Basawapatna
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Basawapatna discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Basawapatna at 1:12–17:

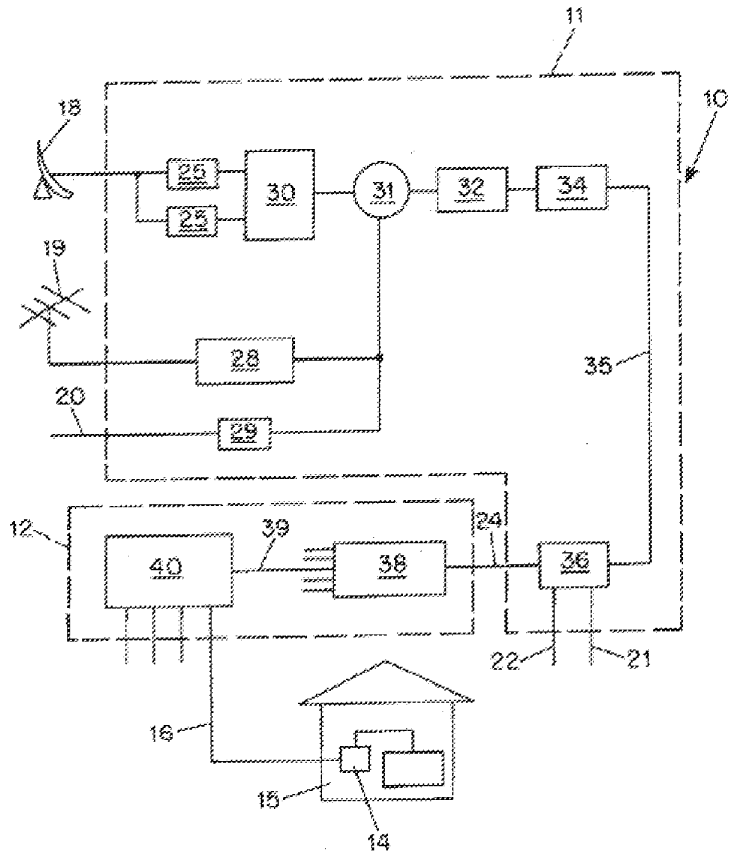
[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Basawapatna
	The present invention relates generally to a communications system for collecting and distributing selected forms of communication signals, and more particularly to a novel communications system for collecting and distributing television, telephone, and data signals to and from an end user's site. Basawapatna at 1:35–57: A typical head end of a communication distribution system receives analog and digitally compressed signals, modulates the signals onto different carrier frequencies, combines the signals, and sends the signals by fiber-optic or coaxial cable to various electronic nodes, each of which typically serves a large number of users, often as many as 300 or more. At the node, the signal may be distributed directly or be converted to those frequencies compatible with equipment at the user site. Between the head end and the distribution nodes, the path is controlled and secure and thus the signal is difficult to tamper with. Between the nodes and a subscribing user, however, a number of major problems can occur. The signal may be stolen by tapping into the cable, channels may be descrambled using unauthorized descrambling equipment, and the reception of extraneous signals can cause the quality of signal reception at the user's site to be poor. Finally, with much of the prior art equipment, there is no reverse path which enables a subscribing user to communicate with the signal provider other than through the use of conventional telephone equipment and procedures. This makes the provision of value added services, such as telephone and computer services, dependent upon the telephone company for the return path communications. Basawapatna at 1:65–2:11: According to the invention, a telecommunication system for providing telecommunication services to a plurality of users comprises a signal collection and transmission system (also referred to as a headend system) for collecting and transmitting telecommunication signals, at least one signal distribution system operatively connected to the signal collection and transmission system that receives the telecommunication signals from the signal collection and transmission system and transmits or distributes the telecommunication signals, via

Asserted Claims	Basawapatna
	service modules according to the invention, to a plurality of users, which communicate with customer interface boxes ("CIB") which both receive signals as well as send requests for telecommunication services to the signal distribution system. Basawapatna at 2:58–3:14: The present invention is embodied in a telecommunications system 10, as shown in FIG. 1, formed by a signal collection and transmission system or circuit 11, sometimes referred to as a headend system, and a signal distribution system or circuit 12, both of which preferably are located at a secured site or sites. A customer interface box ("CIB") 14, located at a user or subscriber site 15, is operatively connected to the signal distribution system 12 by a suitable connection cable 16, such as a coaxial cable, fiber-optic cable, twisted-pair cable, or other suitable wide bandwidth connection means. In accordance with one embodiment of the present invention, the user site may be a home, office, business, or the like. Such a site typically is not a secure site, so signals received from the telecommunication system headend may be susceptible to theft or misappropriation. By utilizing the unique signal distribution system embodying the present invention located at a secured site, the signals to and from the user site are limited to those specifically requested by the user, and thus, a substantial improvement in the security of the system is achieved. In addition, as discussed in more detail below, the signal channel from the secured site to the end user site also may be scrambled for additional security. Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver

Asserted Claims	Basawapatna
	decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:17–36: As mentioned briefly above, satellite antennas 18 also may receive digitally compressed signals from the satellites. In accordance with this aspect of the invention, the signals may be handled in two different ways, one way for an analog only cable system, and one way for a digital or analog and digital cable system. If the cable system is purely an analog system, or if the cable operator decides to distribute particular digital channels on an analog channel line-up, then the digitally compressed signals are processed in the same manner as discussed above with respect to the analog signals, except that a digital IRD 25 will be used in place of an analog IRD. However, if the cable system has digital capabilities, and the cable system operator wishes to distribute the digital channels in digital form, then an integrated receiver transcoder ("IRT") is used to change the digital modulation and the error correction protocol from QPSK modulation to QAM modulation, which is suitable for cable transport. Then, modulator video processor 30 will modulate the digitally modulated RF signal to a desired RF channel position. Basawapatna at 4:61–5:2: The signals from modulator video processor 30 and the other video modulators/demodulators 28 and 29 then are combined and summed by a combined circuit 31 into a single video signal. The single video signal preferably comprises all the channels that a customer or user of the system may desire or be capable of receiving. For example,

Asserted Claims	Basawapatna
	the signal from combiner circuit 31 comprise, local broadcast television channels, cable television channels, pay-per-view channels, and video on demand channels. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Basawapatna discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Basawapatna at 1:65–2:11: According to the invention, a telecommunication system for providing telecommunication services to a plurality of users comprises a signal collection and transmission system (also referred to as a headend system) for collecting and transmitting telecommunication signals, at least one signal distribution system operatively connected to the signal collection and transmission system that receives the telecommunication signals from the signal collection and transmission system and transmits or distributes the telecommunication signals, via service modules according to the invention, to a plurality of users, which communicate with customer interface boxes ("CIB") which both receive signals as well as send requests for telecommunication services to the signal distribution system. Basawapatna at 2:12–17: The signal distribution system preferably comprises one or more nodes, each having one or more communication lines for connecting to service modules. The service modules preferably connect-to the CIB configured to control and authorize telecommunication service requests from the customer communication devices. Basawapatna at 2:58–3:14: The present invention is embodied in a telecommunications system 10, as shown in FIG. 1, formed by a signal collection and transmission system or circuit 11, sometimes referred to

Asserted Claims	Basawapatna
	as a headend system, and a signal distribution system or circuit 12, both of which preferably are located at a secured site or sites. A customer interface box ("CIB") 14, located at a user or subscriber site 15, is operatively connected to the signal distribution system 12 by a suitable connection cable 16, such as a coaxial cable, fiber-optic cable, twisted-pair cable, or other suitable wide bandwidth connection means. In accordance with one embodiment of the present invention, the user site may be a home, office, business, or the like. Such a site typically is not a secure site, so signals received from the telecommunication system headend may be susceptible to theft or misappropriation. By utilizing the unique signal distribution system embodying the present invention located at a secured site, the signals to and from the user site are limited to those specifically requested by the user, and thus, a substantial improvement in the security of the system is achieved. In addition, as discussed in more detail below, the signal channel from the secured site to the end user site also may be scrambled for additional security. Basawapatna at 5:3–19: A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 6:31–45:

Asserted Claims	Basawapatna
	The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 7:23–31:

Asserted Claims	Basawapatna
	As illustrated in FIG. 2, CIB 14 further comprises receiver 68 for receiving user request signals. For example, receiver 68 may be configured to receive user request and message information from a remote control device, such as a laser diode, infrared, or RF remote control device, or receiver 68 may have a cable connection to a signal source (not shown). Thus, CIB 14, is addressable by means of a conventional hand-held remote control unit or other similar control device. Basawapatna at 7:32–46: The operation of CIB 14 in this particular embodiment is controlled by an internal processor 70. For example, in accordance with a preferred embodiment of the, present invention, processor 70 facilitates the transfer of the television or video signal from interface MUX 58 to television 60. In addition, processor 70 preferably interfaces with modem 66, dictating to the modem how it should handle voice and computer data information. Finally, processor 70 preferably coordinates sending user request and message information received by receiver 68 back to service module 40 (via modem 66), and facilitates the display of channel and system message information on display 71. System message information may include billing information, as well as authorization or system messages from the headend or service provider via service module 40. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to

Asserted Claims	Basawapatna
	convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency

Asserted Claims	Basawapatna
	to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 15:28–43: In accordance with yet another embodiment of the present invention, instead of each television set in the home having a separate CIB 14, a single CIB 14 may be configured to receive multiple signals; preferably, one signal for each TV set in the home. In accordance with this particular embodiment, since interface MUX 58 in CIB 14 typically is configured to receive all requested channels for each TV set in the home from 30 service module 40, there is no need for additional CIB's other than to process separate channel requests for the separate TV sets. In this manner, it is possible for CIB 14 to be configured to receive RF or other transmissions from multiple remote control devices, allowing remote control devices associated with each individual TV to control the channel input for the TV the remote is associated with, without the need for additional CIBs in the home. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and

Asserted Claims	Basawapatna
	audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 15:60–16:5: In accordance with another embodiment of the present invention, instead of CIB 14 communicating with service module 40 via the return path of communication connection 16, CIB 14 may communicate with service module 40 via a separate communication connection. For example, service requests, data, and telephony signals from CIB 14 to service module 40 may occur over a standard telephone line, or via another communication connection like PCS, cellular, local multi-point distribution system (LMDS), or the like. Also, service module 40 may communicate with headend system 11 in a similar manner. Therefore the present invention is not limited to using the return path of standard coaxial cable or fiber optic connections. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40 preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54 select the requested channel, decrypt or descramble it, convert it to baseband or a low

Asserted Claims	Basawapatna
	frequency channel, and then send the channel to output interface MUX 80 for transmission to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Basawapatna
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Basawapatna discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Basawapatna at 1:12–17: The present invention relates generally to a communications system for collecting and distributing selected forms of communication signals, and more particularly to a novel communications system for collecting and distributing television, telephone, and data signals to and from an end user's site. Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals.

Asserted Claims	Basawapatna
	Basawapatna at 4:17–36: As mentioned briefly above, satellite antennas 18 also may receive digitally compressed signals from the satellites. In accordance with this aspect of the invention, the signals may be handled in two different ways, one way for an analog only cable system, and one way for a digital or analog and digital cable system. If the cable system is purely an analog system, or if the cable operator decides to distribute particular digital channels on an analog channel line-up, then the digitally compressed signals are processed in the same manner as discussed above with respect to the analog signals, except that a digital IRD 25 will be used in place of an analog IRD. However, if the cable system has digital capabilities, and the cable system operator wishes to distribute the digital channels in digital form, then an integrated receiver transcoder ("IRT") is used to change the digital modulation and the error correction protocol from QPSK modulation to QAM modulation, which is suitable for cable transport. Then, modulator video processor 30 will modulate the digitally modulated RF signal to a desired RF channel position. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 8:52–9:13:

Asserted Claims	Basawapatna
	The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then

Asserted Claims	Basawapatna
	if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like).

Asserted Claims	Basawapatna
	Basawapatna at 12:57–63: In accordance with still a further aspect of the present invention, processor 58 also desirably may include parental control and other filtering capabilities. For example, processor 58 can be programmed to exclude children from receiving certain selected video channels. Thus, for a parent to receive an excluded channel, the parent preferably will enter a secret code which allows the parent to receive the channel. Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40 preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared

Asserted Claims	Basawapatna
	transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54 select the requested channel, decrypt or descramble it, convert it to baseband or a low frequency channel, and then send the channel to output interface MUX 80 for transmission to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 22:41–60: As discussed above, a user of CIB 172 in an apartment can select the channel he/she wants to watch by using a remote control device. Remote receiver 182 will receive the signal from the remote control device and pass it to communication multiplexer 178. In addition, voice and/or computer data from a modem or directly from a telephone or a PC also will pass into communication multiplexer 178. Communication multiplexer 178 will format this information into the 1to 40 MHz bandwidth spectrum. Communication multiplexer 178 then will pass the reverse path information through a reverse path amplifier 184 into interface multiplexer 174. Reverse path amplifier 184 amplifies the signal so that the losses caused by the splitter in the return transmission path are compensated for. Interface multiplexer 174 then will pass the information back through coupler 168 and then back to service module 152. As one skilled in the art will appreciate, while amplifier 184 is positioned between communication MUX 178 and interface MUX 174, the amplifier can be located anywhere in the circuit, including within communication MUX 178 and/or interface MUX 174. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Basawapatna discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Basawapatna at 6:46–57: Referring now to FIG. 2, a more detailed illustration of one embodiment of a customer interface box ("CIB") 14 is shown. In particular, CIB 14 comprises an interface multiplexer (MUX) 58, a modem 66, a receiver 68, a processor 70, and a display device 71. In accordance with one embodiment of the present invention, the signal from service module 40 is received at CIB 14 by interface MUX 58 via connection 16. CIB 14, and in particular interface MUX 58, is in turn connected by a connection 59 to one or more television sets 60. In addition, interface MUX 58 is connected to one or more telephone sets 62 and one or more computers 64 by connections 61 and 63, respectively. Basawapatna at 6:58–7:2: Interface MUX 58 preferably filters the video signal(s) from the forward path and sends it to the one or more television sets 60 via connection(s) 59. Similarly, interface MUX 58 filters out the forward path telephone, computer data and system message signals and sends them to modem 66. Finally, interface MUX 58 receives return path information from modem 66, which is modulated on a carrier between 5 and 50 MHz and sends the carrier with the return path data back to service module 40. Modem 66 can be any suitable modem, such as a standard telephone line modem, a xDSL compatible modem, a DOCSIS compliant cable modem, or any other suitable communication modem. Basawapatna at 7:32–46:

Asserted Claims	Basawapatna
	The operation of CIB 14 in this particular embodiment is controlled by an internal processor 70. For example, in accordance with a preferred embodiment of the, present invention, processor 70 facilitates the transfer of the television or video signal from interface MUX 58 to television 60. In addition, processor 70 preferably interfaces with modem 66, dictating to the modem how it should handle voice and computer data information. Finally, processor 70 preferably coordinates sending user request and message information received by receiver 68 back to service module 40 (via modem 66), and facilitates the display of channel and system message information on display 71. System message information may include billing information, as well as authorization or system messages from the headend or service provider via service module 40. Basawapatna at 7:47–66: In accordance with an alternative embodiment of the present invention, a cheaper CIB 14 having less intelligence could be used. For example, as illustrated in FIG. 3, CIB 14 may be configured with an interface MUX 58 and a remote receiver 68 for receiving signals from a remote control device. Interface MUX 58 is configured to receive the voice, data and video signals from service module 40 via connection 16 and split and forward the respective signals to the proper locations. For example, the voice and data signals are passed to communication modem/multiplexer 66, and the video signals are passed to a television set for viewing. As with CIB 14 illustrated in FIG. 2 and discussed above, communication mix or modem 66 preferably converts the signal to the appropriate analog or digital form, and then passes the voice signals to telephone 62 and the data signals to computer 64. Also, interface MUX 58 may include a decryption or descrambling circuit for decrypting or descrambling the signal from service module 40 if the signal was first encrypted or scrambled prior to transmission to CIB 14. Basawapatna at 9:33–53:

Asserted Claims	Basawapatna
	Individual user segments or circuits 42 of service module 40 preferably communicate with the individual CIBs 14 of each user. Each such user circuit 42 preferably comprise a service interface multiplexer (MUX) 45, an output interface multiplexer (MUX) 46, a communication service module 49, a receiver decoder 54, and a modulator 59. In addition, if the signal from service module 40 to CIB 14 is scrambled or encrypted, each user circuit 42 also will include a scrambling or encryption circuit. The scrambling or encryption circuit may be a separate circuit or device within user circuit 42, or the scrambling or encryption circuit may be configured as part of one of the other components, such as receiver decoder 54, modulator 59, output interface MUX 42, processor 58, or the like. Service interface MUX 45 of service module 40 preferably is configured to receive a communication signal from node 38 via splitter 41 and splitter connection 44. Service interface MUX 45 in turn sends the signal to output interface MUX 46 either through communication service module 49, which handles telephone and computer traffic for the user, or through receiver decoder 54, which handles the video signals. Basawapatna at 9:54–66: In accordance with this aspect of the present invention, if the signal includes telephony or computer signals, service interface MUX 45 preferably passes the telephony and/or computer components of the signal to communication service module 49 via connection 48. If the user is authorized to receive the telephony and/or computer signal(s), communication service module 49 then passes the signal to output interface MUX 46 via connection 50. Thus, in essence, communication service module 49 acts as a communication switch allowing the telephony and/or computer signals to pass through if the user is authorized for such services. Otherwise, if the user is not authorized, communication service module 49 will prevent the communication. Basawapatna at 10:28–39: Once output interface MUX 46 has received the video, voice and/or computer signals from receiver decoder 54 and communication service module 49, it in turn sends the signal

Asserted Claims	Basawapatna
	through communication connection 16 to the subscriber or user customer interface box (CIB) 14. In addition, if the subscriber premise or user site has more than one TV that is independently tuned (i.e., has its own CIB), service module 40 preferably will have one receiver decoder 54 per TV set. Each receiver decoder 54 will modulate each program requested from each TV to a different channel, say 2, 3, 4 or 5. The channels then will be combined together by the same output interface MUX 46. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to

Asserted Claims	Basawapatna
	output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40 preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54 select the requested channel, decrypt or descramble it, convert it to baseband or a low frequency channel, and then send the channel to output interface MUX 80 for transmission to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output

Asserted Claims	Basawapatna
	interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 19:40–58: Summing circuit 118 may combine the local broadcast signals and the cable signals with signals received from satellite antenna 102 and passes the signals to power divider 108. In this manner, system 100 can provide satellite channels, local broadcast channels and channels from a cable company to the users, a solution which most satellite service providers cannot currently provide, even to stand alone homes. Also, as one skilled in the art will appreciate, if the local broadcast and cable signals are analog and the satellite signals are digital, the summing circuit 118 will sum the analog signals with the digital signal and pass all the signals to service module 112. Service module 112 then will be configured to process both analog and digital signals. In addition, in accordance with an alternative embodiment of the present invention, instead of combining the analog and digital signals, the analog signals may be passed to service module 112 on one communication connection and the digital signals may be passed to service module 112 on a separate communication connection. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Basawapatna discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*:

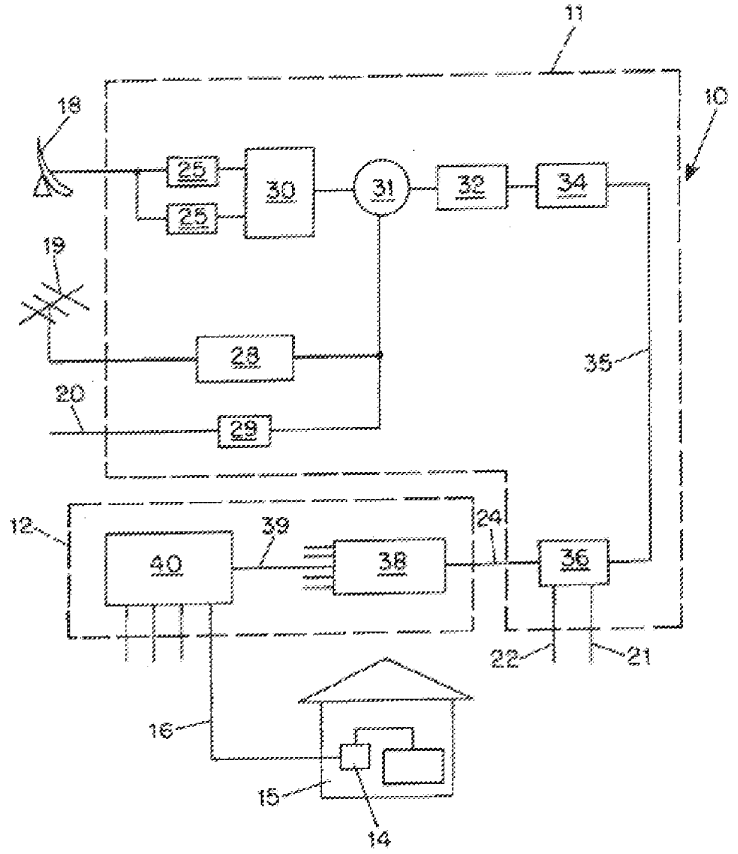
Asserted Claims	Basawapatna
	Basawapatna at 1:12–17: The present invention relates generally to a communications system for collecting and distributing selected forms of communication signals, and more particularly to a novel communications system for collecting and distributing television, telephone, and data signals to and from an end user's site. Basawapatna at 1:65–2:11: According to the invention, a telecommunication system for providing telecommunication services to a plurality of users comprises a signal collection and transmission system (also referred to as a headend system) for collecting and transmitting telecommunication signals, at least one signal distribution system operatively connected to the signal collection and transmission system that receives the telecommunication signals from the signal collection and transmission system and transmits or distributes the telecommunication signals, via service modules according to the invention, to a plurality of users, which communicate with customer interface boxes ("CIB") which both receive signals as well as send requests for telecommunication services to the signal distribution system. Basawapatna at 2:12–17: The signal distribution system preferably comprises one or more nodes, each having one or more communication lines for connecting to service modules. The service modules preferably connect-to the CIB configured to control and authorize telecommunication service requests from the customer communication devices. Basawapatna at 2:58–3:14: The present invention is embodied in a telecommunications system 10, as shown in FIG. 1, formed by a signal collection and transmission system or circuit 11, sometimes referred to as a headend system, and a signal distribution system or circuit 12, both of which

Asserted Claims	Basawapatna
	preferably are located at a secured site or sites. A customer interface box ("CIB") 14, located at a user or subscriber site 15, is operatively connected to the signal distribution system 12 by a suitable connection cable 16, such as a coaxial cable, fiber-optic cable, twisted-pair cable, or other suitable wide bandwidth connection means. In accordance with one embodiment of the present invention, the user site may be a home, office, business, or the like. Such a site typically is not a secure site, so signals received from the telecommunication system headend may be susceptible to theft or misappropriation. By utilizing the unique signal distribution system embodying the present invention located at a secured site, the signals to and from the user site are limited to those specifically requested by the user, and thus, a substantial improvement in the security of the system is achieved. In addition, as discussed in more detail below, the signal channel from the secured site to the end user site also may be scrambled for additional security. Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:17–36:

Asserted Claims	Basawapatna
	As mentioned briefly above, satellite antennas 18 also may receive digitally compressed signals from the satellites. In accordance with this aspect of the invention, the signals may be handled in two different ways, one way for an analog only cable system, and one way for a digital or analog and digital cable system. If the cable system is purely an analog system, or if the cable operator decides to distribute particular digital channels on an analog channel line-up, then the digitally compressed signals are processed in the same manner as discussed above with respect to the analog signals, except that a digital IRD 25 will be used in place of an analog IRD. However, if the cable system has digital capabilities, and the cable system operator wishes to distribute the digital channels in digital form, then an integrated receiver transcoder ("IRT") is used to change the digital modulation and the error correction protocol from QPSK modulation to QAM modulation, which is suitable for cable transport. Then, modulator video processor 30 will modulate the digitally modulated RF signal to a desired RF channel position. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like.

Asserted Claims	Basawapatna
	Basawapatna at 5:55–68: As illustrated in FIG. 1, the output signal from headend system 11, the information of which can be in analog form, digital form, or a combination of both, is transmitted through communication connection 24 to signal distribution system 12, which preferably comprises one or more cable nodes 38 and a plurality of service modules 40. Nodes 38 typically are fiber-optic or coaxial cable systems, or combinations thereof, and are constructed to meet the bandwidth requirements of the system. In conventional cable systems, such nodes each typically serve about 50 to 500 customers, and more preferably about 100 customers. In accordance with the present invention, each node 38 typically serves about 10 to about 40 service modules, and each service module in turn serves between about 10 and about 40 user sites. Basawapatna at 6:1–10: At node 38 the signal typically is converted from fiber-optic to coaxial form (i.e., optical to RF) using an opto-electronic (O/E) converter circuit and then transmitted to service modules 40. As one skilled in the art will appreciate, as the signals pass to service modules 40, the signals may pass through a number of signal splitters or couplers and amplifiers. Since the signal between nodes 38 and service modules 40 have both forward and return paths, the splitters and amplifiers preferably are configured to handle the dual path. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be

Asserted Claims	Basawapatna
	determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 8:4–23: In accordance with one embodiment of the present invention, the video and audio portions of the video signal are modulated together onto an RF carrier, for example, channel 2, 3, 4, or the like and transmitted from service module 40 to CIB 14 over a communication connection. In one aspect of the invention, the video portion of the signal is in composite video format and the audio portion of the signal is in a single channel audio signal, which could be a two channel stereo signal modulated onto a single channel. In accordance with this aspect of the present invention, CIB 14 can pass the composite video and audio signals to the television viewing set or to a home theater or stereo system via a suitable communication connection, such as a coax cable, or other suitable communication cable. Alternatively, CIB 14 may be configured with an S-Video (also known as Y/C Video) generator and/or a stereo or surround sound generator. In accordance with this aspect of the present invention, a suitable S-Video or Y/C Video cable and suitable stereo connection cables are used to connect the television or home theater system to CIB 14. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Basawapatna discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 21:28–48: To extract the proper channel for each apartment, coupler 168 CIB 172 preferably includes a band pass filter (BPF) which allows only that particular apartment's channel(s) to be made available to the TV set(s) in that apartment. For example, for apartment 1, coupler 168 or CIB 172 includes a BPF which allows only channel 2 to be viewed by the users in apartment 1 an no other channels. Similarly, in apartment "N", coupler 168 or CIB 172 includes a BPF which allows channel "M" to be viewed by the users in apartment "N". In this manner, service module 152 can provide the premium and pay-per-view channels to the users which pay for those services. As one skilled in the art will appreciate, if the BPF is configured with coupler 168, only a single channel will pass to CIB 172. However, if the BPF is configured in CIB 172, all channels 2-M will pass to CIB 172 in each apartment, and the proper channel for a particular apartment will be extracted by CIB 172. In accordance with a preferred embodiment of the present invention, to prevent users in apartments from stealing signals directed to the other apartments, coupler 168 and the BPF preferably are configured together, and apart from CIB 172 (see FIG. 8). Basawapatna at 21:49–55:

Asserted Claims	Basawapatna
	Referring now to FIG. 8, a more detailed diagram of a coupler box 166 and a CIB 172 are illustrated. In particular, coupler box 166 includes a splitter or coupler 168 and a band pass filter (BPF) 170. CIB 172 includes an interface multiplexer 174, a descrambler 176, a communication multiplexer 178, an authorization module 180, and a remote receiver 182. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Basawapatna discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband

Asserted Claims	Basawapatna
	channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:3–19:

Asserted Claims	Basawapatna
	A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 5:20–32: Data path modulator 34 preferably is a commercial piece of hardware typically configured to receive user authentication data, as well as other data, such as system messages, and the like, and modulate that data to a particular channel frequency. As one skilled in the art will appreciate, because the communication system of the present invention probably will have a large number of users, a large amount of user authentication data will be transmitted to the service modules 40. Therefore, in one embodiment, it is preferable to send the information through the system on one or more separate channel carrier frequencies, rather than appending the channel authentication information to the individual video channels. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path

Asserted Claims	Basawapatna
	signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a

Asserted Claims	Basawapatna
	typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel

Asserted Claims	Basawapatna
	such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27:

Asserted Claims	Basawapatna
	The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:17–37: As one skilled in the art will appreciate, the video or television signal received by service module 40 from headend system 11 may be scrambled or encrypted in accordance with one or more scrambling techniques. For example, encryption, synchronization suppression, spectral inversion, jamming, non-standard frequency modulation, or a combination thereof may be used. In addition, some of the channels modulated in the signal may be analog and others digital. Thus, user circuits 42 preferably are configured to decode or decrypt the signal and handle both analog and digital channels at the same time. For example user circuits 42 may have analog receiver decoders 54 to handle the analog portion of the signal and a digital receiver decoder (or transcoder) to handle the digital portion of the signal. Preferably processor 58 includes the descrambling or decoding intelligence and instructs receiver decoder 54 (and the digital transcoder) as to how to handle the decoding in accordance with the proper decoding scheme. Also, if this signal from service module 40

Asserted Claims	Basawapatna
	to CIB 14 is to be scrambled, processor 58 will dictate the scrambling technique and control the scrambling process. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of

Asserted Claims	Basawapatna
	scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:25–47:

Asserted Claims	Basawapatna
	In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service

Asserted Claims	Basawapatna
	module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return

Asserted Claims	Basawapatna
	path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz).

Asserted Claims	Basawapatna
	Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz.

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	Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they

Asserted Claims	Basawapatna
	first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58: Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the

Asserted Claims	Basawapatna
	service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Basawapatna discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In

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	particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System

Asserted Claims	Basawapatna
	(CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:3–19: A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 5:20–32: Data path modulator 34 preferably is a commercial piece of hardware typically configured to receive user authentication data, as well as other data, such as system messages, and the like, and modulate that data to a particular channel frequency. As one skilled in the art will appreciate, because the communication system of the present invention probably will have a large number of users, a large amount of user authentication data will be transmitted to the service modules 40. Therefore, in one embodiment, it is preferable to send the information through the system on one or more separate channel carrier frequencies, rather than appending the channel authentication information to the individual video channels. Basawapatna at 5:33–54:

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	After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass

Asserted Claims	Basawapatna
	through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need

Asserted Claims	Basawapatna
	to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a

Asserted Claims	Basawapatna
	preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:17–37: As one skilled in the art will appreciate, the video or television signal received by service module 40 from headend system 11 may be scrambled or encrypted in accordance with

Asserted Claims	Basawapatna
	one or more scrambling techniques. For example, encryption, synchronization suppression, spectral inversion, jamming, non-standard frequency modulation, or a combination thereof may be used. In addition, some of the channels modulated in the signal may be analog and others digital. Thus, user circuits 42 preferably are configured to decode or decrypt the signal and handle both analog and digital channels at the same time. For example user circuits 42 may have analog receiver decoders 54 to handle the analog portion of the signal and a digital receiver decoder (or transcoder) to handle the digital portion of the signal. Preferably processor 58 includes the descrambling or decoding intelligence and instructs receiver decoder 54 (and the digital transcoder) as to how to handle the decoding in accordance with the proper decoding scheme. Also, if this signal from service module 40 to CIB 14 is to be scrambled, processor 58 will dictate the scrambling technique and control the scrambling process. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15:

Asserted Claims	Basawapatna
	For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver

Asserted Claims	Basawapatna
	decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or

Asserted Claims	Basawapatna
	the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site

Asserted Claims	Basawapatna
	will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-

Asserted Claims	Basawapatna
	cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast

Asserted Claims	Basawapatna
	satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39:

Asserted Claims	Basawapatna
	In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module,

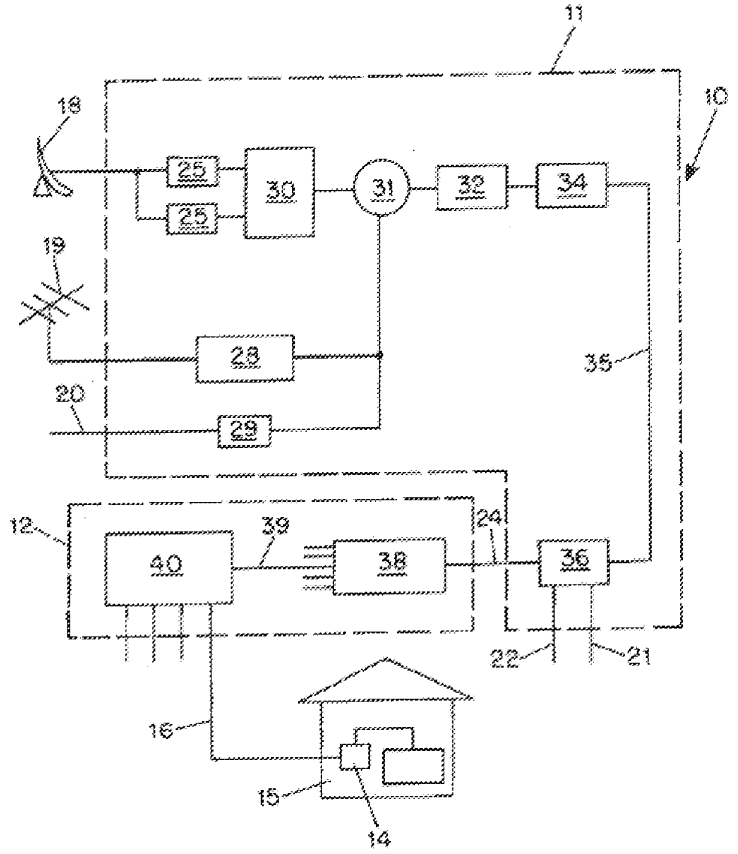
Asserted Claims	Basawapatna
	preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58: Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Basawapatna discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*.

Asserted Claims	Basawapatna
	See, e.g.: Basawapatna at 6:1–10: At node 38 the signal typically is converted from fiber-optic to coaxial form (i.e., optical to RF) using an opto-electronic (O/E) converter circuit and then transmitted to service modules 40. As one skilled in the art will appreciate, as the signals pass to service modules 40, the signals may pass through a number of signal splitters or couplers and amplifiers. Since the signal between nodes 38 and service modules 40 have both forward and return paths, the splitters and amplifiers preferably are configured to handle the dual path. Basawapatna at 7:47–66: In accordance with an alternative embodiment of the present invention, a cheaper CIB 14 having less intelligence could be used. For example, as illustrated in FIG. 3, CIB 14 may be configured with an interface MUX 58 and a remote receiver 68 for receiving signals from a remote control device. Interface MUX 58 is configured to receive the voice, data and video signals from service module 40 via connection 16 and split and forward the respective signals to the proper locations. For example, the voice and data signals are passed to communication modem/multiplexer 66, and the video signals are passed to a television set for viewing. As with CIB 14 illustrated in FIG. 2 and discussed above, communication mix or modem 66 preferably converts the signal to the appropriate analog or digital form, and then passes the voice signals to telephone 62 and the data signals to computer 64. Also, interface MUX 58 may include a decryption or descrambling circuit for decrypting or descrambling the signal from service module 40 if the signal was first encrypted or scrambled prior to transmission to CIB 14. Basawapatna at 9:14–32:

Asserted Claims	Basawapatna
	Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 9:33–53: Individual user segments or circuits 42 of service module 40 preferably communicate with the individual CIBs 14 of each user. Each such user circuit 42 preferably comprise a service interface multiplexer (MUX) 45, an output interface multiplexer (MUX) 46, a communication service module 49, a receiver decoder 54, and a modulator 59. In addition, if the signal from service module 40 to CIB 14 is scrambled or encrypted, each user circuit 42 also will include a scrambling or encryption circuit. The scrambling or encryption circuit may be a separate circuit or device within user circuit 42, or the scrambling or encryption circuit may be configured as part of one of the other components, such as receiver decoder 54, modulator 59, output interface MUX 42, processor 58, or the like. Service interface MUX 45 of service module 40 preferably is configured to receive a communication signal from node 38 via splitter 41 and splitter connection 44. Service interface MUX 45 in turn sends the signal to output interface MUX 46 either through communication service module 49, which handles telephone and computer traffic for the user, or through receiver decoder 54, which handles the video signals. Basawapatna at 20:25–45:

Asserted Claims	Basawapatna
	Referring now to FIG. 7, yet another embodiment of the present invention is shown. In accordance with this particular embodiment of the present invention, a service module 152 is configured to provide telecommunication services to users wired together serially in a loop-through system. For example, in many older apartment buildings, a single cable passes serially from one apartment to the next, and so on. Typically, a loop circuit will connect apartments on the same floor, although it does not have to be configured that way. In accordance with these loop-through systems, each apartment typically comprises a coupler that splits off the signal so that one or more televisions in that apartment can be connected to the loop-through system. Buildings with loop-through wiring traditionally have been very difficult to upgrade to provide premium channels, pay-per-view channels, or even additional cable channels. In addition, it is extremely difficult to provide two-way communications, such as telephone and computer services over the cable with the traditional loop-through systems. However, service module 152 is adapted to provide such services to users connected to loop through systems. Basawapatna at 20:46–55: In accordance with this particular embodiment of the present invention, service module 152 preferably comprises a splitter 154, a plurality of user control circuits (UCCs) 156, a summing circuit 158, a multiplexer (MUX) 160, and a control processor 162. As with service module 40 illustrated in FIG. 4, splitter 154 is configured to receive signals from and transmit signals to a headend system providing video, telephone, and/or computer services. In addition, splitter 154 amplifies and distributes signals to individual UCCs 156 in service module 152 through splitter connections 155. Basawapatna at 21:49–55: Referring now to FIG. 8, a more detailed diagram of a coupler box 166 and a CIB 172 are illustrated. In particular, coupler box 166 includes a splitter or coupler 168 and a band pass

Asserted Claims	Basawapatna
	filter (BPF) 170. CIB 172 includes an interface multiplexer 174, a descrambler 176, a communication multiplexer 178, an authorization module 180, and a remote receiver 182. Basawapatna at 21:56–60: In the embodiment illustrated in FIG. 8, the splitter or coupler 168 and BPF 170 are configured separate from CIB 172. However, in accordance with an alternative embodiment of the present invention, splitter or coupler 168 and BPF 170 may be configured within CIB 172. Basawapatna at 23:14–24: While not discussed in detail herein, service module 152 and, in particular, UCCs 156 will handle the telephone and computer services in a manner similar to service modules 40 as discussed above. Also, while this embodiment of the present invention is described herein with reference to apartments with loop-through configurations, one skilled in the art will appreciate that the present invention can be used with other loop-through set-ups. For example, rural cable systems in which individual farm houses are connected to a single cable with couplers or splitters also can utilize the present invention. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Basawapatna discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 6:46–57: Referring now to FIG. 2, a more detailed illustration of one embodiment of a customer interface box ("CIB") 14 is shown. In particular, CIB 14 comprises an interface multiplexer (MUX) 58, a modem 66, a receiver 68, a processor 70, and a display device 71. In accordance with one embodiment of the present invention, the signal from service module 40 is received at CIB 14 by interface MUX 58 via connection 16. CIB 14, and in particular interface MUX 58, is in turn connected by a connection 59 to one or more television sets 60. In addition, interface MUX 58 is connected to one or more telephone sets 62 and one or more computers 64 by connections 61 and 63, respectively. Basawapatna at 6:58–7:2: Interface MUX 58 preferably filters the video signal(s) from the forward path and sends it to the one or more television sets 60 via connection(s) 59. Similarly, interface MUX 58 filters out the forward path telephone, computer data and system message signals and sends them to modem 66. Finally, interface MUX 58 receives return path information from modem 66, which is modulated on a carrier between 5 and 50 MHz and sends the carrier with the return path data back to service module 40. Modem 66 can be any suitable modem, such as a standard telephone line modem, a xDSL compatible modem, a DOCSIS compliant cable modem, or any other suitable communication modem.

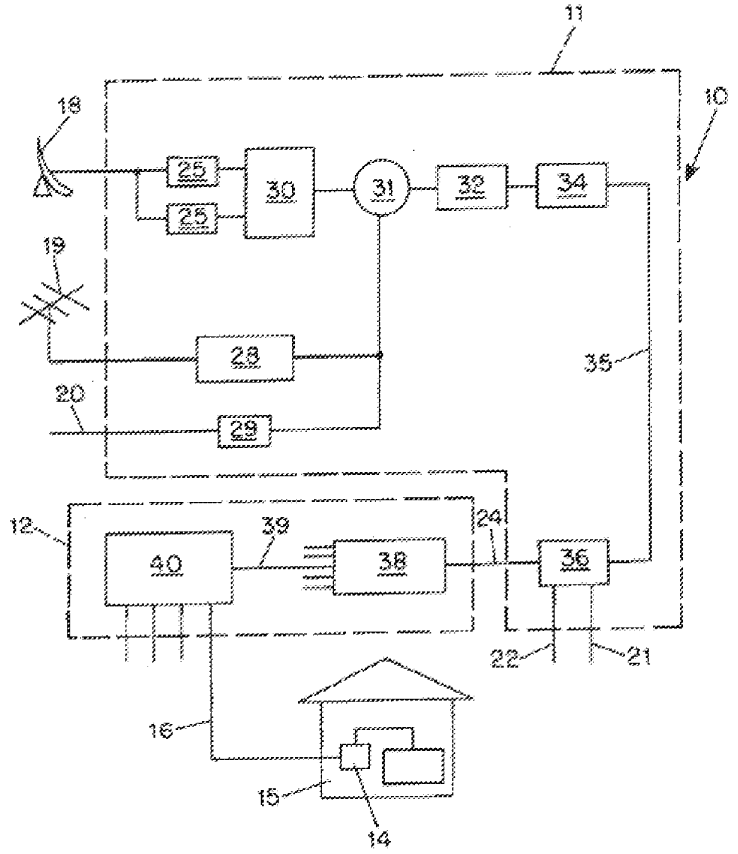
Asserted Claims	Basawapatna
	Basawapatna at 7:32–46: The operation of CIB 14 in this particular embodiment is controlled by an internal processor 70. For example, in accordance with a preferred embodiment of the, present invention, processor 70 facilitates the transfer of the television or video signal from interface MUX 58 to television 60. In addition, processor 70 preferably interfaces with modem 66, dictating to the modem how it should handle voice and computer data information. Finally, processor 70 preferably coordinates sending user request and message information received by receiver 68 back to service module 40 (via modem 66), and facilitates the display of channel and system message information on display 71. System message information may include billing information, as well as authorization or system messages from the headend or service provider via service module 40. Basawapatna at 7:47–66: In accordance with an alternative embodiment of the present invention, a cheaper CIB 14 having less intelligence could be used. For example, as illustrated in FIG. 3, CIB 14 may be configured with an interface MUX 58 and a remote receiver 68 for receiving signals from a remote control device. Interface MUX 58 is configured to receive the voice, data and video signals from service module 40 via connection 16 and split and forward the respective signals to the proper locations. For example, the voice and data signals are passed to communication modem/multiplexer 66, and the video signals are passed to a television set for viewing. As with CIB 14 illustrated in FIG. 2 and discussed above, communication mix or modem 66 preferably converts the signal to the appropriate analog or digital form, and then passes the voice signals to telephone 62 and the data signals to computer 64. Also, interface MUX 58 may include a decryption or descrambling circuit for decrypting or descrambling the signal from service module 40 if the signal was first encrypted or scrambled prior to transmission to CIB 14. Basawapatna at 9:33–53:

Asserted Claims	Basawapatna
	Individual user segments or circuits 42 of service module 40 preferably communicate with the individual CIBs 14 of each user. Each such user circuit 42 preferably comprise a service interface multiplexer (MUX) 45, an output interface multiplexer (MUX) 46, a communication service module 49, a receiver decoder 54, and a modulator 59. In addition, if the signal from service module 40 to CIB 14 is scrambled or encrypted, each user circuit 42 also will include a scrambling or encryption circuit. The scrambling or encryption circuit may be a separate circuit or device within user circuit 42, or the scrambling or encryption circuit may be configured as part of one of the other components, such as receiver decoder 54, modulator 59, output interface MUX 42, processor 58, or the like. Service interface MUX 45 of service module 40 preferably is configured to receive a communication signal from node 38 via splitter 41 and splitter connection 44. Service interface MUX 45 in turn sends the signal to output interface MUX 46 either through communication service module 49, which handles telephone and computer traffic for the user, or through receiver decoder 54, which handles the video signals. Basawapatna at 9:54–66: In accordance with this aspect of the present invention, if the signal includes telephony or computer signals, service interface MUX 45 preferably passes the telephony and/or computer components of the signal to communication service module 49 via connection 48. If the user is authorized to receive the telephony and/or computer signal(s), communication service module 49 then passes the signal to output interface MUX 46 via connection 50. Thus, in essence, communication service module 49 acts as a communication switch allowing the telephony and/or computer signals to pass through if the user is authorized for such services. Otherwise, if the user is not authorized, communication service module 49 will prevent the communication. Basawapatna at 10:28–39:

Asserted Claims	Basawapatna
	Once output interface MUX 46 has received the video, voice and/or computer signals from receiver decoder 54 and communication service module 49, it in turn sends the signal through communication connection 16 to the subscriber or user customer interface box (CIB) 14. In addition, if the subscriber premise or user site has more than one TV that is independently tuned (i.e., has its own CIB), service module 40 preferably will have one receiver decoder 54 per TV set. Each receiver decoder 54 will modulate each program requested from each TV to a different channel, say 2, 3, 4 or 5. The channels then will be combined together by the same output interface MUX 46. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using

Asserted Claims	Basawapatna
	modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40 preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54 select the requested channel, decrypt or descramble it, convert it to baseband or a low frequency channel, and then send the channel to output interface MUX 80 for transmission

Asserted Claims	Basawapatna
	to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 19:40–58: Summing circuit 118 may combine the local broadcast signals and the cable signals with signals received from satellite antenna 102 and passes the signals to power divider 108. In this manner, system 100 can provide satellite channels, local broadcast channels and channels from a cable company to the users, a solution which most satellite service providers cannot currently provide, even to stand alone homes. Also, as one skilled in the art will appreciate, if the local broadcast and cable signals are analog and the satellite signals are digital, the summing circuit 118 will sum the analog signals with the digital signal and pass all the signals to service module 112. Service module 112 then will be configured to process both analog and digital signals. In addition, in accordance with an alternative embodiment of the present invention, instead of combining the analog and digital signals, the analog signals may be passed to service module 112 on one communication connection and the digital signals may be passed to service module 112 on a separate communication connection. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Basawapatna discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Basawapatna discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a

Asserted Claims	Basawapatna
	baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:3–19:

Asserted Claims	Basawapatna
	A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 5:20–32: Data path modulator 34 preferably is a commercial piece of hardware typically configured to receive user authentication data, as well as other data, such as system messages, and the like, and modulate that data to a particular channel frequency. As one skilled in the art will appreciate, because the communication system of the present invention probably will have a large number of users, a large amount of user authentication data will be transmitted to the service modules 40. Therefore, in one embodiment, it is preferable to send the information through the system on one or more separate channel carrier frequencies, rather than appending the channel authentication information to the individual video channels. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may

Asserted Claims	Basawapatna
	include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG.

Asserted Claims	Basawapatna
	2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are

Asserted Claims	Basawapatna
	communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44.

Asserted Claims	Basawapatna
	Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:17–37: As one skilled in the art will appreciate, the video or television signal received by service module 40 from headend system 11 may be scrambled or encrypted in accordance with one or more scrambling techniques. For example, encryption, synchronization suppression, spectral inversion, jamming, non-standard frequency modulation, or a combination thereof may be used. In addition, some of the channels modulated in the signal may be analog and others digital. Thus, user circuits 42 preferably are configured to decode or decrypt the signal and handle both analog and digital channels at the same time. For example user circuits 42 may have analog receiver decoders 54 to handle the analog portion of the signal and a digital receiver decoder (or transcoder) to handle the digital portion of the signal. Preferably processor 58 includes the descrambling or decoding intelligence and instructs receiver decoder 54 (and the digital transcoder) as to how to handle the decoding in

Asserted Claims	Basawapatna
	accordance with the proper decoding scheme. Also, if this signal from service module 40 to CIB 14 is to be scrambled, processor 58 will dictate the scrambling technique and control the scrambling process. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art

Asserted Claims	Basawapatna
	will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels.

Asserted Claims	Basawapatna
	Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal

Asserted Claims	Basawapatna
	transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59:

Asserted Claims	Basawapatna
	As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will

Asserted Claims	Basawapatna
	modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video

Asserted Claims	Basawapatna
	channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies.

Asserted Claims	Basawapatna
	From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58: Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer

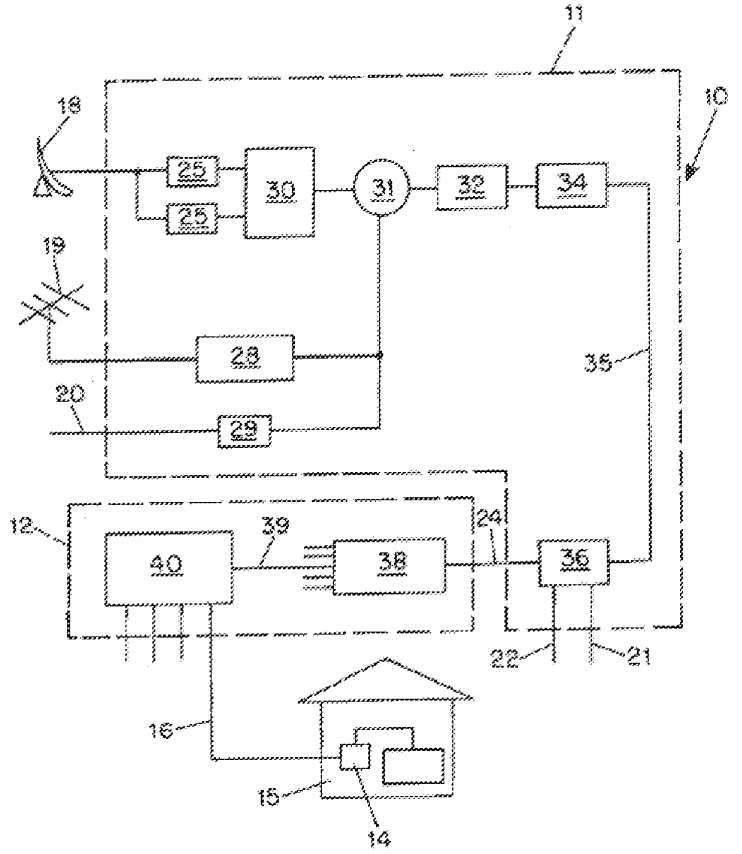
Asserted Claims	Basawapatna
	communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Basawapatna discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. *See, e.g.*: Basawapatna at 6:1–10: At node 38 the signal typically is converted from fiber-optic to coaxial form (i.e., optical to RF) using an opto-electronic (O/E) converter circuit and then transmitted to service

Asserted Claims	Basawapatna
	modules 40. As one skilled in the art will appreciate, as the signals pass to service modules 40, the signals may pass through a number of signal splitters or couplers and amplifiers. Since the signal between nodes 38 and service modules 40 have both forward and return paths, the splitters and amplifiers preferably are configured to handle the dual path. Basawapatna at 7:47–66: In accordance with an alternative embodiment of the present invention, a cheaper CIB 14 having less intelligence could be used. For example, as illustrated in FIG. 3, CIB 14 may be configured with an interface MUX 58 and a remote receiver 68 for receiving signals from a remote control device. Interface MUX 58 is configured to receive the voice, data and video signals from service module 40 via connection 16 and split and forward the respective signals to the proper locations. For example, the voice and data signals are passed to communication modem/multiplexer 66, and the video signals are passed to a television set for viewing. As with CIB 14 illustrated in FIG. 2 and discussed above, communication mix or modem 66 preferably converts the signal to the appropriate analog or digital form, and then passes the voice signals to telephone 62 and the data signals to computer 64. Also, interface MUX 58 may include a decryption or descrambling circuit for decrypting or descrambling the signal from service module 40 if the signal was first encrypted or scrambled prior to transmission to CIB 14. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal

Asserted Claims	Basawapatna
	power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 9:33–53: Individual user segments or circuits 42 of service module 40 preferably communicate with the individual CIBs 14 of each user. Each such user circuit 42 preferably comprise a service interface multiplexer (MUX) 45, an output interface multiplexer (MUX) 46, a communication service module 49, a receiver decoder 54, and a modulator 59. In addition, if the signal from service module 40 to CIB 14 is scrambled or encrypted, each user circuit 42 also will include a scrambling or encryption circuit. The scrambling or encryption circuit may be a separate circuit or device within user circuit 42, or the scrambling or encryption circuit may be configured as part of one of the other components, such as receiver decoder 54, modulator 59, output interface MUX 42, processor 58, or the like. Service interface MUX 45 of service module 40 preferably is configured to receive a communication signal from node 38 via splitter 41 and splitter connection 44. Service interface MUX 45 in turn sends the signal to output interface MUX 46 either through communication service module 49, which handles telephone and computer traffic for the user, or through receiver decoder 54, which handles the video signals. Basawapatna at 20:25–45: Referring now to FIG. 7, yet another embodiment of the present invention is shown. In accordance with this particular embodiment of the present invention, a service module 152 is configured to provide telecommunication services to users wired together serially in a loop-through system. For example, in many older apartment buildings, a single cable passes serially from one apartment to the next, and so on. Typically, a loop circuit will connect apartments on the same floor, although it does not have to be configured that way. In accordance with these loop-through systems, each apartment typically comprises a

Asserted Claims	Basawapatna
	coupler that splits off the signal so that one or more televisions in that apartment can be connected to the loop-through system. Buildings with loop-through wiring traditionally have been very difficult to upgrade to provide premium channels, pay-per-view channels, or even additional cable channels. In addition, it is extremely difficult to provide two-way communications, such as telephone and computer services over the cable with the traditional loop-through systems. However, service module 152 is adapted to provide such services to users connected to loop through systems. Basawapatna at 20:46–55: In accordance with this particular embodiment of the present invention, service module 152 preferably comprises a splitter 154, a plurality of user control circuits (UCCs) 156, a summing circuit 158, a multiplexer (MUX) 160, and a control processor 162. As with service module 40 illustrated in FIG. 4, splitter 154 is configured to receive signals from and transmit signals to a headend system providing video, telephone, and/or computer services. In addition, splitter 154 amplifies and distributes signals to individual UCCs 156 in service module 152 through splitter connections 155. Basawapatna at 21:49–55: Referring now to FIG. 8, a more detailed diagram of a coupler box 166 and a CIB 172 are illustrated. In particular, coupler box 166 includes a splitter or coupler 168 and a band pass filter (BPF) 170. CIB 172 includes an interface multiplexer 174, a descrambler 176, a communication multiplexer 178, an authorization module 180, and a remote receiver 182. Basawapatna at 21:56–60: In the embodiment illustrated in FIG. 8, the splitter or coupler 168 and BPF 170 are configured separate from CIB 172. However, in accordance with an alternative embodiment of the present invention, splitter or coupler 168 and BPF 170 may be configured within CIB 172.

Asserted Claims	Basawapatna
	Basawapatna at 23:14–24: While not discussed in detail herein, service module 152 and, in particular, UCCs 156 will handle the telephone and computer services in a manner similar to service modules 40 as discussed above. Also, while this embodiment of the present invention is described herein with reference to apartments with loop-through configurations, one skilled in the art will appreciate that the present invention can be used with other loop-through set-ups. For example, rural cable systems in which individual farm houses are connected to a single cable with couplers or splitters also can utilize the present invention. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Basawapatna discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. *See, e.g.*: Basawapatna at 1:65–2:11: According to the invention, a telecommunication system for providing telecommunication services to a plurality of users comprises a signal collection and transmission system (also referred to as a headend system) for collecting and transmitting telecommunication signals, at least one signal distribution system operatively connected to the signal collection and transmission system that receives the telecommunication signals from the signal collection and transmission system and transmits or distributes the telecommunication signals, via service modules according to the invention, to a plurality of users, which communicate with customer interface boxes ("CIB") which both receive signals as well as send requests for telecommunication services to the signal distribution system. Basawapatna at 2:12–17: The signal distribution system preferably comprises one or more nodes, each having one or more communication lines for connecting to service modules. The service modules preferably connect-to the CIB configured to control and authorize telecommunication service requests from the customer communication devices. Basawapatna at 2:58–3:14:

Asserted Claims	Basawapatna
	The present invention is embodied in a telecommunications system 10, as shown in FIG. 1, formed by a signal collection and transmission system or circuit 11, sometimes referred to as a headend system, and a signal distribution system or circuit 12, both of which preferably are located at a secured site or sites. A customer interface box ("CIB") 14, located at a user or subscriber site 15, is operatively connected to the signal distribution system 12 by a suitable connection cable 16, such as a coaxial cable, fiber-optic cable, twisted-pair cable, or other suitable wide bandwidth connection means. In accordance with one embodiment of the present invention, the user site may be a home, office, business, or the like. Such a site typically is not a secure site, so signals received from the telecommunication system headend may be susceptible to theft or misappropriation. By utilizing the unique signal distribution system embodying the present invention located at a secured site, the signals to and from the user site are limited to those specifically requested by the user, and thus, a substantial improvement in the security of the system is achieved. In addition, as discussed in more detail below, the signal channel from the secured site to the end user site also may be scrambled for additional security. Basawapatna at 5:3–19: A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information.

Asserted Claims	Basawapatna
	Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 7:23–31:

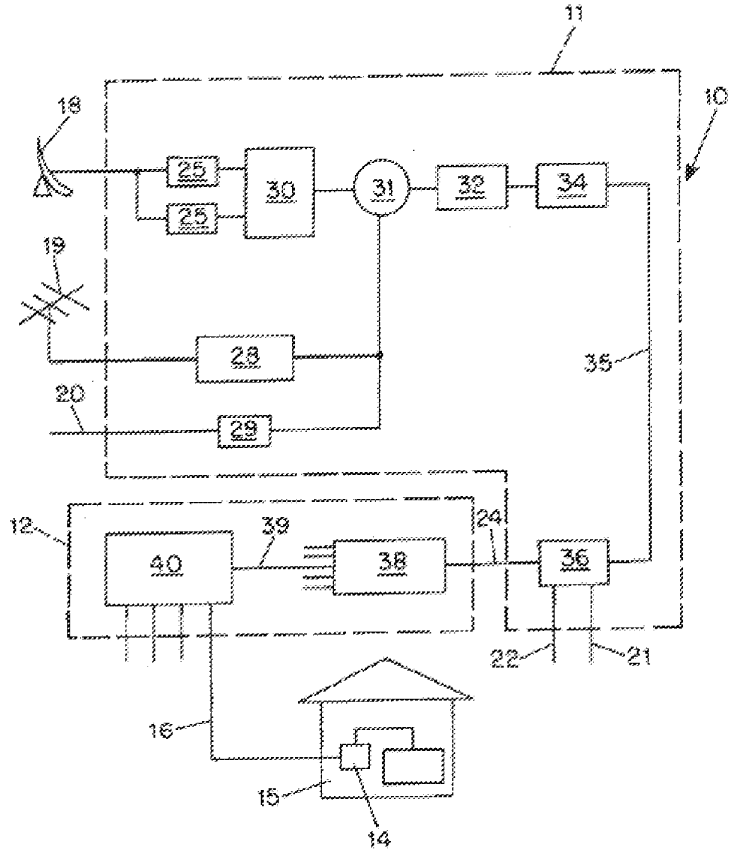
Asserted Claims	Basawapatna
	As illustrated in FIG. 2, CIB 14 further comprises receiver 68 for receiving user request signals. For example, receiver 68 may be configured to receive user request and message information from a remote control device, such as a laser diode, infrared, or RF remote control device, or receiver 68 may have a cable connection to a signal source (not shown). Thus, CIB 14, is addressable by means of a conventional hand-held remote control unit or other similar control device. Basawapatna at 7:32–46: The operation of CIB 14 in this particular embodiment is controlled by an internal processor 70. For example, in accordance with a preferred embodiment of the, present invention, processor 70 facilitates the transfer of the television or video signal from interface MUX 58 to television 60. In addition, processor 70 preferably interfaces with modem 66, dictating to the modem how it should handle voice and computer data information. Finally, processor 70 preferably coordinates sending user request and message information received by receiver 68 back to service module 40 (via modem 66), and facilitates the display of channel and system message information on display 71. System message information may include billing information, as well as authorization or system messages from the headend or service provider via service module 40. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As

Asserted Claims	Basawapatna
	discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver

Asserted Claims	Basawapatna
	decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 15:28–43: In accordance with yet another embodiment of the present invention, instead of each television set in the home having a separate CIB 14, a single CIB 14 may be configured to receive multiple signals; preferably, one signal for each TV set in the home. In accordance with this particular embodiment, since interface MUX 58 in CIB 14 typically is configured to receive all requested channels for each TV set in the home from 30 service module 40, there is no need for additional CIB's other than to process separate channel requests for the separate TV sets. In this manner, it is possible for CIB 14 to be configured to receive RF or other transmissions from multiple remote control devices, allowing remote control devices associated with each individual TV to control the channel input for the TV the remote is associated with, without the need for additional CIBs in the home. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16

Asserted Claims	Basawapatna
	between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 15:60–16:5: In accordance with another embodiment of the present invention, instead of CIB 14 communicating with service module 40 via the return path of communication connection 16, CIB 14 may communicate with service module 40 via a separate communication connection. For example, service requests, data, and telephony signals from CIB 14 to service module 40 may occur over a standard telephone line, or via another communication connection like PCS, cellular, local multi-point distribution system (LMDS), or the like. Also, service module 40 may communicate with headend system 11 in a similar manner. Therefore the present invention is not limited to using the return path of standard coaxial cable or fiber optic connections. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40 preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54

Asserted Claims	Basawapatna
	select the requested channel, decrypt or descramble it, convert it to baseband or a low frequency channel, and then send the channel to output interface MUX 80 for transmission to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at Fig. 1:

Asserted Claims	Basawapatna
	 FIG. 1 To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Basawapatna discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Basawapatna discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Basawapatna at 21:28–48: To extract the proper channel for each apartment, coupler 168 CIB 172 preferably includes a band pass filter (BPF) which allows only that particular apartment's channel(s) to be made available to the TV set(s) in that apartment. For example, for apartment 1, coupler 168 or CIB 172 includes a BPF which allows only channel 2 to be viewed by the users in apartment 1 an no other channels. Similarly, in apartment "N", coupler 168 or CIB 172 includes a BPF which allows channel "M" to be viewed by the users in apartment "N". In this manner, service module 152 can provide the premium and pay-per-view channels to the users which pay for those services. As one skilled in the art will appreciate, if the BPF

Asserted Claims	Basawapatna
	is configured with coupler 168, only a single channel will pass to CIB 172. However, if the BPF is configured in CIB 172, all channels 2-M will pass to CIB 172 in each apartment, and the proper channel for a particular apartment will be extracted by CIB 172. In accordance with a preferred embodiment of the present invention, to prevent users in apartments from stealing signals directed to the other apartments, coupler 168 and the BPF preferably are configured together, and apart from CIB 172 (see FIG. 8). Basawapatna at 21:49–55: Referring now to FIG. 8, a more detailed diagram of a coupler box 166 and a CIB 172 are illustrated. In particular, coupler box 166 includes a splitter or coupler 168 and a band pass filter (BPF) 170. CIB 172 includes an interface multiplexer 174, a descrambler 176, a communication multiplexer 178, an authorization module 180, and a remote receiver 182. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Basawapatna discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 3:43–61: In accordance with an embodiment of the present invention, signal collection or headend system 11 provides an output signal through a communication connection 24 to signal

Asserted Claims	Basawapatna
	distribution system or circuit 12. Communication connection 24 may comprises any suitable high-speed or wide bandwidth connection, but in accordance with one embodiment of the present invention, communication connection 24 comprises a coaxial cable connection or a fiber-optic cable connection. The output signal from signal collection or headend system 11, which is sent through connection 24 to signal distribution system 12, preferably comprises a combination of video and/or television signals for a plurality of channels, as well as telephone, computer data, and system information signals, which signal collection or headend system 11 generates or receives from its various sources. The signal(s) which pass between signal collection or headend system 11 and signal distribution system. 12 may be analog, digital, or a combination of both analog and digital. Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:17–36: As mentioned briefly above, satellite antennas 18 also may receive digitally compressed signals from the satellites. In accordance with this aspect of the invention, the signals may

Asserted Claims	Basawapatna
	be handled in two different ways, one way for an analog only cable system, and one way for a digital or analog and digital cable system. If the cable system is purely an analog system, or if the cable operator decides to distribute particular digital channels on an analog channel line-up, then the digitally compressed signals are processed in the same manner as discussed above with respect to the analog signals, except that a digital IRD 25 will be used in place of an analog IRD. However, if the cable system has digital capabilities, and the cable system operator wishes to distribute the digital channels in digital form, then an integrated receiver transcoder ("IRT") is used to change the digital modulation and the error correction protocol from QPSK modulation to QAM modulation, which is suitable for cable transport. Then, modulator video processor 30 will modulate the digitally modulated RF signal to a desired RF channel position. Basawapatna at 5:55–68: As illustrated in FIG. 1, the output signal from headend system 11, the information of which can be in analog form, digital form, or a combination of both, is transmitted through communication connection 24 to signal distribution system 12, which preferably comprises one or more cable nodes 38 and a plurality of service modules 40. Nodes 38 typically are fiber-optic or coaxial cable systems, or combinations thereof, and are constructed to meet the bandwidth requirements of the system. In conventional cable systems, such nodes each typically serve about 50 to 500 customers, and more preferably about 100 customers. In accordance with the present invention, each node 38 typically serves about 10 to about 40 service modules, and each service module in turn serves between about 10 and about 40 user sites. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5

Asserted Claims	Basawapatna
	across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13:

Asserted Claims	Basawapatna
	The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:67–10:4: As mentioned above, the signal from headend system 11 may be analog, digital, or a combination of both. Regardless of its form, if the telephony and/or computer data is modulated onto an analog channel and communication service module 49 preferably passes the signal to CIB 14 if the user is authorized to receive the service. Basawapatna at 19:40–58: Summing circuit 118 may combine the local broadcast signals and the cable signals with signals received from satellite antenna 102 and passes the signals to power divider 108. In this manner, system 100 can provide satellite channels, local broadcast channels and

Asserted Claims	Basawapatna
	channels from a cable company to the users, a solution which most satellite service providers cannot currently provide, even to stand alone homes. Also, as one skilled in the art will appreciate, if the local broadcast and cable signals are analog and the satellite signals are digital, the summing circuit 118 will sum the analog signals with the digital signal and pass all the signals to service module 112. Service module 112 then will be configured to process both analog and digital signals. In addition, in accordance with an alternative embodiment of the present invention, instead of combining the analog and digital signals, the analog signals may be passed to service module 112 on one communication connection and the digital signals may be passed to service module 112 on a separate communication connection. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Basawapatna discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 6:46–57: Referring now to FIG. 2, a more detailed illustration of one embodiment of a customer interface box ("CIB") 14 is shown. In particular, CIB 14 comprises an interface multiplexer (MUX) 58, a modem 66, a receiver 68, a processor 70, and a display device 71. In accordance with one embodiment of the present invention, the signal from service module 40 is received at CIB 14 by interface MUX 58 via connection 16. CIB 14, and in

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	particular interface MUX 58, is in turn connected by a connection 59 to one or more television sets 60. In addition, interface MUX 58 is connected to one or more telephone sets 62 and one or more computers 64 by connections 61 and 63, respectively. Basawapatna at 6:58–7:2: Interface MUX 58 preferably filters the video signal(s) from the forward path and sends it to the one or more television sets 60 via connection(s) 59. Similarly, interface MUX 58 filters out the forward path telephone, computer data and system message signals and sends them to modem 66. Finally, interface MUX 58 receives return path information from modem 66, which is modulated on a carrier between 5 and 50 MHz and sends the carrier with the return path data back to service module 40. Modem 66 can be any suitable modem, such as a standard telephone line modem, a xDSL compatible modem, a DOCSIS compliant cable modem, or any other suitable communication modem. Basawapatna at 7:32–46: The operation of CIB 14 in this particular embodiment is controlled by an internal processor 70. For example, in accordance with a preferred embodiment of the, present invention, processor 70 facilitates the transfer of the television or video signal from interface MUX 58 to television 60. In addition, processor 70 preferably interfaces with modem 66, dictating to the modem how it should handle voice and computer data information. Finally, processor 70 preferably coordinates sending user request and message information received by receiver 68 back to service module 40 (via modem 66), and facilitates the display of channel and system message information on display 71. System message information may include billing information, as well as authorization or system messages from the headend or service provider via service module 40. Basawapatna at 7:47–66: In accordance with an alternative embodiment of the present invention, a cheaper CIB 14 having less intelligence could be used. For example, as illustrated in FIG. 3, CIB 14 may

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	be configured with an interface MUX 58 and a remote receiver 68 for receiving signals from a remote control device. Interface MUX 58 is configured to receive the voice, data and video signals from service module 40 via connection 16 and split and forward the respective signals to the proper locations. For example, the voice and data signals are passed to communication modem/multiplexer 66, and the video signals are passed to a television set for viewing. As with CIB 14 illustrated in FIG. 2 and discussed above, communication mix or modem 66 preferably converts the signal to the appropriate analog or digital form, and then passes the voice signals to telephone 62 and the data signals to computer 64. Also, interface MUX 58 may include a decryption or descrambling circuit for decrypting or descrambling the signal from service module 40 if the signal was first encrypted or scrambled prior to transmission to CIB 14. Basawapatna at 9:33–53: Individual user segments or circuits 42 of service module 40 preferably communicate with the individual CIBs 14 of each user. Each such user circuit 42 preferably comprise a service interface multiplexer (MUX) 45, an output interface multiplexer (MUX) 46, a communication service module 49, a receiver decoder 54, and a modulator 59. In addition, if the signal from service module 40 to CIB 14 is scrambled or encrypted, each user circuit 42 also will include a scrambling or encryption circuit. The scrambling or encryption circuit may be a separate circuit or device within user circuit 42, or the scrambling or encryption circuit may be configured as part of one of the other components, such as receiver decoder 54, modulator 59, output interface MUX 42, processor 58, or the like. Service interface MUX 45 of service module 40 preferably is configured to receive a communication signal from node 38 via splitter 41 and splitter connection 44. Service interface MUX 45 in turn sends the signal to output interface MUX 46 either through communication service module 49, which handles telephone and computer traffic for the user, or through receiver decoder 54, which handles the video signals. Basawapatna at 9:54–66:

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	In accordance with this aspect of the present invention, if the signal includes telephony or computer signals, service interface MUX 45 preferably passes the telephony and/or computer components of the signal to communication service module 49 via connection 48. If the user is authorized to receive the telephony and/or computer signal(s), communication service module 49 then passes the signal to output interface MUX 46 via connection 50. Thus, in essence, communication service module 49 acts as a communication switch allowing the telephony and/or computer signals to pass through if the user is authorized for such services. Otherwise, if the user is not authorized, communication service module 49 will prevent the communication. Basawapatna at 10:28–39: Once output interface MUX 46 has received the video, voice and/or computer signals from receiver decoder 54 and communication service module 49, it in turn sends the signal through communication connection 16 to the subscriber or user customer interface box (CIB) 14. In addition, if the subscriber premise or user site has more than one TV that is independently tuned (i.e., has its own CIB), service module 40 preferably will have one receiver decoder 54 per TV set. Each receiver decoder 54 will modulate each program requested from each TV to a different channel, say 2, 3, 4 or 5. The channels then will be combined together by the same output interface MUX 46. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel

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	to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 17:26–52: Referring now to FIG. 5, another embodiment of a service module 40 is illustrated. In accordance with this particular embodiment of the present invention, service module 40

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	preferably is configured to only provide video services to the end user. In this manner, service module 40 includes an integrated receiver decoder (IRD) 54 for each end user television connected to service module 40. Service module 40 of this particular embodiment may be configured from a plurality of commercially available IRD's. However, many commercially available IRD's receive commands from infrared remote control devices. Therefore, in order for processor 58 to communicate with IRD's 54, infrared transmitters 86 preferably are used. Processor 58 sends commands to infrared transmitters 86 via communication connection 88, and transmitters 86 communicate the commands to IRD's 54 using an infrared transmission. When IRD's 54 receive the command from processor 58 to select and transmit a particular video channel, IRD's 54 select the requested channel, decrypt or descramble it, convert it to baseband or a low frequency channel, and then send the channel to output interface MUX 80 for transmission to the associated CIB 14. Service module 40 may comprise a single output interface MUX 80 for all IRD's 54 as illustrated in FIG. 5, or each IRD 54 may have its own output interface MUX 80 associated with it. This allows the use of commercially available IRDs to accomplish the same goal of using existing wiring. Basawapatna at 19:40--58: Summing circuit 118 may combine the local broadcast signals and the cable signals with signals received from satellite antenna 102 and passes the signals to power divider 108. In this manner, system 100 can provide satellite channels, local broadcast channels and channels from a cable company to the users, a solution which most satellite service providers cannot currently provide, even to stand alone homes. Also, as one skilled in the art will appreciate, if the local broadcast and cable signals are analog and the satellite signals are digital, the summing circuit 118 will sum the analog signals with the digital signal and pass all the signals to service module 112. Service module 112 then will be configured to process both analog and digital signals. In addition, in accordance with an alternative embodiment of the present invention, instead of combining the analog and digital signals, the analog signals may be passed to service module 112 on one

Asserted Claims	Basawapatna
	communication connection and the digital signals may be passed to service module 112 on a separate communication connection. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Basawapatna discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be

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	configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:3–19: A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each

Asserted Claims	Basawapatna
	channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 5:20–32: Data path modulator 34 preferably is a commercial piece of hardware typically configured to receive user authentication data, as well as other data, such as system messages, and the like, and modulate that data to a particular channel frequency. As one skilled in the art will appreciate, because the communication system of the present invention probably will have a large number of users, a large amount of user authentication data will be transmitted to the service modules 40. Therefore, in one embodiment, it is preferable to send the information through the system on one or more separate channel carrier frequencies, rather than appending the channel authentication information to the individual video channels. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24

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	and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational

Asserted Claims	Basawapatna
	level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In

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	addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52.

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	Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:17–37: As one skilled in the art will appreciate, the video or television signal received by service module 40 from headend system 11 may be scrambled or encrypted in accordance with one or more scrambling techniques. For example, encryption, synchronization suppression, spectral inversion, jamming, non-standard frequency modulation, or a combination thereof may be used. In addition, some of the channels modulated in the signal may be analog and others digital. Thus, user circuits 42 preferably are configured to decode or decrypt the signal and handle both analog and digital channels at the same time. For example user circuits 42 may have analog receiver decoders 54 to handle the analog portion of the signal and a digital receiver decoder (or transcoder) to handle the digital portion of the signal. Preferably processor 58 includes the descrambling or decoding intelligence and instructs receiver decoder 54 (and the digital transcoder) as to how to handle the decoding in accordance with the proper decoding scheme. Also, if this signal from service module 40 to CIB 14 is to be scrambled, processor 58 will dictate the scrambling technique and control the scrambling process.

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	Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to

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	baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the

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	audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left

Asserted Claims	Basawapatna
	stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return

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	path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66:

Asserted Claims	Basawapatna
	When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23:

Asserted Claims	Basawapatna
	In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118.

Asserted Claims	Basawapatna
	Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58: Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines

Asserted Claims	Basawapatna
	whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Basawapatna discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter

Asserted Claims	Basawapatna
	(LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured

Asserted Claims	Basawapatna
	after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:3–19: A video output signal from combiner circuit 31 then is transmitted to an access control system 32 and data path modulator 34. In accordance with a preferred embodiment of the present invention, access control system 32 keeps track of the user authorization for each channel. For example if a user purchases rights to receive certain cable channels, such as HBO, Showtime, pay-per-view channels, or the like, access control system 32 will keep track of the authorization of users to receive these channels. The authorization information for each user then typically is sent to the service modules 40 in a separate channel bandwidth frequency range. As discussed in more detail below, the authorization information then is used by the service modules to determine whether to send a requested channel to a particular user, or not. As one skilled in the art will appreciate, access control system 32 may comprise a suitable computer database and system for maintaining user authentication information. Basawapatna at 5:20–32: Data path modulator 34 preferably is a commercial piece of hardware typically configured to receive user authentication data, as well as other data, such as system messages, and the like, and modulate that data to a particular channel frequency. As one skilled in the art will appreciate, because the communication system of the present invention probably will have a large number of users, a large amount of user authentication data will be transmitted to the service modules 40. Therefore, in one embodiment, it is preferable to send the information through the system on one or more separate channel carrier frequencies, rather than appending the channel authentication information to the individual video channels. Basawapatna at 5:33–54:

Asserted Claims	Basawapatna
	After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information.

Asserted Claims	Basawapatna
	Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used.

Asserted Claims	Basawapatna
	Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through

Asserted Claims	Basawapatna
	a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:17–37: As one skilled in the art will appreciate, the video or television signal received by service module 40 from headend system 11 may be scrambled or encrypted in accordance with one or more scrambling techniques. For example, encryption, synchronization suppression, spectral inversion, jamming, non-standard frequency modulation, or a combination thereof may be used. In addition, some of the channels modulated in the signal may be analog and others digital. Thus, user circuits 42 preferably are configured to decode or decrypt the

Asserted Claims	Basawapatna
	signal and handle both analog and digital channels at the same time. For example user circuits 42 may have analog receiver decoders 54 to handle the analog portion of the signal and a digital receiver decoder (or transcoder) to handle the digital portion of the signal. Preferably processor 58 includes the descrambling or decoding intelligence and instructs receiver decoder 54 (and the digital transcoder) as to how to handle the decoding in accordance with the proper decoding scheme. Also, if this signal from service module 40 to CIB 14 is to be scrambled, processor 58 will dictate the scrambling technique and control the scrambling process. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system,

Asserted Claims	Basawapatna
	receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably

Asserted Claims	Basawapatna
	comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band.

Asserted Claims	Basawapatna
	Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set.

Asserted Claims	Basawapatna
	Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e.,

Asserted Claims	Basawapatna
	from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L

Asserted Claims	Basawapatna
	band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are

Asserted Claims	Basawapatna
	resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58:

Asserted Claims	Basawapatna
	Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Basawapatna discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*:

Asserted Claims	Basawapatna
	Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 6:11–30:

Asserted Claims	Basawapatna
	In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type

Asserted Claims	Basawapatna
	of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then

Asserted Claims	Basawapatna
	if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate

Asserted Claims	Basawapatna
	the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 12:50–56: As with the other video channels, if the pay channel request is allowed, processor 58 will direct receiver decoder 54 to select the pay channel from the video signal stream, and modulator 59 will convert the pay channel from its modulated frequency to baseband and then to the appropriate frequency for transmission to the user's CIB 14 (e.g., baseband or channels 2, 3, 4, 5, or the like). Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in

Asserted Claims	Basawapatna
	the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance

Asserted Claims	Basawapatna
	with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Basawapatna
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Basawapatna discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16: Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and

Asserted Claims	Basawapatna
	then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a

Asserted Claims	Basawapatna
	local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5 across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from

Asserted Claims	Basawapatna
	CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable

Asserted Claims	Basawapatna
	connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted. Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or

Asserted Claims	Basawapatna
	compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition, if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15:

Asserted Claims	Basawapatna
	For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels.

Asserted Claims	Basawapatna
	Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8:

Asserted Claims	Basawapatna
	In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59:

Asserted Claims	Basawapatna
	As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote

Asserted Claims	Basawapatna
	Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots,

Asserted Claims	Basawapatna
	each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116,

Asserted Claims	Basawapatna
	which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16: As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58:

Asserted Claims	Basawapatna
	Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Basawapatna discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Basawapatna at 3:62–4:16:

Asserted Claims	Basawapatna
	Still referring to FIG. 1, satellite dish antenna 18 may receive analog or digitally compressed video channels from various satellites. In accordance with one aspect of the present invention, the signals received by satellite antenna 18 preferably are analog. In particular, the analog signals are received from the satellite in a frequency range between about 3.7 and about 4.2 GHz. The analog signal then passes to a low noise block converter (LNB) (not shown) which converts the signal to L-band frequencies (about 950 to about 1450 MHz or higher). Next, the signal passes to one or more analog integrated receiver decoders ("IRDs") 25 which converts each channel residing in the L-band frequency to a baseband frequency. Thus, as one skilled in the art will appreciate, it is preferable to have one IRD for each channel residing in the signal. From IRDs 25, the individual baseband channels are modulated to a channel (i.e., carrier frequency) chosen by the cable system operator by modulator video processor 30. In addition, modulator video processor may be configured to encrypt the signals or otherwise scramble the signals so that only the paying subscribers will be able to descramble or de-encrypt the signals. Basawapatna at 4:37–47: Typically, the off-air signals received by antenna 19 are not scrambled. Thus, in accordance with the present invention, the signals preferably pass to a demodulator/modulator unit 28 which demodulates the received signals to baseband and then remodulates the signal channels to the appropriate cable system channel frequency as selected by the cable operator. In addition, as one skilled in the art will appreciate, if the received off-air signal channel already is at the frequency which will be sent to the user's, then the demodulator/modulator 28 will not demodulate and remodulate the signal, but will merely pass the signal on. Basawapatna at 4:48–60: Finally, signals received via wide bandwidth connection 20, are treated in the same manner as signals received by satellite antennas 18. That is, the signals are decoded and then

Asserted Claims	Basawapatna
	demodulated and remodulated to a desired channel frequency. If wide bandwidth connection 20 also is providing wide bandwidth Internet connectivity, for example, cable system Internet connectivity using Data-Over-Cable Service Interface Specification (DOCSIS) or other standards based connectivity, a Cable Modem Transmission System (CMTS) may be used with modulator 29. That is, modulator 29 also could be configured after a CMTS in a DOCSIS compliant system or other suitable data transmission system for cable connectivity. Basawapatna at 5:33–54: After the data has been modulated to the appropriate frequency, the video and data signal then is sent through a high-speed or wide bandwidth connection 35, such as a fiber-optic or coaxial cable connection, to a signal separator 36. Telephone and computer connections 21 and 22 likewise are fed to signal separator 36. In accordance with one embodiment of the present invention, signal separator 36 preferably produces a forward path signal which may include video, system data, telephone, and computer signals, and sends the forward path signal to distribution systems or circuits 12 through wide bandwidth communication connections 24. In addition, signal separator 36 preferably extracts telephone and/or computer signals from the reverse or return path signal of communication connection 24 and sends the telephone voice and/or computer data signals over telephone connection 21 and computer connection 22, respectively. Telephone connection 21 may be connected to a local exchange carrier or a long distance carrier, whichever is appropriate. Also, computer connection 22 can be any suitable communication connection, such as standard telephone, high speed telephone (e.g., DSL, ISDN) coax cable, fibre optic, or the like. Basawapatna at 6:11–30: In accordance with one embodiment of the present invention, forward path communications (i.e. video and forward path telephone and data) between service modules 40 and customer interface boxes ("CIBs") 14 at the user sites 15 preferably occur either at baseband frequency or at a very low frequency channel, such as channels 2, 3, 4 or 5

Asserted Claims	Basawapatna
	across connection 16. Also, as one skilled in the art will appreciate, data being transmitted to end users may be transmitted on a separate data channel, which typically will be determined by the cable system and the CMTS. Connection 16 may comprise any suitable connection, such as fibre optic, coaxial cable, twisted pair telephone cable, POTS telephone cable, or any other suitable communications connection. Moreover, more than one communication connection 16 may exist between site 15 and service module 40. The signal from service module 40 to CIB 14 preferably is in RF analog forth; however, the signal also may be transmitted in digital form. For example, a digital signal may pass through a coaxial connection to CIB 14, or an xDSL line may be used to transport the digital information. Basawapatna at 6:31–45: The return path or reverse path communication from CIB 14 to service module 40 preferably comprises telephone, computer, and user request data from modem 66 (see FIG. 2) and preferably is modulated onto a carrier frequency between 5 and 50 MHz. In a typical DOCSIS compliant system, the CMTS informs the cable modem connected to a computer of the frequency for return transmission. As discussed in greater detail below, CIBs 14 need little built-in intelligence, but can be upgraded to a higher computational level if desired. In addition, in accordance with alternative embodiments of the present invention, instead of telephone, data and user request information being transmitted from CIB 14 to service module 40 via the return path of connection 16, a separate communication line may be used; for example, a user's existing telephone line. Basawapatna at 7:3–22: In accordance with the illustrated embodiment, information from telephone set 62, computer 64 and receiver 68 preferably pass through modem 66, which converts the computer data, telephone voice and user request information to the proper form (i.e., analog or digital), and modulates the information to the return path frequency (e.g., 5-50 MHz). For example, if the signals passed between service module 40 and CIB 14 are in

Asserted Claims	Basawapatna
	analog form, the digital computer signals from computer 64 preferably should be modulated to the proper return path frequency by modem 66 before they are passed over communication connection 16 to service module 40. Similarly, computer signals received by CIB 14 should be converted to digital form before being passed to computer 64 or processor 70. Also, as one skilled in the art will appreciate, even if the signals between service module 40 and CIB 14 are digital signals, modem 66 may still be needed to modulate the return path information to the proper frequency, and the modem may be need to facilitate the return path communication protocol; for example, if xDSL or another suitable digital communication means is used. Basawapatna at 8:52–9:13: The present invention is based on the premise that all video communications between service modules 40 and CIBs 14 occur over one or more channels of television bandwidth, typically one channel for each TV set having its own CIB 14. The channels are communicated either as a baseband audio and video signal, or as a low frequency channel such as 2, 3, 4, or 5. As a result of only one or a few channels being sent to each user site 15, signal stealing is reduced because only a few channels can be stolen at a time, and the party stealing the signal is limited to watching the channel(s) selected by the valid user. In addition, if the valid user turns off his TV set, there can be no signal stealing as no signal is being transmitted to the CIB. This premise, of course, presupposes that all cable connections and hardware devices between headend system 11 and service modules 40 are secure. Such security can be achieved by providing secure buildings and structures for all headend, node and service module equipment, as well as using sophisticated jamming algorithms and other forms of scrambling and encryption. One skilled in the art will appreciate that the video signal received and processed by service modules 40 may be analog signals, digitally compressed signals, or a combination of both. Therefore, the type of signal (i.e., analog or digital) will dictate the type of scrambling, jamming and/or encryption techniques used. In addition, if additional security is needed, the signal between service module 40 and the user site 15 also can be scrambled, jammed and/or encrypted.

Asserted Claims	Basawapatna
	Basawapatna at 9:14–32: Service module 40 preferably is an addressabile or programmable module, which receives an encrypted, scrambled, jammed, and/or frequency shifted signal having a plurality of channels modulated therein. Service module 40 then converts a user requested video channel from its modulated frequency in the signal to baseband and then perhaps to a low frequency channel and transmits it to the requesting user. Thus, in accordance with a preferred embodiment of the present invention, a significant amount of the intelligence and decision making aspects of the system are provided within service module 40, as shown schematically in FIG. 4. In particular, service module 40 preferably includes a signal power splitter 41 which receive signals from and transmit signals to cable node 38 through a wide bandwidth communication line 39, such as a coaxial cable, fiber-optic cable, or the like. In addition, signal power splitter 41 preferably amplifies and distributes signals to individual user circuits 42 in service module 40, through splitter connections 44. Basawapatna at 10:5–27: The video portion of the signal, which may be analog, analog scrambled, or digitally compressed and encoded preferably is passed to receiver decoder 54 via connection 52. Upon receiving the video signal, receiver decoder 54 descrambles or decrypts the signal and converts the particular video channel requested by a user from its modulated or compressed waveform to baseband frequency. Once the signal is at baseband, receiver decoder 54 can pass the signal to output interface MUX 46 via connection 55 at baseband, or receiver decoder 54 can remodulate the signal to a predetermined low frequency channel, such as channel 2, 3, 4 or 5, and send the signal out at that frequency. As discussed in greater detail below, receiver decoder 54 preferably utilizes modulator 59 to convert the selected channel from its modulated frequency to baseband frequency, and then if appropriate, to the low frequency channel output. Also, if scrambling or encryption is desired, it can be done at this point. The scrambling can be spectral inversion (performed by the local oscillator and/or modulator), synch suppression which makes the signal unwatchable at an unauthorized receiver, or a combination of both techniques. In addition,

Asserted Claims	Basawapatna
	if the signal from service module 40 to CIB 14 is a digital signal, digital encryption techniques may be used. Basawapatna at 11:38–57: For digitally compressed video signals, typically about six (6) to ten (10) channels are compressed together in about 6 MHz of an RF signal. Thus, when digital receiver decoder 54 in user circuit 42 receives the digitally compressed signals it selects the group of digitally compressed signals carrying the requested channel. Receiver decoder 54, preferably using modulator 59, then demodulates the group of channels from its modulated frequency to baseband and decompresses the compressed channels. Then, receiver decoder 54 preferably decrypts the channels if they were encrypted at the headend and selects the one channel that the user requested. Receiver decoder 54 then transmits the clean channel to output interface MUX 46 at baseband, or receiver decoder remodulates the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art will appreciate, the digital receiver decoder preferably is adapted to handle any digital encryption techniques including asynchronous encryption or synchronous encryption like DES. Basawapatna at 11:58–12:15: For analog video signals, typically one channel is modulated into about a 6 MHz band of an RF signal. Thus, when an analog receiver decoder 54 in user circuit 42 receives the analog signal it converts it from its modulated frequency to baseband, preferably using modulator 59. Then, if baseband scrambling or jamming was used at the headend system, receiver decoder 54 preferably descrambles the channel and transmits the clean channel to output interface MUX 46 at baseband: Alternatively, receiver decoder 54 can remodulate the signal to a low frequency channel, such as 2, 3, 4, or 5, as desired, preferably using modulator 59, and then transmit the low frequency channel to output interface MUX 46. Output interface MUX 46 then transmits the signal on to CIB 14. As one skilled in the art

Asserted Claims	Basawapatna
	will appreciate, the analog receiver decoder preferably is adapted to handle any type of scrambling technique used at the headend system, including RF or baseboard scrambling or jamming. As one skilled in the art will appreciate, if RF scrambling or jamming was used, receiver decoder 54 will descramble the signal prior to converting the channel to baseband or the low frequency channel (2, 3, 4, etc.) Also, instead of converting the desired channel to baseband before converting it to the low frequency channel, modulator 59 can be configured to convert the channel directly from its undulated frequency to the low frequency channel without first converting it to baseband. Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. Basawapatna at 14:25–47: In accordance with one embodiment of the present invention, the video portion of the signal transmitted from service module 40 to CIB 14 is in composite video form, and the audio portion of the signal is a single audio channel signal, both modulated together in the same RF frequency band. However, in accordance with another embodiment of the present invention, service module 40, and in particular user circuit 42 may be adapted to transmit S-Video (also called Y/C Video) signals and/or 2-channel stereo or 6-channel surround

Asserted Claims	Basawapatna
	sound signals to CIB 14. In accordance with this particular aspect of the present invention, service module 40 may include circuitry to convert the composite video signal into an S-Video (Y/C Video) signal. For example, a suitable comb filter may be used to extract the Y and C components from the composite video signal. However, since an S-Video signal comprises two separate video signal components instead of a single composite signal, the two signals (Y and C components) should not be modulated to a single modulation frequency. Thus, in accordance with a preferred embodiment of the present invention, each of the Y and C video signal components can be modulated to separate modulation frequency bands and transmitted to CIB 14 as separate channels. Basawapatna at 14:48–57: In a similar manner, to forward the audio portion of the video signal in stereo mode (2-channels) or surround sound mode (6-channels), service module 40 preferably includes a stereo or surround sound generating circuit which creates the 2 audio channels for stereo or the 6 audio channels for surround sound. As with the S-Video signal, it is preferable to transmit the multiple audio channels to CIB 14 at separate modulated frequency bands. In this manner, the stereo or surround sound audio separation is not lost by combining the separate channels into the same modulation band. Basawapatna at 14:58–15:8: In accordance with this particular embodiment of the present invention, CIB 14 preferably includes a demodulator for each video and/or audio component of the video signal transmitted in a separate frequency band. For example, if the video signal from service module 40 is transmitted as an S-Video signal and a 2-channel stereo audio signal, the video signal is modulated into 4 separate frequency bands; one for the Y video component, one for the C video component, one for the right stereo audio channel, and one for the left stereo audio channel. In this manner, CIB 14 includes at least 4 demodulators for demodulating each component part. After each component part is demodulated to baseband, CIB 14 transmits the signal to a television set and/or a home theater system using suitable connections. For example, the S-Video signal preferably is transmitted to the

Asserted Claims	Basawapatna
	TV set using an S-Video cable, and the stereo channels are transmitted to the TV set or stereo system using suitable audio connections, such as cables with RCA connectors or the like. Basawapatna at 15:9–27: In accordance with another embodiment of the present invention, if a user site has more than one television, that user site may have more than one CIB 14; one for each television set. Since the user site typically will only have one communication connection to a service module 40, in order for each television set to display a different video signal than the other television sets at the user site, multiple video channels should be transmitted to the user site. Preferably one channel for each television set and associated CIB 14 is transmitted to the user site via communication connection 16. Thus, to accommodate such a configuration, each such CIB 14 associated with each television set preferably is tuned to a different channel, for example 2, 3, 4, 5, etc., and the forward path signal to the user site will include a multiple channel signal, one channel for each device. If the signals from service module 40 are in S-Video and/or stereo audio form, each television set in the home preferably will receive a plurality of frequency bands, one for each component of the video signal for that television set. Basawapatna at 15:44–59: As mentioned above, CIB 14 preferably communicates service request information, and computer and telephony information, if appropriate, to service module 40 via the return path of connection 16. For example, the typical return path of a standard coaxial cable communication connection is the frequency range between about 4 MHz and about 40 MHz. However, in accordance with an alternative embodiment of the invention, the return path can be configured at higher frequency ranges, such as one of the channel frequency ranges between about 50 MHz and about 500 MHz. If communication connection 16 between service module 40 and CIB 14 comprises an xDSL connection, the video and audio signals may be sent from service module 40 to CIB 14 at baseband. In accordance

Asserted Claims	Basawapatna
	with this particular embodiment of the invention, the return path from CIB 14 to service module 40 then is between about DC and about 128 KHz. Basawapatna at 16:31–36: As mentioned above, computer and telephony information may be carried in the forward path from service module 40 to CIB 14 in a high frequency dedicated channel (i.e. >50 MHz), in the 4-40 MHz band, or the information can be encoded in the vertical blanking interval (VBI) of one or more video channels. Basawapatna at 16:37–54: In accordance one embodiment of the present invention, the forward path data is transmitted from the headend to service module 49 and then on to CIB 14 using a data-over-cable service interface specification (DOCSIS) system or other suitable data-over-cable system. In accordance with this aspect of the present invention, the headend has a cable modem termination system (CMTS), which includes a modulator and demodulator for modulating the forward path data (i.e., from the headend to the end user CIB via a service module) to a particular frequency and for demodulating the return path data (i.e., from a user's computer via a CIB a service module). The CMTS also provides an interface between the cable system and the Internet backbone, either locally, or by reaching a remote Internet backbone point of presence via a wide area network. The CMTS typically will modulate the data to a frequency above 50 MHz and then tell the cable modem which frequency to use for the return path (typically between 4 and 40 MHz). Basawapatna at 16:55–16:66: When the data reaches service module 40, communication service module 49 will pass the data signal to each CIB 14 connected to service module 40. The DOCSIS compliant cable modem in CIB 14 or connected to CIB 14 then will extract the portion of the data signal intended for that particular user. As one skilled in the art will appreciate, each CIB and

Asserted Claims	Basawapatna
	cable modem connected to service module 40 will receive the entire data signal (i.e., data for all users connected to the service module), not just that particular end user's data. In accordance with this aspect of the present invention, the cable modem is configured to extract the data for its particular end user from the composite data signal. Basawapatna at 17:1–6: For the return path, the cable modem will modulate the return data to a frequency determined by the CMTS (typically below 40 MHz). The return path data will pass from CIB 14 to service module 40. At service module 40, communication service module 40 will pass the return path data to the CMTS at the headend. Basawapatna at 18:23–39: In accordance with one embodiment of the present invention, master antenna 102 is configured to receive a variety of television programming channels from a direct broadcast satellite (DBS) video service provider. The video channels may comprise a variety of cable channels, as well as pay-per-view and video on demand services. Preferably, the video signal received by antenna 102 is a 500 MHz bandwidth or a 1000 MHz bandwidth signal in the Ku frequency band. LNB converter 104 receives the signal and converts it to the L band frequency range, approximately 950 to 1450 MHz and 1450 to 2050 MHz. This 500-1000 MHz bandwidth signal may be divided into about 20 to about 40 transponder slots, each of which may carry an analog video channel or about 1-20 digitally compressed video channels. Each transponder slot comprises a frequency band of between about 25 MHz to about 50 MHz, and more preferably about 36 MHz. Basawapatna at 18:66–19:23: In accordance with the illustrated embodiment, service modules 112 are similar to the service modules discussed above with reference to FIG. 4. Therefore, service modules 112 may be configured to receive the video signals in analog form, digitally compressed form, or both. If handling digitally compressed signals, which signals from the satellite typically

Asserted Claims	Basawapatna
	are, service modules 112 includes circuitry to decompress digitally compressed video signals. In accordance with this aspect of the invention, service modules 112 preferably comprise about 10 to about 20 integrated receiver decoders or IRD chipsets (interchangeably referred to herein as IRDs) (one for each user television connected to service module 112). The IRDs preferably extract the transponder frequency band from the compressed video signal which includes the requested channel for the particular user and demodulates it to baseband frequency. The IRD then decompress the frequency band into the 10 to 20 individual channels that were digitally compressed into that band. If the signal was sent encrypted, the IRD or the processor then decrypts the signal. Finally, service module 112 extracts the requested video channel and transmits it to the user at baseband, or remodulates the signal to a channel frequency, such as channel 2, 3, 4 or 5. If service module 112 receives analog video signals, it preferably will process these signals in the same manner as service modules 40 in FIG. 4. Basawapatna at 19:24–39: In accordance with another embodiment of the present invention, system 100 further may comprise an antenna 114 for receiving local broadcast television signals, and/or a cable connection (not shown) for receiving channels from a cable company. As one skilled in the art will appreciate, local broadcast channels typically are analog, unencrypted and are resident in the 50-850 MHz bandwidth. In accordance with this aspect of the present invention, the signal from antenna 114 preferably passes to a frequency converter 116, which may or may not convert the received local broadcast signals to different frequencies. From frequency converter 116, the signal passes to a summing circuit 118. Similarly, channels from the cable system may be passed directly to summing circuit 118, or they first may be converted to different frequencies prior to being passed to summing circuit 118. Basawapatna at 20:56–21:16:

Asserted Claims	Basawapatna
	As with the user control circuits 42 of service module 40, user control circuits 156 are configured to communicate with the individual apartments in the loop-through circuit, and comprise a service interface MUX, an integrated receiver decoder, a communication service module, and a modulator. The service interface MUX, the integrated receiver decoder, the communication service module, and the modulator all operate in the same manner as the equivalent components in service module 40 discussed above, except that instead of each IRD in UCC 156 transmitting video channels at base band or at a low frequency channel like 2, 3, 4, or 5, in the loop-through system, the video signal to be sent to the apartment furthest away from service module 152 preferably is modulated onto channel 2, the signal for the next closest apartment preferably is modulated onto channel 3, and so on, with the signal for the nearest apartment to service module 152 being modulated onto the highest channel number. With this particular configuration, if there are "N" number of total apartments on the loop through circuit, preferably there are at least "N" UCCs 156 in service module 152, and the IRD in UCC "N" preferably modulates its requested video signal to the frequency associated with channel M, where M=N+1. Thus, for example, if a loop-through system on a particular apartment building floor services ten (10) apartments, the video signal for the apartment closest to the service module, preferably will be modulated onto channel 11. This particular configuration minimizes the loss to the furthest apartment. Basawapatna at 23:37–58: Referring now to FIG. 9, the method for providing video services will be discussed. In particular, when a customer selects a video channel for viewing (step 202), the customer communication device or set-top box determines that a video service was requested (step 204) and preferably communicates the selected channel and other user information to the service module (step 206). The service module receives the request and the service module's processor then checks the customer authorization (step 208) and determines whether or not the customer is a valid user (step 210). If not, the service module sends an invalid customer message to the customer communication device and refuses service (step 212). If the customer has a valid account, the cable or paid television channel is selected

Asserted Claims	Basawapatna
	and processed accordingly (step 214). If a cable channel is selected, the service module checks to determine whether or not the customer is authorized to receive the selected channel (step 216 and 218). If not, an invalid channel message is sent to the customer (step 220). If the customer is authorized to receive the selected cable channel, the signal is decoded and converted to the proper frequency (step 222). Once converted, the signal is sent to the requesting user (step 224). To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Basawapatna discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Basawapatna at 13:46–14:7: Reverse or return path signals from the service modules to the headend system typically comprise telephone and computer communications from the users, as well as customer service requests, pay-per-view program requests and system management data, such as repair, maintenance, and status information messages from the users or the service modules. In accordance with a preferred embodiment of the present invention, return path signals typically are communicated at frequencies below 40 MHz, and more specifically between about 4 MHz and about 40 MHz. In accordance with this aspect of the invention, service interface MUXs 45 preferably have a 50 MHz high pass filter in the forward path

Asserted Claims	Basawapatna
	and a 50 MHz low pass filter in the return path, thus separating the forward and return paths of the signals. In addition, service interface MUXs 45 may be configured to create or format the return path signal by combining the outgoing telephone and/or computer communications signals, and the system management data into a block of return path data, and ensuring the return path information or data is formatted or modulated to the appropriate return path frequencies. However, while in accordance with the described embodiment of the present invention, service interface MUXs 45 are configured to format the return path to headend system 11, one skilled in the art will appreciate that other modules or components of service module 40 may be configured to format the return path data. For example, processor 58 and/or receiver decoder 54 may be used to combine and format the return path data. Thus, the present invention is not limited to the described embodiment. Basawapatna at 14:8–24: Output interface MUXs 46 essentially are similar to service interface MUXs 45 and preferably comprise similar low pass and high pass filters. As discussed above, when a customer requests a particular video or television channel, processor 58 directs receiver decoder 54 (and modulator 59) to convert the video channel from its modulated frequency to the signal's baseband frequency, decrypt or descramble the signal, and then transmit the signal at baseband or a low channel frequency, preferably channel 2, 3, 4 or 5. Thus the video portion of the forward path signal from service module 40 to the user site preferably comprises only one channel for each customer interface box 14. In addition, the telephone and computer information portions of the forward path signal to CIB 14 may be carried in the vertical blanking interval (VBI) of one or more forward path channels, or the telephone and computer information may be formatted into one or more forward path channels. To the extent Basawapatna does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Basawapatna alone or it would have been obvious to combine Basawapatna with

Exhibit A2 – Basawapatna Invalidity Claim Chart

Asserted Claims	Basawapatna
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Carnero

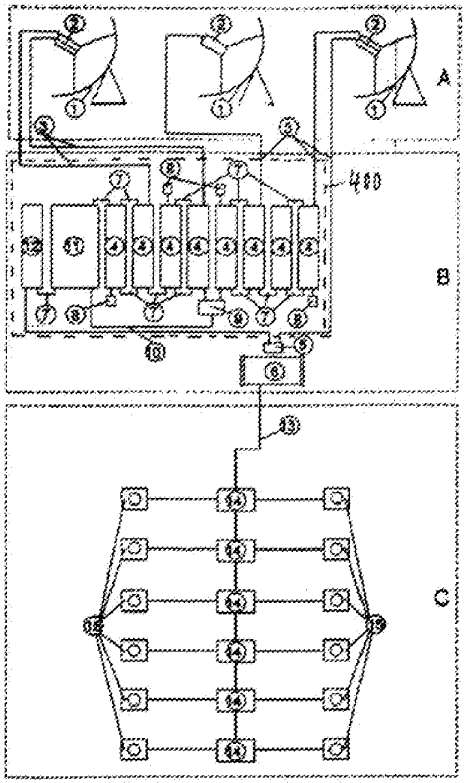
European Patent Application EP 0 740 434 ("Carnero") was published on October 30, 1996. Carnero therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Carnero invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Carnero
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Carnero discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Carnero at Abstract:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Carnero
	(57) The invention relates to a system, in particular, a community antenna system, for distributing television signals of different channels. The system consists of a signal generator (A), a head device (B) with a signal processing unit (400) and a distribution network (C, 13). According to the invention, the signal processing device (400) comprises at least one channel-specific converter (4). Each channel-specific converter (4) converts a pre-definable channel in the intermediate frequency band, into another channel in the intermediate frequency band. Several channel-specific converters (4) are connected in a daisy chain. Channels that are not to be distributed are overlapped by channels that are to be transmitted through amplification of their signal levels. The processed signals originate from different polarities and/or different satellites and are transmitted to user outlets (15) via a single distribution cable (13). Carnero at 3:19-26: The system, according to the invention, can be used, among other things, in cases where a single distribution cable has already been laid or in cases where the laying of a further distribution cable would be costly or impossible, due to the same circumstances. Moreover, the system, according to the invention, in which channels of two polarities or from two or more satellites are transmitted to user outlets via a single distribution cable, does not have any switching devices on the distribution cable. This means that no electrical switching pulses are coupled onto the distribution cable, so that corresponding interference is excluded. Carnero at Page 4:

Asserted Claims	Carnero
	The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network. Blocks A, B and C are designed as follows: 1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz. 2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6; 3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14. Carnero at 9:27-32: As shown in Figure 10, channels 70, 72 are located at circuit point d (parabolic antenna on the left in Figure 9), ... 92 in vertical polarity and channels 71, 93, ... 93 in horizontal polarity. At the switching point e (center parabolic antenna in Figure 9), channels 65 - 69 are available in only one polarity.

Asserted Claims	Carnero
	At the switching point f (parabolic antenna on the right in Figure 9), the channels 49, 51, ...63; 33, 35, ...47; 1, 3, ...31 are in vertical polarity and the channels 50, 52, ...64; 34, 36, ...48; 2, 4 ... 32 in horizontal polarity. Carnero at Fig. 3:  Figure 3

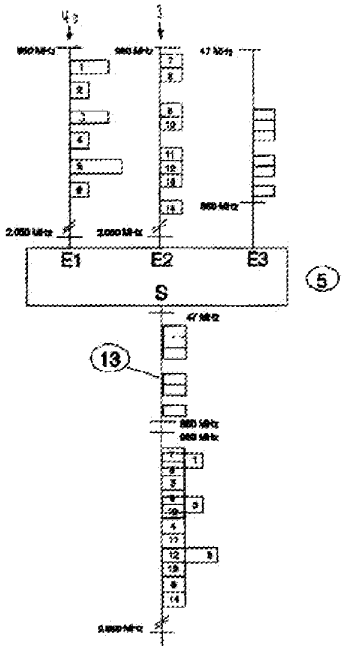
Asserted Claims	Carnero
	To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Carnero discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Carnero at 3:9-17: The system, according to the invention, is characterized by a number of advantages. According to the invention, the user is provided with pre-definable channels, via only one distribution cable, which are individually selected from signals originating from one antenna or from several antennas. Individual selection of channels can be used to meet the demand of system users for the reception of predefined channels. The individual channel converters provided, according to the invention, which convert a pre-definable channel into another channel, as well as the system as a whole, are designed in a simple circuit. The channel-specific converters can be set to any frequency in a pre-definable frequency band. In this way, the system, according to the invention, makes it possible to flexibly meet a changed demand of the system users with regard to the reception of pre-definable channels. Carnero at 3:48-53: The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by

Asserted Claims	Carnero
	which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter. Carnero at 8:16-25: The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a keyboard 161, the control unit 162 and a display 163. The display shows data entered into the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter. Carnero at 8:42-46: Channels 2, 4 and 6, which arrive at input E1, have been frequency-converted in the channel-specific converters 4, in such a way, that no channels of the same frequencies arrive at input E2. Channels 1 and 3 at input E1 are allocated in frequencies between the undesired channels 7 and 8 or 9 and 10, which come in at input E2. The signal or power level of channel 1 is set to a value at least 15 dB above the corresponding level of channels 7 and 8. The signal or power level of channel 3 is set to a value at least 15 dB above the corresponding level of channels 9 and 10 To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Carnero
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Carnero discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Carnero at Page 4: The channel-specific converters 4 of the head device B are preferably integrated in at least one converter module 40, wherein the converter module 40 can be connected at its input, via a cable 3, to a down converter (LNA/LNB) 2, and at its output to the distribution cable 13 (coaxial cable). Preferably, the distribution cable 13 is connected to the output of an amplifier 6, which may be connected downstream of the ("second") mixer 5. Carnero at 7:26-30: In the system, according to the invention, the number of channel-specific converters 4 is equal to the number of channels coupled into the distribution cable 13, and transmitted to the user outlets 15, via the diverters 14. The channel-specific converters can be set to predeterminable input frequencies in the intermediate frequency range, and to predeterminable output frequencies in the intermediate frequency range. Carnero at 8:10-15: As shown in Figure 7, the converters 4 may include a microprocessor 49, that controls the PLL circuits 46 and 54 and determines the input and output frequency of the channel signal of the converters 4. Further, the microprocessor 49 may control the amplifier 56. An input unit 16 can be connected to the microprocessor 49, for example, via a 4-cable bus, through which the data of a pre-definable input and output frequency and/or control data for the amplifier 56 (signal amplification parameters) can be input into the microprocessor 49.

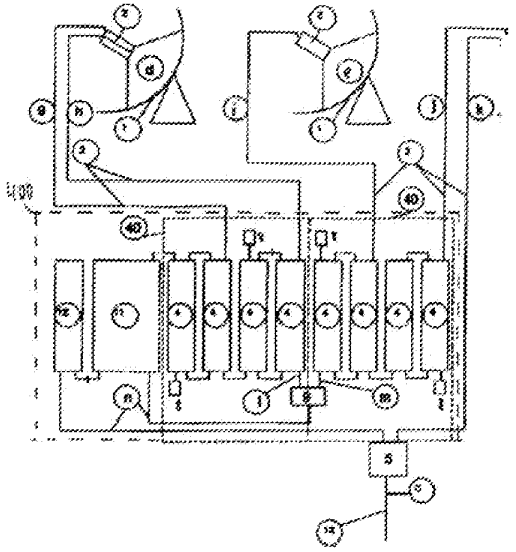
Asserted Claims	Carnero
	Carnero at 8:32-9:20: As shown in Figure 8 as an example, signals from channels 1, 2, 3, 4, 5 and 6 are fed to input E1. These signals originate from a satellite, have a bandwidth of 27 MHz and, as described, have been converted by channel-specific converters into the frequency band between 950 and 2,050 MHz. Input E2 is fed with signals from channels 7, 8, 9, 10, 11, 12, 13 and 14, which originate from a satellite, have a bandwidth of 27 MHz, and have been converted by channel-specific converters in the frequency band between 950 and 2,050 MHz, as described. Input E3 provides 6 terrestrial TV channels with 8 MHz bandwidth, in the frequency band between 47 and 860 MHz. The signals of the channels coming in at input E1 are supplied by the channel-specific converters 4, in which the frequency conversion and the generation of the respective levels are carried out, with regard to the coupling of the signals via the mixer output S into the distribution cable 13. Channels 2, 4 and 6, which arrive at input E1, have been frequency-converted in the channel-specific converters 4, in such a way, that no channels of the same frequencies arrive at input E2. Channels 1 and 3 at input E1 are allocated in frequencies between the undesired channels 7 and 8 or 9 and 10, which come in at input E2. The signal or power level of channel 1 is set to a value at least 15 dB above the corresponding level of channels 7 and 8. The signal or power level of channel 3 is set to a value at least 15 dB above the corresponding level of channels 9 and 10. Channel 5 of input E1 is set to the same frequency as the non-desired channel 12 at input E2, with the signal or power level of channel 5 being at least 20 dB above the corresponding level of channel 12. The level difference (at least 15 dB or at least 20 dB) depends on the frequencies of the overlaying channel and the frequency of the channel(s) to be overlaid: at a different

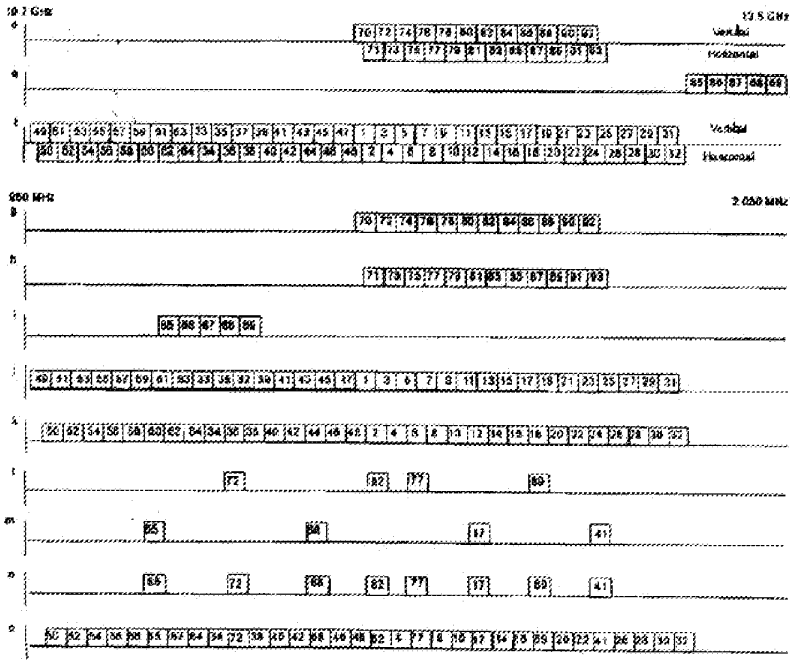
Asserted Claims	Carnero
	frequency (cf. channel 1 overlaying channels 7 and 8) the level difference is at least 15 dB; at the same frequency (cf. channel 5 overlaying channel 12) the level difference is at least 20 dB. The channels at the inputs E1, E2 and E3 of mixer 5, which are configured in this way, with respect to frequency and level, are coupled by the mixer at output S into the distribution cable 13, in the arrangement shown in Figure 8: - in the frequency band between 47 and 860 MHz, the same channels are available at output S, in the same frequency position, and with the same levels as at input E3; - in the frequency band between 950 and 2,050 MHz, channels 7 and 8 of input E2 are overlaid at output S, by channel 1 of input E1. Since channel 1 is set to a signal level, that is at least 15 dB above the levels of channels 7 and 8, only channel 1 is visible to the system user, without channels 7 and 8 causing interference. Likewise, at output S, channels 9 and 10 of input E2 are overlaid by channel 3 of input E1. In addition, channel 5 of input E1 is coupled into distribution cable 13 at output S, in the frequency position of channel 12 of input E2, with channel 5 overlapping channel 12, because the signal level of channel 5 is at least 20 dB above channel 12. In addition, channel 4 (originally at input E1) is coupled into distribution cable 13 between channels 3 (originally at input E1) and 11 (originally at input E2), and channel 6 (originally at input E1) is coupled between channels 13 (originally at input E2) and 14 (originally at input E2). Channels 4 and 6 are thus inserted into free frequency positions at input E2. Therefore, channels in the frequency band from 47 to 860 MHz and channels 1, 2, 3, 4, 11, 5, 13, 6 and 14 in the frequency band from 950 to 2,050 MHz are made available to the system user. Similarly, channels 7, 8, 9, 10 and 12 are transmitted on distribution cable 13. However, these channels are overlaid, so that they are not made available to the system user. With the signal level difference of at least 15 dB provided according to the invention,

Asserted Claims	Carnero
	the overlapping channels can be displayed in good reception quality in the terminals, that can be connected to the user outlets. Carnero at Fig. 8:  Figure 8 Carnero at 9:21-55: Figure 9 shows an example of the system, according to the invention, which is also shown in Figure 3. It is assumed that signals of different TV channels are received and processed, originating from three satellites of different orbital position with horizontal and vertical

Asserted Claims	Carnero
	position. Circuit points d, e, f, g, h, i, j, k, I, m, n, and o are indicated in the system, according to the invention, shown in Figure 9. Figure 10 shows the channels at the circuit points d – o shown in Figure 9. Signals received from each satellite in a frequency band between 10.7 - 12.5 GHz with horizontal and vertical polarity are located at points d, e and f of Figure 9. As shown in Figure 10, channels 70, 72 are located at circuit point d (parabolic antenna on the left in Figure 9), ... 92 in vertical polarity and channels 71, 93, ... 93 in horizontal polarity. At the switching point e (center parabolic antenna in Figure 9), channels 65 - 69 are available in only one polarity. At the switching point f (parabolic antenna on the right in Figure 9), the channels 49, 51, ...63; 33, 35, ...47; 1, 3, ...31 are in vertical polarity and the channels 50, 52, ...64; 34, 36, ...48; 2, 4 ... 32 in horizontal polarity. Each downconverter 2 (Figure 9) selects a polarity and converts the frequency band of 10.9 - 12.5 GHz to the frequency band of 950 - 2,050 MHz, in such a way, that channels belonging to the same satellites and to the same polarity are present in each cable 3 at the circuit points g, h, i, j, k. As shown in Figure 10, channels 70, 72, ...92, are located at circuit point g, channels 71, 73, ...93 are located at circuit point h, channels 65 - 69 are located at circuit point i, channels 49, 51...63, 33...47, 1, 3, ...31 are located at circuit point j, and channels 50, 52 ... 64; 34, 36, ... 48; 2, 4 ... 32 at circuit point k. The desired channels are selected from all available channels at the switching points d - k. For example, channels 60, 36, 44, 2, 6, 12, 18, and 24 available at circuit point k are not processed further, while channels 65, 72, 68, 82, 77, 17, 89, and 41 available at circuit points g, h, i, j, are further processed instead.

Asserted Claims	Carnero
	For this purpose, converter modules 40 are provided at the circuit points g, h, i, j, and the channel-specific converters 4 of the modules 40 are set to the input frequencies of each of the selected channels, and to the output frequencies, to which the channels are to be allocated. These output frequencies are occupied frequencies of unwanted channels to be overlaid or free frequencies. According to the invention, channels are provided at the output of each converter module 40, which have a different frequency position compared to the frequency position at the input of the modules. As can be seen from Figure 10, at circuit point i, channels 72, 82, 77, and 89 occur in a frequency position, that is different from the frequency position of the channels at circuit points g and h. Channels 65, 68, 17 and 41 exist at circuit point m, which originate from circuit points I and j, also in different frequency positions. After the channels have been subjected to a mixing process in mixer 9, all selected channels originating from circuit points g, h, i and j are present at circuit point n, as shown in Figure 10, in frequency positions that differ from the original frequency positions. These channels are introduced via the feed source 11 into the amplifier 12, which amplifies the signal levels of the channels. Then, the channels present at circuit point n are mixed with the channels present at circuit point k in mixer 5. In this mixing process, the channels present at circuit point n are overlaid on the channels of the same frequency, that are present at circuit point k. Carnero at Figs. 9-10:

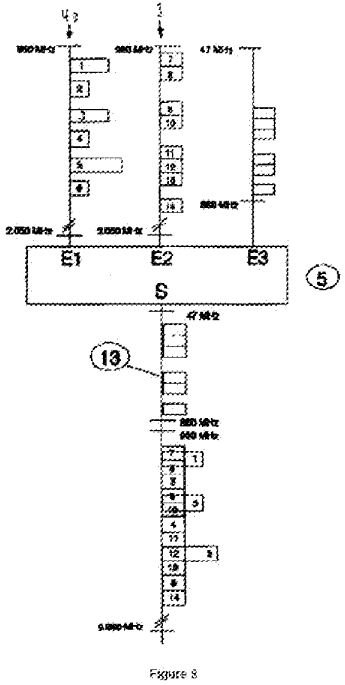
Asserted Claims	Carnero
	 Figure 9

Asserted Claims	Carnero
	 Figure 10 To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Carnero discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal.

Asserted Claims	Carnero
	See, e.g.: Carnero at Page 4: The channel-specific converters 4 of the head device B are preferably integrated in at least one converter module 40, wherein the converter module 40 can be connected at its input, via a cable 3, to a down converter (LNA/LNB) 2, and at its output to the distribution cable 13 (coaxial cable). Preferably, the distribution cable 13 is connected to the output of an amplifier 6, which may be connected downstream of the ("second") mixer 5. Carnero at 7:20-22: As shown in Figure 3, the distribution network C consists of a single distribution cable 13, on which all channels, that are FM modulated, are transmitted. The distribution cable 13 is made up of a coaxial cable and runs to diverters 14, which output the signal to various user outlets 15. Carnero at 7:26-30: In the system, according to the invention, the number of channel-specific converters 4 is equal to the number of channels coupled into the distribution cable 13, and transmitted to the user outlets 15, via the diverters 14. The channel-specific converters can be set to predeterminable input frequencies in the intermediate frequency range, and to predeterminable output frequencies in the intermediate frequency range. Carnero at 8:32-9:20: As shown in Figure 8 as an example, signals from channels 1, 2, 3, 4, 5 and 6 are fed to input E1. These signals originate from a satellite, have a bandwidth of 27 MHz and, as described, have been converted by channel-specific converters into the frequency band between 950 and 2,050 MHz.

Asserted Claims	Carnero
	Input E2 is fed with signals from channels 7, 8, 9, 10, 11, 12, 13 and 14, which originate from a satellite, have a bandwidth of 27 MHz, and have been converted by channel-specific converters in the frequency band between 950 and 2,050 MHz, as described. Input E3 provides 6 terrestrial TV channels with 8 MHz bandwidth, in the frequency band between 47 and 860 MHz. The signals of the channels coming in at input E1 are supplied by the channel-specific converters 4, in which the frequency conversion and the generation of the respective levels are carried out, with regard to the coupling of the signals via the mixer output S into the distribution cable 13. Channels 2, 4 and 6, which arrive at input E1, have been frequency-converted in the channel-specific converters 4, in such a way, that no channels of the same frequencies arrive at input E2. Channels 1 and 3 at input E1 are allocated in frequencies between the undesired channels 7 and 8 or 9 and 10, which come in at input E2. The signal or power level of channel 1 is set to a value at least 15 dB above the corresponding level of channels 7 and 8. The signal or power level of channel 3 is set to a value at least 15 dB above the corresponding level of channels 9 and 10. Channel 5 of input E1 is set to the same frequency as the non-desired channel 12 at input E2, with the signal or power level of channel 5 being at least 20 dB above the corresponding level of channel 12. The level difference (at least 15 dB or at least 20 dB) depends on the frequencies of the overlaying channel and the frequency of the channel(s) to be overlaid: at a different frequency (cf. channel 1 overlaying channels 7 and 8) the level difference is at least 15 dB; at the same frequency (cf. channel 5 overlaying channel 12) the level difference is at least 20 dB.

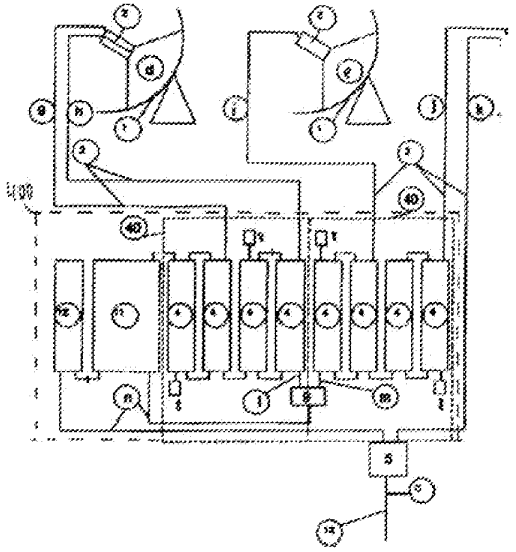
Asserted Claims	Carnero
	The channels at the inputs E1, E2 and E3 of mixer 5, which are configured in this way, with respect to frequency and level, are coupled by the mixer at output S into the distribution cable 13, in the arrangement shown in Figure 8: - in the frequency band between 47 and 860 MHz, the same channels are available at output S, in the same frequency position, and with the same levels as at input E3; - in the frequency band between 950 and 2,050 MHz, channels 7 and 8 of input E2 are overlaid at output S, by channel 1 of input E1. Since channel 1 is set to a signal level, that is at least 15 dB above the levels of channels 7 and 8, only channel 1 is visible to the system user, without channels 7 and 8 causing interference. Likewise, at output S, channels 9 and 10 of input E2 are overlaid by channel 3 of input E1. In addition, channel 5 of input E1 is coupled into distribution cable 13 at output S, in the frequency position of channel 12 of input E2, with channel 5 overlapping channel 12, because the signal level of channel 5 is at least 20 dB above channel 12. In addition, channel 4 (originally at input E1) is coupled into distribution cable 13 between channels 3 (originally at input E1) and 11 (originally at input E2), and channel 6 (originally at input E1) is coupled between channels 13 (originally at input E2) and 14 (originally at input E2). Channels 4 and 6 are thus inserted into free frequency positions at input E2. Therefore, channels in the frequency band from 47 to 860 MHz and channels 1, 2, 3, 4, 11, 5, 13, 6 and 14 in the frequency band from 950 to 2,050 MHz are made available to the system user. Similarly, channels 7, 8, 9, 10 and 12 are transmitted on distribution cable 13. However, these channels are overlaid, so that they are not made available to the system user. With the signal level difference of at least 15 dB provided according to the invention, the overlapping channels can be displayed in good reception quality in the terminals, that can be connected to the user outlets. Carnero at Fig. 8:

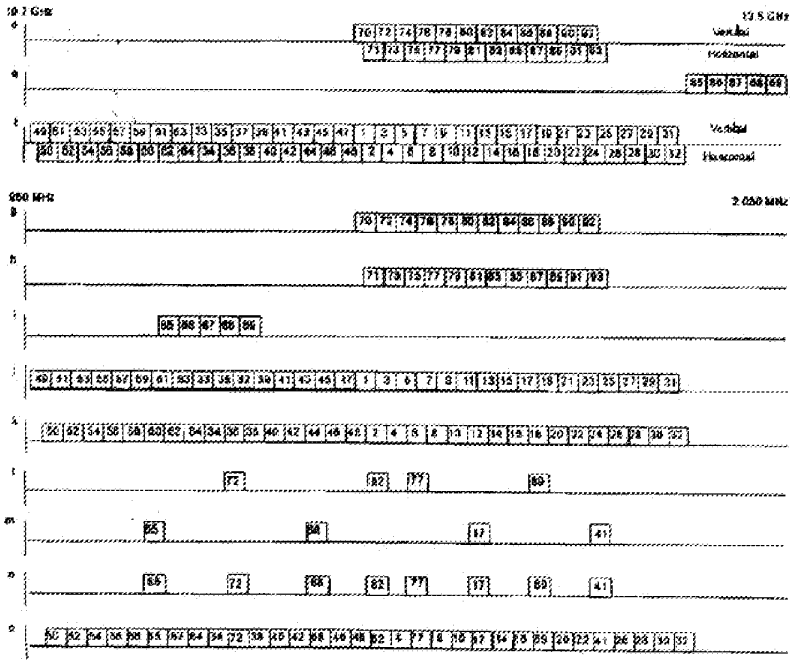
Asserted Claims	Carnero
	 Figure 8 Carnero at 9:21-10:21: Figure 9 shows an example of the system, according to the invention, which is also shown in Figure 3. It is assumed that signals of different TV channels are received and processed, originating from three satellites of different orbital position with horizontal and vertical position. Circuit points d, e, f, g, h, i, j, k, I, m, n, and o are indicated in the system, according to the invention, shown in Figure 9. Figure 10 shows the channels at the circuit points d – o shown in Figure 9.

Asserted Claims	Carnero
	Signals received from each satellite in a frequency band between 10.7 - 12.5 GHz with horizontal and vertical polarity are located at points d, e and f of Figure 9. As shown in Figure 10, channels 70, 72 are located at circuit point d (parabolic antenna on the left in Figure 9), ... 92 in vertical polarity and channels 71, 93, ... 93 in horizontal polarity. At the switching point e (center parabolic antenna in Figure 9), channels 65 - 69 are available in only one polarity. At the switching point f (parabolic antenna on the right in Figure 9), the channels 49, 51, ...63; 33, 35, ...47; 1, 3, ...31 are in vertical polarity and the channels 50, 52, ...64; 34, 36, ...48; 2, 4 ... 32 in horizontal polarity. Each downconverter 2 (Figure 9) selects a polarity and converts the frequency band of 10.9 - 12.5 GHz to the frequency band of 950 - 2,050 MHz, in such a way, that channels belonging to the same satellites and to the same polarity are present in each cable 3 at the circuit points g, h, i, j, k. As shown in Figure 10, channels 70, 72, ...92, are located at circuit point g, channels 71, 73, ...93 are located at circuit point h, channels 65 - 69 are located at circuit point i, channels 49, 51...63, 33...47, 1, 3, ...31 are located at circuit point j, and channels 50, 52 ... 64; 34, 36, ... 48; 2, 4 ... 32 at circuit point k. The desired channels are selected from all available channels at the switching points d - k. For example, channels 60, 36, 44, 2, 6, 12, 18, and 24 available at circuit point k are not processed further, while channels 65, 72, 68, 82, 77, 17, 89, and 41 available at circuit points g, h, i, j, are further processed instead. For this purpose, converter modules 40 are provided at the circuit points g, h, i, j, and the channel-specific converters 4 of the modules 40 are set to the input frequencies of each of the selected channels, and to the output frequencies, to which the channels are to be

Asserted Claims	Carnero
	allocated. These output frequencies are occupied frequencies of unwanted channels to be overlaid or free frequencies. According to the invention, channels are provided at the output of each converter module 40, which have a different frequency position compared to the frequency position at the input of the modules. As can be seen from Figure 10, at circuit point i, channels 72, 82, 77, and 89 occur in a frequency position, that is different from the frequency position of the channels at circuit points g and h. Channels 65, 68, 17 and 41 exist at circuit point m, which originate from circuit points I and j, also in different frequency positions. After the channels have been subjected to a mixing process in mixer 9, all selected channels originating from circuit points g, h, i and j are present at circuit point n, as shown in Figure 10, in frequency positions that differ from the original frequency positions. These channels are introduced via the feed source 11 into the amplifier 12, which amplifies the signal levels of the channels. Then, the channels present at circuit point n are mixed with the channels present at circuit point k in mixer 5. In this mixing process, the channels present at circuit point n are overlaid on the channels of the same frequency, that are present at circuit point k. The channels at circuit point n have a higher signal level of at least 15, but preferably 18 to 20 dB above the signal levels of the channels at circuit point k, which are to be overlaid. This level difference ensures that the channel, that overlays another channel, is received without interference from the channel that has been overlaid. After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24.

Asserted Claims	Carnero
	Thus, according to the invention, it is provided that signals, in particular, television signals transmitted via satellites, of different channels are distributed in a community antenna system. The signals are received in a signal generator A, and the received signals of a certain polarity (H, V) are converted from a receive frequency band into signals in an intermediate frequency band. The signals converted to the intermediate frequency band are processed and the processed signals are transmitted to user outlets 15, via a single distribution cable 13, in the intermediate frequency band. In this process, individual pre-definable channels in the intermediate frequency band are converted into other channels in the intermediate frequency band. First channels converted in the intermediate frequency band are mixed with second channels in the intermediate frequency band, and the first and second channels are transmitted over the distribution cable 13. In particular, different signal levels are generated for two channels of the same frequency, converted to the intermediate frequency band, with the signal levels of the signals of different channels differing by at least 15 dB. Carnero at Figs. 9-10:

Asserted Claims	Carnero
	 Figure 9

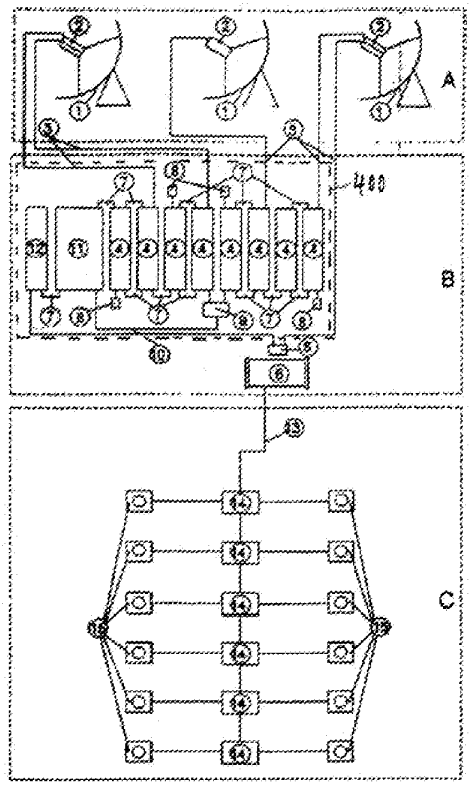
Asserted Claims	Carnero
	 Figure 10 To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal	Carnero discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.

Asserted Claims	Carnero
is not altered by the steps of selecting, combining, and transmitting.	*See, e.g.*: Carnero at 7:20-22: As shown in Figure 3, the distribution network C consists of a single distribution cable 13, on which all channels, that are FM modulated, are transmitted. The distribution cable 13 is made up of a coaxial cable and runs to diverters 14, which output the signal to various user outlets 15. Carnero at 7:26-30: In the system, according to the invention, the number of channel-specific converters 4 is equal to the number of channels coupled into the distribution cable 13, and transmitted to the user outlets 15, via the diverters 14. The channel-specific converters can be set to predeterminable input frequencies in the intermediate frequency range, and to predeterminable output frequencies in the intermediate frequency range. Canero at 8:49-52: The level difference (at least 15 dB or at least 20 dB) depends on the frequencies of the overlaying channel and the frequency of the channel(s) to be overlaid: at a different frequency (cf. channel 1 overlaying channels 7 and 8) the level difference is at least 15 dB; at the same frequency (cf. channel 5 overlaying channel 12) the level difference is at least 20 dB. Carnero at 9:15-20: Therefore, channels in the frequency band from 47 to 860 MHz and channels 1, 2, 3, 4, 11, 5, 13, 6 and 14 in the frequency band from 950 to 2,050 MHz are made available to the system user. Similarly, channels 7, 8, 9, 10 and 12 are transmitted on distribution cable 13. However, these channels are overlaid, so that they are not made available to the system user. With the signal level difference of at least 15 dB provided according to the invention,

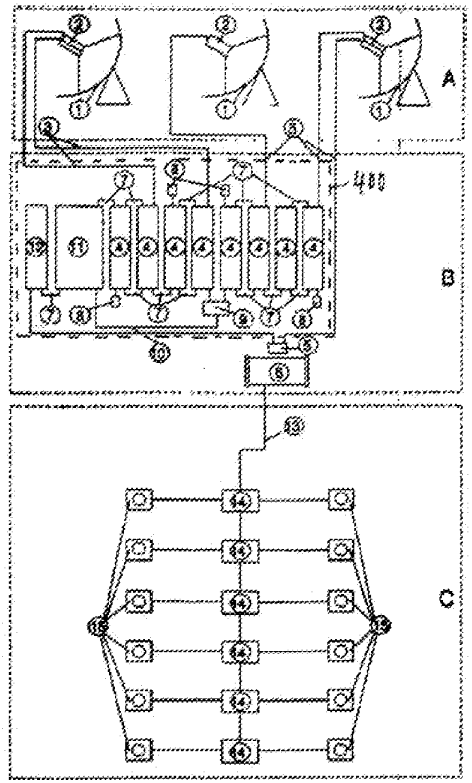
Asserted Claims	Carnero
	the overlapping channels can be displayed in good reception quality in the terminals, that can be connected to the user outlets. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Carnero discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Carnero at 7:43-46: The amplifier 42 amplifies the supplied signals, for example, in the frequency band from 950 to 2,050 MHz. The signals are fed to a tracking filter 43 on the input side. This filter is a bandpass filter tuned to the selected input channel frequency by means of a voltage, generated by a phase-locked loop (PLL) circuit 46. The circuit 46 is controlled by a microprocessor (MP) 49. Carnero at 7:55-60: The mixer 52 connected downstream of the amplifier 51 mixes the signal of the frequency 479.5 MHz, selected at the input, with a signal formed by a local oscillator (OL) 53. The local oscillator is controlled by a PLL circuit 54. The PLL circuit 54 is also controlled by the microprocessor 49. A tracking filter 55 is connected downstream of the mixer 52, which, like the filter 43, is a bandpass filter. The filter 55 eliminates the unwanted signals

Asserted Claims	Carnero
	formed during the mixing done by the mixer 52. The output of filter 55 then carries the signal of the frequency-converted channel, which is fed to an amplifier 56. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Carnero discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: Carnero at 3:48-53: The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Carnero
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Carnero discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Carnero at 3:48-53: The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Carnero discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Carnero at Fig. 3:

Asserted Claims	Carnero
	 Figure 3 Carnero at Page 4:

Asserted Claims	Carnero
	The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network. Blocks A, B and C are designed as follows: 1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz. 2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6; 3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an	Carnero discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.

Asserted Claims	Carnero
IRD and all IRDs receive the same composite signal.	*See* claim 14, *supra*. *See, e.g.*: Carnero at Fig. 3:  Figure 3

Asserted Claims	Carnero
	Carnero at 3:19-26: The system, according to the invention, can be used, among other things, in cases where a single distribution cable has already been laid or in cases where the laying of a further distribution cable would be costly or impossible, due to the same circumstances. Moreover, the system, according to the invention, in which channels of two polarities or from two or more satellites are transmitted to user outlets via a single distribution cable, does not have any switching devices on the distribution cable. This means that no electrical switching pulses are coupled onto the distribution cable, so that corresponding interference is excluded. Carnero at Page 4: The signal distribution system shown in the drawings, as well as in Figure 3, consists of three blocks A, B and C. Block A is a signal generator, block B is a head device with a signal processing unit and block C represents the distribution network. Blocks A, B and C are designed as follows: 1. Block A is a signal generator consisting of at least one antenna 1 and known down converters 2 (low-noise amplifier LNA, low-noise block converter LNB). The received signals may originate from different broadcast and/or telecommunications satellites and/or have different polarities (horizontal, vertical). The down-converters 2 convert the received signals, in an already known way, from the received frequency range of, for example, 11.7 - 12.5 GHz; 10.7 - 11.7 GHz; 12.5 - 12.75 GHz or preferably 10.7 - 12.5 GHz into an intermediate frequency range of, for example, 950 - 1760 MHz or preferably 950 MHz and 2,050 MHz. 2. Block B is a head device with a signal processing device 400, in which channel-specific converters 4 are arranged. The channel-specific converters 4 are described in more

Asserted Claims	Carnero
	detail, in particular, with reference to Figure 7. Various designs of the signal processing device 400 are shown in Figures 3, 4, 5, and 6; 3. The distribution network C has a single distribution cable 13, through which the signals are transmitted to user outlets 15, via tapping or diverters 14. Carnero at 10:7-16: Thus, according to the invention, it is provided that signals, in particular, television signals transmitted via satellites, of different channels are distributed in a community antenna system. The signals are received in a signal generator A, and the received signals of a certain polarity (H, V) are converted from a receive frequency band into signals in an intermediate frequency band. The signals converted to the intermediate frequency band are processed and the processed signals are transmitted to user outlets 15, via a single distribution cable 13, in the intermediate frequency band. In this process, individual pre-definable channels in the intermediate frequency band are converted into other channels in the intermediate frequency band. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Carnero discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior

Asserted Claims	Carnero
	art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Carnero discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Carnero discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Carnero discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. *See, e.g.*: Carnero at 3:9-17:

Asserted Claims	Carnero
	The system, according to the invention, is characterized by a number of advantages. According to the invention, the user is provided with pre-definable channels, via only one distribution cable, which are individually selected from signals originating from one antenna or from several antennas. Individual selection of channels can be used to meet the demand of system users for the reception of predefined channels. The individual channel converters provided, according to the invention, which convert a pre-definable channel into another channel, as well as the system as a whole, are designed in a simple circuit. The channel-specific converters can be set to any frequency in a pre-definable frequency band. In this way, the system, according to the invention, makes it possible to flexibly meet a changed demand of the system users with regard to the reception of pre-definable channels. Carnero at 3:48-53: The channel-specific converters may each have a microprocessor, that controls at least one oscillator. The microprocessor allows a converter-external input device to be detachably connected to the microprocessor and data to be input to the converter and the microprocessor, respectively, designating a predeterminable input channel frequency and a predeterminable output channel frequency. In this way, the channel-specific converters can be easily set to a pre-definable input frequency and a pre-definable output frequency, by which the frequency conversion of a channel is determined. The converter-external input device can also be designed as a remote-controlled transmitter. Carnero at 8:16-25: The input unit 16 can have a control unit 162 (in particular, a microprocessor MP). A program assigned to the control unit 162 generates data as a function, for example, of the cutoff frequencies of the respective intermediate frequency range (950 MHz, 2,050 MHz), of channel bandwidths and channel spacings and signal levels of the channel signals, which corresponds to predefined technical specifications, and which is input into the microprocessor 49 of the channel-specific converter 4. The input unit 16 includes a keyboard 161, the control unit 162 and a display 163. The display shows data entered into

Asserted Claims	Carnero
	the keypad 161, operator guidance information, and information indicating the state of the converter after it is configured by the data entered. The input unit 16 may be designed as a remote-controlled transmitter with a transmitting device, that transmits the data to be input to a receiver connected to the microprocessor 49 of the channel-specific converter. Carnero at 8:42-46: Channels 2, 4 and 6, which arrive at input E1, have been frequency-converted in the channel-specific converters 4, in such a way, that no channels of the same frequencies arrive at input E2. Channels 1 and 3 at input E1 are allocated in frequencies between the undesired channels 7 and 8 or 9 and 10, which come in at input E2. The signal or power level of channel 1 is set to a value at least 15 dB above the corresponding level of channels 7 and 8. The signal or power level of channel 3 is set to a value at least 15 dB above the corresponding level of channels 9 and 10 To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Carnero discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 21, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

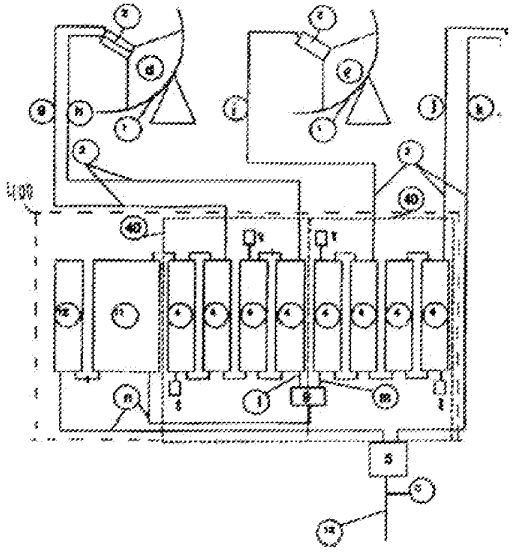
Asserted Claims	Carnero
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Carnero discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Carnero at 7:43-46: The amplifier 42 amplifies the supplied signals, for example, in the frequency band from 950 to 2,050 MHz. The signals are fed to a tracking filter 43 on the input side. This filter is a bandpass filter tuned to the selected input channel frequency by means of a voltage, generated by a phase-locked loop (PLL) circuit 46. The circuit 46 is controlled by a microprocessor (MP) 49. Carnero at 7:55-60: The mixer 52 connected downstream of the amplifier 51 mixes the signal of the frequency 479.5 MHz, selected at the input, with a signal formed by a local oscillator (OL) 53. The local oscillator is controlled by a PLL circuit 54. The PLL circuit 54 is also controlled by the microprocessor 49. A tracking filter 55 is connected downstream of the mixer 52, which, like the filter 43, is a bandpass filter. The filter 55 eliminates the unwanted signals formed during the mixing done by the mixer 52. The output of filter 55 then carries the signal of the frequency-converted channel, which is fed to an amplifier 56. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected	Carnero discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.

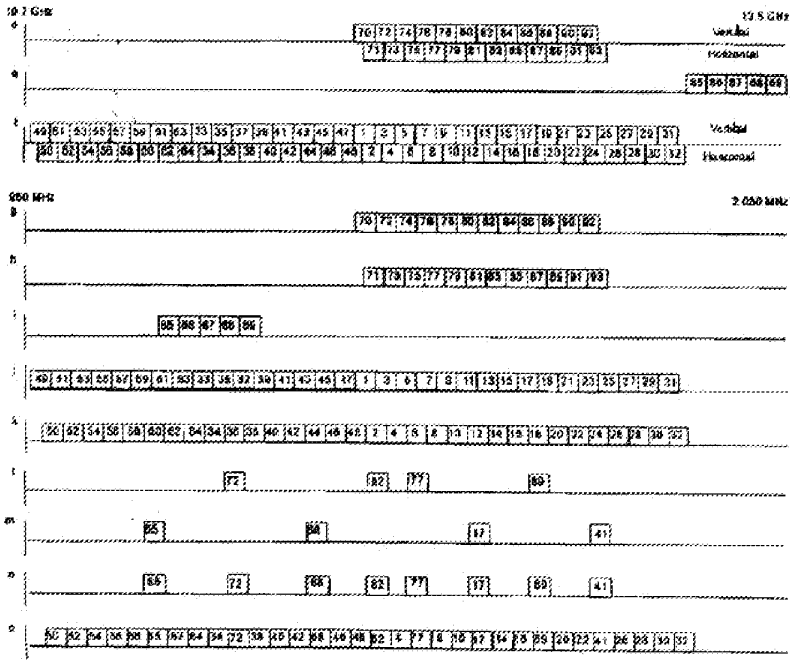
Asserted Claims	Carnero
signal to an analog signal using a digital to analog converter prior to combining.	*See* claim 14, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Carnero discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Carnero discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the	Carnero discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.

Asserted Claims	Carnero
digitized broadband signal prior to selecting and extracting transponder signal.	*See* claims 14, 17, *supra*. *See, e.g.*: Carnero at 9:21-10:21: Figure 9 shows an example of the system, according to the invention, which is also shown in Figure 3. It is assumed that signals of different TV channels are received and processed, originating from three satellites of different orbital position with horizontal and vertical position. Circuit points d, e, f, g, h, i, j, k, I, m, n, and o are indicated in the system, according to the invention, shown in Figure 9. Figure 10 shows the channels at the circuit points d – o shown in Figure 9. Signals received from each satellite in a frequency band between 10.7 - 12.5 GHz with horizontal and vertical polarity are located at points d, e and f of Figure 9. As shown in Figure 10, channels 70, 72 are located at circuit point d (parabolic antenna on the left in Figure 9), ... 92 in vertical polarity and channels 71, 93, ... 93 in horizontal polarity. At the switching point e (center parabolic antenna in Figure 9), channels 65 - 69 are available in only one polarity. At the switching point f (parabolic antenna on the right in Figure 9), the channels 49, 51, ...63; 33, 35, ...47; 1, 3, ...31 are in vertical polarity and the channels 50, 52, ...64; 34, 36, ...48; 2, 4 ... 32 in horizontal polarity. Each downconverter 2 (Figure 9) selects a polarity and converts the frequency band of 10.9 - 12.5 GHz to the frequency band of 950 - 2,050 MHz, in such a way, that channels belonging to the same satellites and to the same polarity are present in each cable 3 at the circuit points g, h, i, j, k.

Asserted Claims	Carnero
	As shown in Figure 10, channels 70, 72, ...92, are located at circuit point g, channels 71, 73, ...93 are located at circuit point h, channels 65 - 69 are located at circuit point i, channels 49, 51...63, 33...47, 1, 3, ...31 are located at circuit point j, and channels 50, 52 ... 64; 34, 36, ... 48; 2, 4 ... 32 at circuit point k. The desired channels are selected from all available channels at the switching points d - k. For example, channels 60, 36, 44, 2, 6, 12, 18, and 24 available at circuit point k are not processed further, while channels 65, 72, 68, 82, 77, 17, 89, and 41 available at circuit points g, h, i, j, are further processed instead. For this purpose, converter modules 40 are provided at the circuit points g, h, i, j, and the channel-specific converters 4 of the modules 40 are set to the input frequencies of each of the selected channels, and to the output frequencies, to which the channels are to be allocated. These output frequencies are occupied frequencies of unwanted channels to be overlaid or free frequencies. According to the invention, channels are provided at the output of each converter module 40, which have a different frequency position compared to the frequency position at the input of the modules. As can be seen from Figure 10, at circuit point i, channels 72, 82, 77, and 89 occur in a frequency position, that is different from the frequency position of the channels at circuit points g and h. Channels 65, 68, 17 and 41 exist at circuit point m, which originate from circuit points I and j, also in different frequency positions. After the channels have been subjected to a mixing process in mixer 9, all selected channels originating from circuit points g, h, i and j are present at circuit point n, as shown in Figure 10, in frequency positions that differ from the original frequency positions. These channels are introduced via the feed source 11 into the amplifier 12, which amplifies the signal levels of the channels. Then, the channels present at circuit point n are mixed with the channels present at circuit point k in mixer 5. In this mixing process, the channels present at circuit point n are overlaid on the channels of the same frequency, that are present at circuit point k.

Asserted Claims	Carnero
	The channels at circuit point n have a higher signal level of at least 15, but preferably 18 to 20 dB above the signal levels of the channels at circuit point k, which are to be overlaid. This level difference ensures that the channel, that overlays another channel, is received without interference from the channel that has been overlaid. After the mixing process has been carried out in the second mixer 5, one or more channels shown in Figure 10 will be received, these channels then being distributed via the single distribution cable 13. In this case, as illustrated in Figure 10, channel 65 is superimposed on channel 60 (cf. larger amplitude of 65 compared to 60), channel 72 on channel 36, channel 68 on channel 44, channel 82 on channel 2, channel 77 on channel 6, channel 17 on channel 12, channel 89 on channel 18, and channel 41 on channel 24. Thus, according to the invention, it is provided that signals, in particular, television signals transmitted via satellites, of different channels are distributed in a community antenna system. The signals are received in a signal generator A, and the received signals of a certain polarity (H, V) are converted from a receive frequency band into signals in an intermediate frequency band. The signals converted to the intermediate frequency band are processed and the processed signals are transmitted to user outlets 15, via a single distribution cable 13, in the intermediate frequency band. In this process, individual predefinable channels in the intermediate frequency band are converted into other channels in the intermediate frequency band. First channels converted in the intermediate frequency band are mixed with second channels in the intermediate frequency band, and the first and second channels are transmitted over the distribution cable 13. In particular, different signal levels are generated for two channels of the same frequency, converted to the intermediate frequency band, with the signal levels of the signals of different channels differing by at least 15 dB. Carnero at Figs. 9-10:

Asserted Claims	Carnero
	 Figure 9

Asserted Claims	Carnero
	 Figure 10 To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized	Carnero discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.

Asserted Claims	Carnero
broadband signal to locate a selected transponder channel at baseband.	*See* claim 38, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Carnero discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Carnero discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

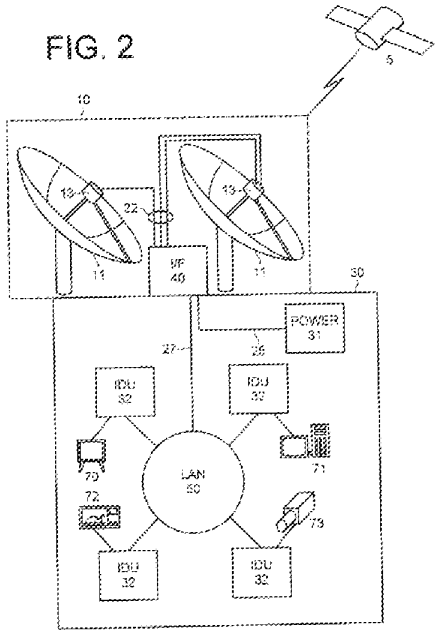
Asserted Claims	Carnero
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Carnero discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. To the extent Carnero does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Carnero alone or it would have been obvious to combine Carnero with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

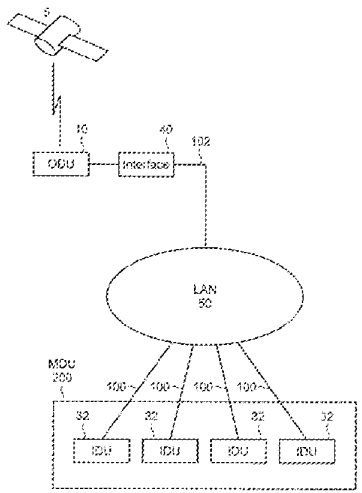
INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Davis '055

U.S. Patent Pub. No. 2002/0154,055 ("Davis '055") was filed on April 15, 2002 and published on October 24, 2002, and claims priority to U.S. Provisional Patent No. 60/284,593, which was filed on April 18, 2001. Davis '055 therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, Davis '055 invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Davis '055
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Davis '055 discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Davis '055 at Abstract:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Davis '055
	A satellite communication system including an interface device for distributing satellite signals received from an outdoor unit (ODU) to a plurality of indoor units (IDUs) connected to a local area network (LAN), at a particular site. Only two cables, a power cable and a cable connected to the LAN, must be installed between the interface device and the site containing the IDUs. Accordingly, the installation of IDUs at a site is simplified and has the flexibility of allowing future satellite based services to be added without requiring the installation of new cables between the ODU and the IDUs. The satellite communication system also permit flexibility among connected devices, including to which other devices they are connected, how they are connected to other devices and what types of connections are used. Davis '055 at Fig. 2:  Davis '055 at Fig. 8:

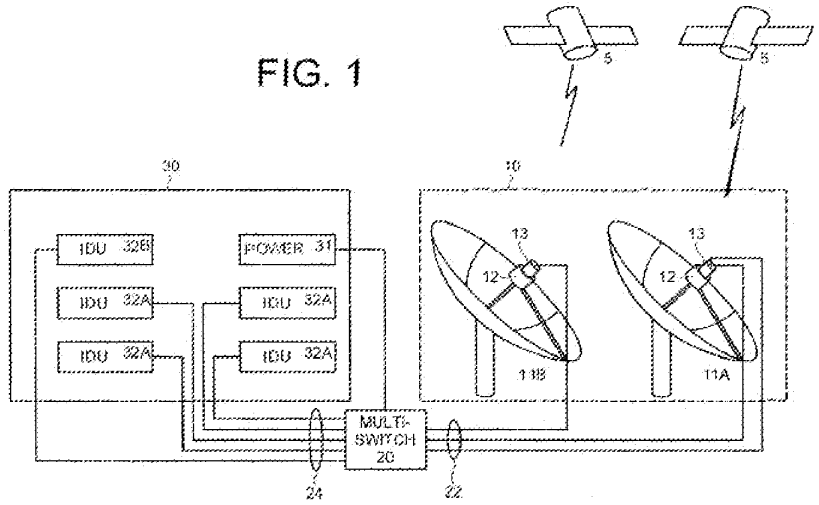
Asserted Claims	Davis '055
	 FIG. 8 Davis '055 at [0002]: This invention relates generally to the connection of a satellite antenna to multiple indoor units (IDUs), and more specifically, to an interface which connects at least one satellite antenna to multiple indoor units by means of a local area network (LAN). Davis '055 at [0012]: It would be advantageous to simplify the installation of multiple IDUs at a particular site, while reducing the number of cables required for such an installation. It would also be advantageous to substantially increase the number of IDUs that can access a single ODU. Further, it would be advantageous to allow for new IDUs and/or new services to be installed at a particular site without needing to install more cables.

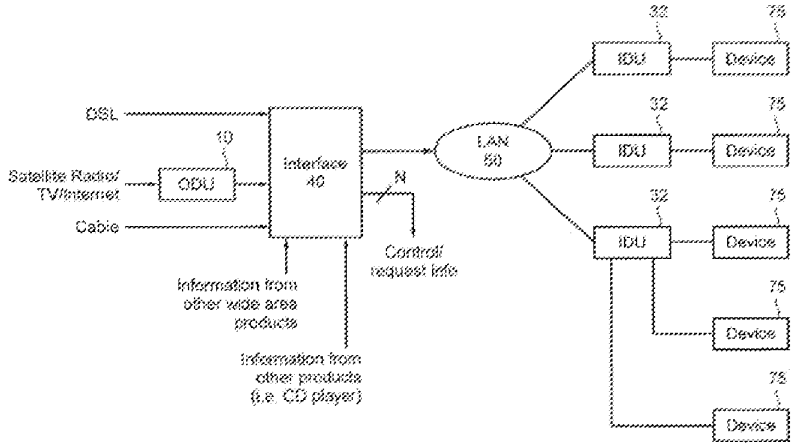
Asserted Claims	Davis '055
	Davis '055 at [0014]: A first aspect of the present invention embodies an apparatus acting as an interface between a satellite antenna and a plurality of IDUs in a satellite communication system. This interface device includes a cable connection to each LNB output of the antenna, similar to a conventional multiswitch. Unlike a multiswitch, however, the interface device requires at most two additional cables, regardless of the number of IDUs in the system. One of these cables connects the interface device to a power source, while the other cable is a connection to a wired LAN, which is further connected to all of the IDUs. In this aspect, the interface device may include a processor that runs a set of protocols for control-ling the transmission of data over the network. Further, the interface device may be built into the satellite antenna, or alternatively, may be configured as a standalone device within or outside of a building housing the IDUs. Davis '055 at [0037]: FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection. Davis '055 at [0038]: The interface device 40 may be configured as part of the ODU 10, as shown in FIG. 2, and may even be integrated into a satellite antenna 11. Alternatively, the interface device 40 may be located apart from the ODU 10, either inside the building 30 (such as an attic) or at another outdoor location (such as on the roof). The interface device 40 may receive a

Asserted Claims	Davis '055
	single cable 22 from each LNB 13 at ODU 10. The interface device 40 may be connected to the ODU 10 via transmission cables (not shown). The transmission cables may allow the interface device 40 to send a signal to a satellite antenna 11, which is configured to transmit the signal to another site via satellite 5. Davis '055 at [0039]: As shown in FIG. 2, each IDU 32 is associated with one or more satellite services. Such services may include satellite television 70, satellite based Internet service for a device 71, diagnostics/maintenance of appliances 72, and home security 73. Services such as appliance diagnostics/maintenance 72 and home security 73, may require data to be measured or collected at their corresponding IDUs 32 and transmitted back to a central processing location (not shown) for analysis. Conventional satellite communication systems (e.g., the system illustrated in FIG. 1) would require both a receiving and transmitting cable to connect these IDUs 32 to the multiswitch 20. However, by connecting the interface device 40 to each mu 32 via LAN 50, the interface device 40 can both transmit and receive data from all of the IDUs 32 connected to a single data bus. Davis '055 at claim 12: The satellite communication system of claim 1, wherein at least one of said IDUs comprises a receiver for a satellite television application. Davis '055 at claim 23: The apparatus according to claim 18, wherein said apparatus receives digital baseband signals transmitted from one or more of the plurality of IDUs through said LAN. *See also* U.S. Provisional Patent No. 60/284,593 ("Davis Provs.") at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can

Asserted Claims	Davis '055
	include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. …

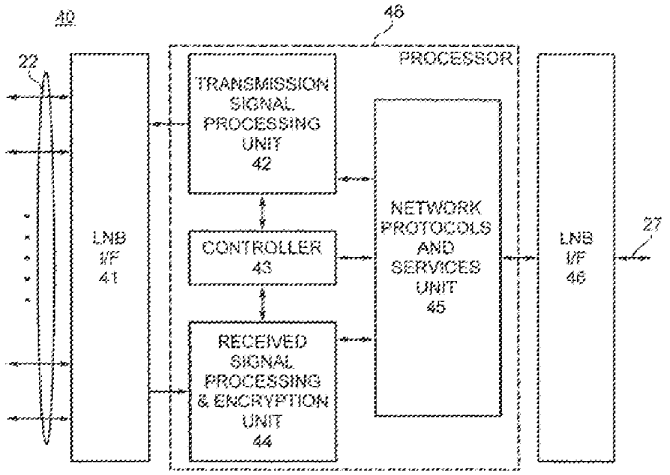
Asserted Claims	Davis '055
	Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

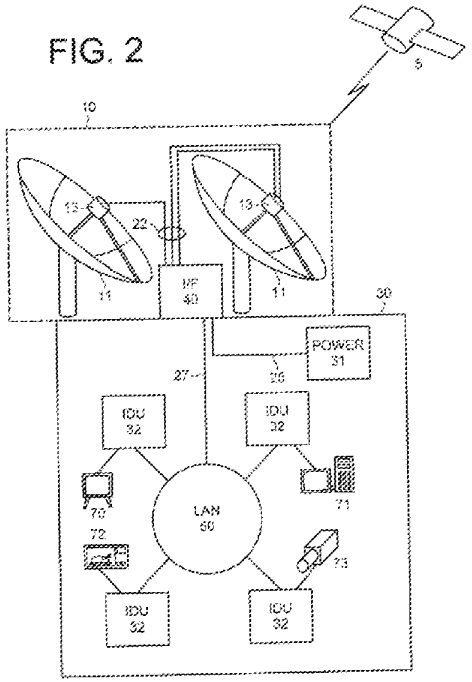
Asserted Claims	Davis '055
14[a] communicating a transponder request signal to the ODU from the IRD;	Davis '055 discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Davis '055 at [0036]: In the satellite communication system illustrated in FIG. 1, the satellite signals may already be encrypted when they are received by ODU 10 and sent to the IDUs 32A and 32B. Accordingly, IDUs 32A and 32B may comprise Integrated Receiver Decoders (IRDs), which include a processor for decrypting or descrambling the received signal. Further, IRDs may perform other functions, such as providing an electronic program guide (EPG) or recording certain programs on satellite TV signals. Davis '055 at Fig. 1: FIG. 1  Davis '055 at [0055]-[0056]:

Asserted Claims	Davis '055
	By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. Further, the present invention is in no way limited to satellite Internet services, where requests must be transmitted over a physical cable to the ISP. In another exemplary embodiment, requests for digital content may be transmitted from an IDU 32 over the LAN 50 to interface device 40, which forwards the request to an antenna 11 for transmission to a satellite 5. Accordingly, the satellite 5 may relay the request to a satellite antenna 11 of a satellite based ISP. Davis '055 at Fig. 10:  FIG. 10

Asserted Claims	Davis '055
	Davis '055 at [0073]: FIG. 10 illustrates yet another embodiment of the present invention, where the interface 40 acts as an converter and/or concentrator. As illustrated in FIG. 10, the interface 40 may receive information from any number of connec-tions, such as DSL, satellite, cable, among others. The interface 40 may also receive information from other wide area products and from other devices such as CD players. The interface 40 may convert/concentrate the received infor-mation for forwarding to LAN 50. Interface 40 may also include outgoing connections for sending control/request information to any of the information sources illustrated in FIG. 10. *See also* Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.

Asserted Claims	Davis '055
	To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Davis '055 discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Davis '055 at [0013]: The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. Davis '055 at [0041]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the

Asserted Claims	Davis '055
	transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. Davis '055 at Fig. 5:  FIG. 5 Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs

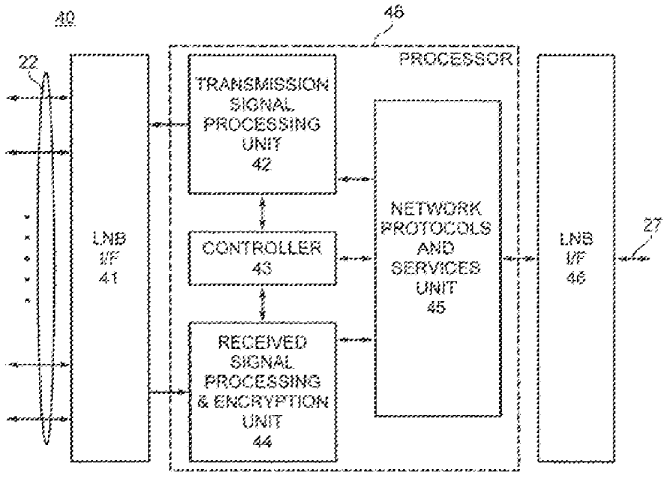
Asserted Claims	Davis '055
	having a certain decryption key will be able to decrypt the signal and access the information contained therein. Davis '055 at Fig. 2:  Davis '055 at [0050]: As described above, controller 43 may be used to store the software needed for employing a particular set of network protocols. In addition, the controller 43 can be used as a buffer, especially when multiple satellite signals are being received by the interface device 40 at the same time. The buffer allows for units 42, 44, and 45 to process the received signals

Asserted Claims	Davis '055
	one at a time, perhaps according to a first-come, first-served basis or based on a priority assigned to each type of signal. Such assigned priorities may also be stored in a table in controller 43. Davis '055 at [0055]-[0056]: By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. Further, the present invention is in no way limited to satellite Internet services, where requests must be transmitted over a physical cable to the ISP. In another exemplary embodiment, requests for digital content may be transmitted from an IDU 32 over the LAN 50 to interface device 40, which forwards the request to an antenna 11 for transmission to a satellite 5. Accordingly, the satellite 5 may relay the request to a satellite antenna 11 of a satellite based ISP. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.

Asserted Claims	Davis '055
	EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7:

Asserted Claims	Davis '055
	Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Davis '055 discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Davis '055 at [0013]:

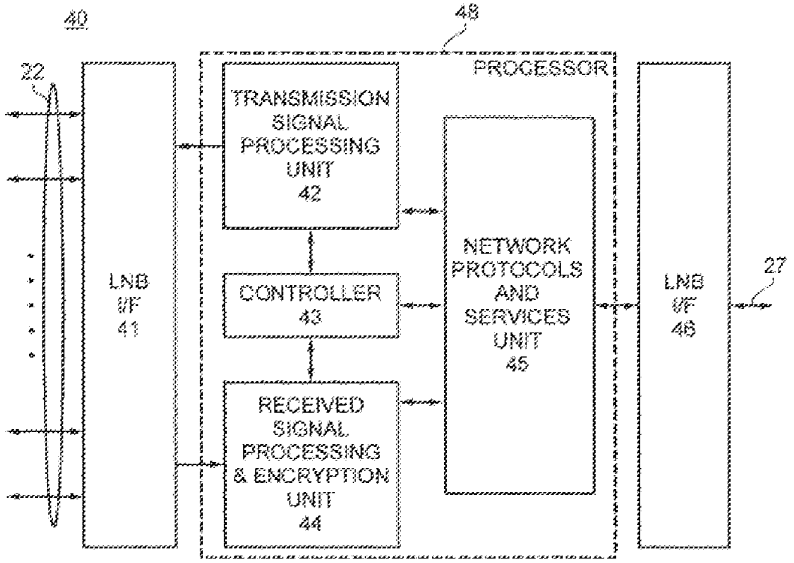
Asserted Claims	Davis '055
	The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. Davis '055 at [0041]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. Davis '055 at Fig. 5:

Asserted Claims	Davis '055
	 FIG. 5 *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?)

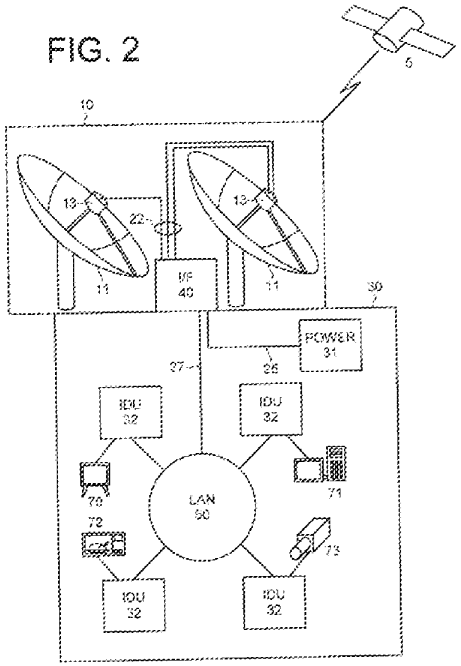
Asserted Claims	Davis '055
	• Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct

Asserted Claims	Davis '055
	LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Davis '055 discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Davis '055 at Abstract: A satellite communication system including an interface device for distributing satellite signals received from an outdoor unit (ODU) to a plurality of indoor units (IDUs) connected to a local area network (LAN), at a particular site. Only two cables, a power

Asserted Claims	Davis '055
	cable and a cable connected to the LAN, must be installed between the interface device and the site containing the IDUs. Accordingly, the installation of IDUs at a site is simplified and has the flexibility of allowing future satellite based services to be added without requiring the installation of new cables between the ODU and the IDUs. The satellite communication system also permit flexibility among connected devices, including to which other devices they are connected, how they are connected to other devices and what types of connections are used. Davis '055 at [0002]: This invention relates generally to the connection of a satellite antenna to multiple indoor units (IDUs), and more specifically, to an interface which connects at least one satellite antenna to multiple indoor units by means of a local area network (LAN). Davis '055 at [0013]: The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. Davis '055 at [0040]: FIG. 5 is a block diagram of the interface device 40 according to the exemplary embodiment shown in FIG. 2. The LNBs 13 of an ODU 10 are connected via cables 22 to input/outputs ports on an LNB interface 41. The LNB interface 41 is connected to a

Asserted Claims	Davis '055
	received signal processing and encryption unit 44 and a transmission signal processing unit 42, which are both connected to a network protocols and services processing unit 45. Davis '055 at Fig. 5:  FIG. 5 Davis '055 at [0041]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the

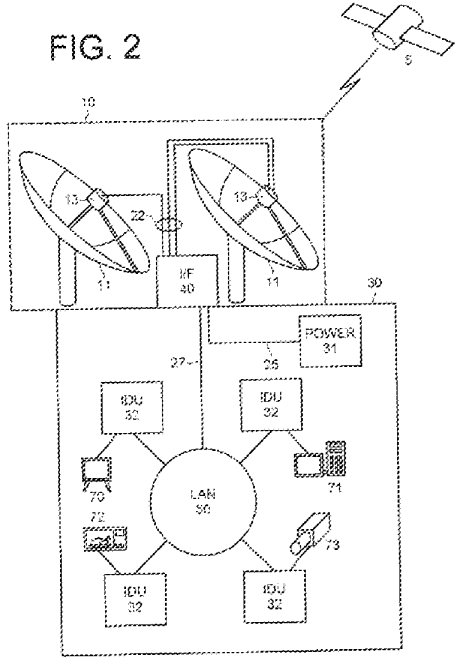
Asserted Claims	Davis '055
	transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. Davis '055 at [0047]: In an exemplary embodiment, the network protocols and services unit 45 may employ point-to-point communications to transmit packets of the baseband signal directly to the IDU 32 for which the signal is intended (e.g., signals are sent directly to the receiver at the site 30). The network protocols and services unit 45 may alternatively broadcast data packets to every IDU 32 in site 30. In this alternative embodiment, each IDU 32 may include a processor for examining the received packet and determining whether the data in the packet is intended for that IDU 32, or for another. Further, the network protocols and services processing unit 45 may be configured to choose between point-to-point or broadcast transmission of each baseband signal packet. Davis '055 at Fig. 2:

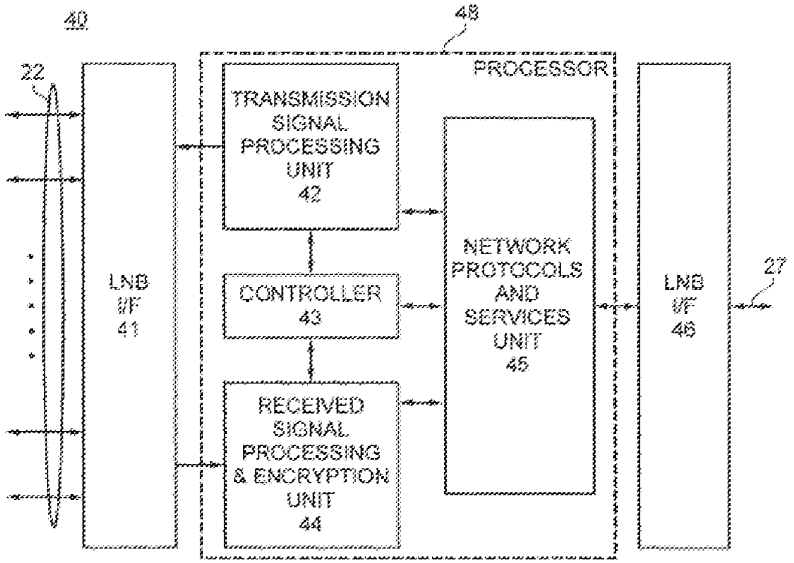
Asserted Claims	Davis '055
	 Davis '055 at claim 6: The satellite communication system of claim 5, wherein said wired LAN is made up of dedicated connections including twisted wire pairs or coaxial cables. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or

Asserted Claims	Davis '055
	10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple

Asserted Claims	Davis '055
	access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step	Davis '055 discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a

Asserted Claims	Davis '055
of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0013]: This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein. Davis '055 at Fig. 2:

Asserted Claims	Davis '055
	 Davis '055 at Fig. 5:

Asserted Claims	Davis '055
	 FIG. 5 *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables.

Asserted Claims	Davis '055
	EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7:

Asserted Claims	Davis '055
	Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Davis '055 discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Davis '055
	Davis '055 at [0041]-[0042]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. Processing units 42, 44, and 45 are all connected to a controller 43. The network protocols and services processing unit 45 is connected to LAN interface 46. LAN cable 27 connects the LAN interface 46 to the wired LAN 50. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) Minimizes number of cables to be run from the outdoor unit (maximum 2);

Asserted Claims	Davis '055
	• Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted.

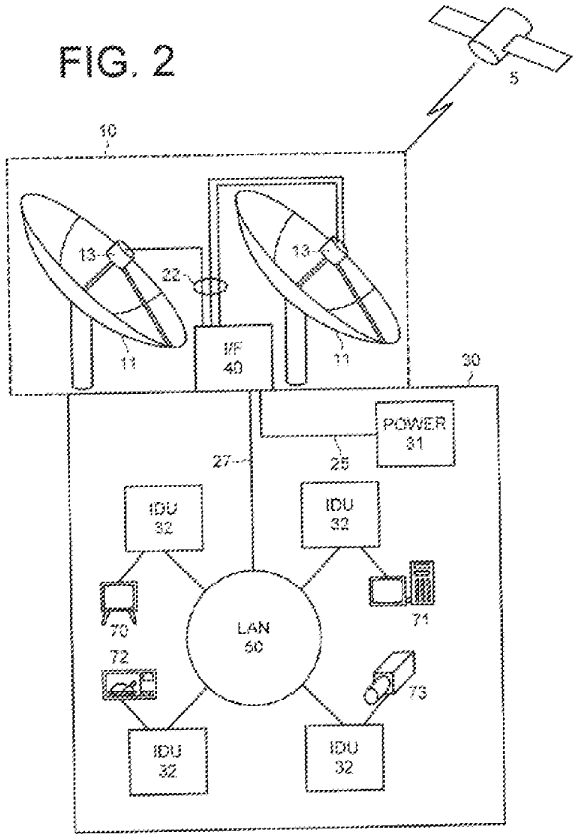
Asserted Claims	Davis '055
	This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Davis '055 discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Davis '055 at [0041]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to

Asserted Claims	Davis '055
	the received signal processing and encryption unit 44. Similarly, the output from the transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units)

Asserted Claims	Davis '055
	• Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.

Asserted Claims	Davis '055
	Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Davis '055 discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0013]: The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. Davis '055 at [0037]:

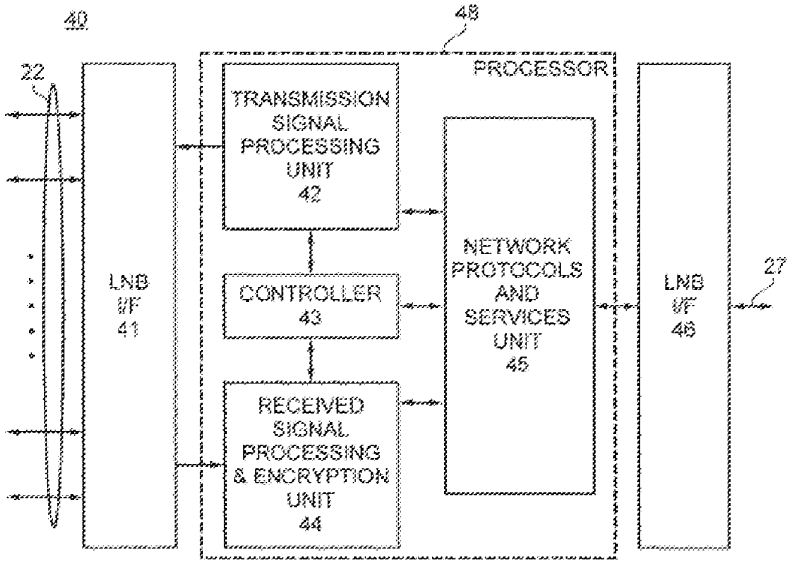
Asserted Claims	Davis '055
	FIG. 2 illustrates an exemplary embodiment of the present invention where an interface device 40 connects the LNB 13 of an ODU 10 to multiple IDUs in conjunction with a wired LAN 50. The ODU 10 includes one or more satellite antennas 11, each of which includes one (or more) LNB 13. The LNB outputs are then connected via cables 22 to the interface device 40. Interface device 40 includes two output cables, including a power cable 25 connected to power source 31 within site 30, and a LAN connection 27 that is connected to LAN 50 running through site 30. The LAN 50 is connected to a plurality of IDUs 32. FIG. 2 as illustrated shows a dedicated cable 27 for the LAN connection. An existing cable, such as power cable 25, could also be used for the LAN connection. Davis '055 at Fig. 2:

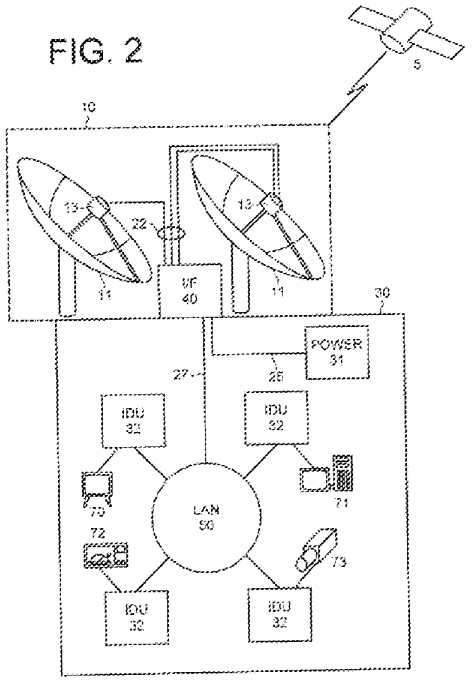
Asserted Claims	Davis '055
	 Davis '055 at [0047]: In an exemplary embodiment, the network protocols and services unit 45 may employ point-to-point communications to transmit packets of the baseband signal directly to the IDU 32 for which the signal is intended (e.g., signals are sent directly to the receiver at the

Asserted Claims	Davis '055
	site 30). The network protocols and services unit 45 may alternatively broadcast data packets to every IDU 32 in site 30. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances.

Asserted Claims	Davis '055
	Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice.

Asserted Claims	Davis '055
	To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Davis '055 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0013]: The present invention provides an interface that connects the plurality of LNB outputs to a local area network (LAN), which is connected to each IDU at a particular site. In particular, for each LNB at the ODU side, the interface of the present invention includes a receiver that converts the radio frequency (RF) signal from the LNB output into digital baseband information. This digital baseband information from each LNB output can be filtered, compressed and encrypted by the interface before being multiplexed together and sent by means of the LAN to the corresponding IDUs. The data can be sent to directly to its intended IDU using point-to-point communications, or alternatively, can be broadcast to each IDU. Davis '055 at [0042]: Processing units 42, 44, and 45 are all connected to a controller 43. The network protocols and services processing unit 45 is connected to LAN interface 46. LAN cable 27 connects the LAN interface 46 to the wired LAN 50. Davis '055 at Fig. 5:

Asserted Claims	Davis '055
	 FIG. 5 Davis '055 at [0047]: In an exemplary embodiment, the network protocols and services unit 45 may employ point-to-point communications to transmit packets of the baseband signal directly to the IDU 32 for which the signal is intended (e.g., signals are sent directly to the receiver at the site 30). The network protocols and services unit 45 may alternatively broadcast data packets to every IDU 32 in site 30. Davis '055 at Fig. 2:

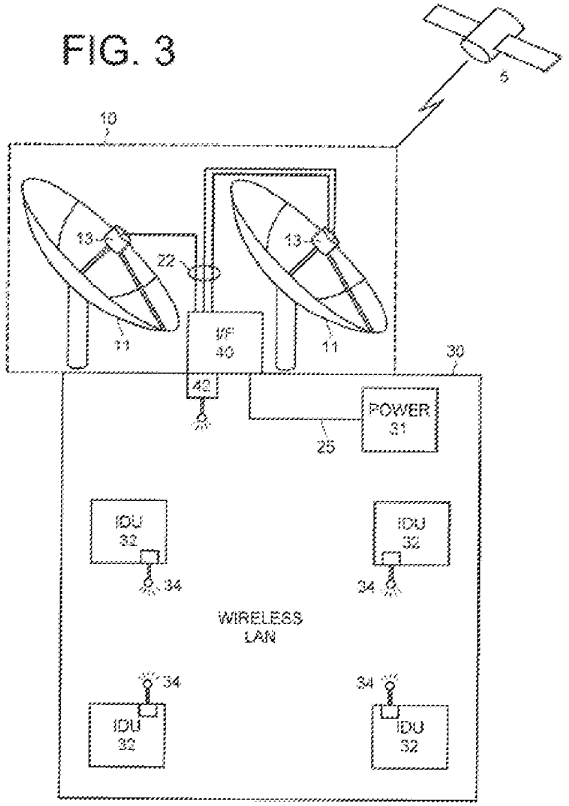
Asserted Claims	Davis '055
	 Davis '055 at [0055]-[0056]: By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. Further, the present invention is in no way limited to satellite Internet services, where requests must be transmitted over a physical cable to the ISP. In another exemplary

Asserted Claims	Davis '055
	embodiment, requests for digital content may be transmitted from an IDU 32 over the LAN 50 to interface device 40, which forwards the request to an antenna 11 for transmission to a satellite 5. Accordingly, the satellite 5 may relay the request to a satellite antenna 11 of a satellite based ISP. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units)

Asserted Claims	Davis '055
	• Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.

Asserted Claims	Davis '055
	Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Davis '055 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0055]-[0056]: By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. Further, the present invention is in no way limited to satellite Internet services, where requests must be transmitted over a physical cable to the ISP. In another exemplary embodiment, requests for digital content may be transmitted from an IDU 32 over the LAN 50 to interface device 40, which forwards the request to an antenna 11 for transmission to a satellite 5. Accordingly, the satellite 5 may relay the request to a satellite antenna 11 of a satellite based ISP. Davis '055 at [0058]:

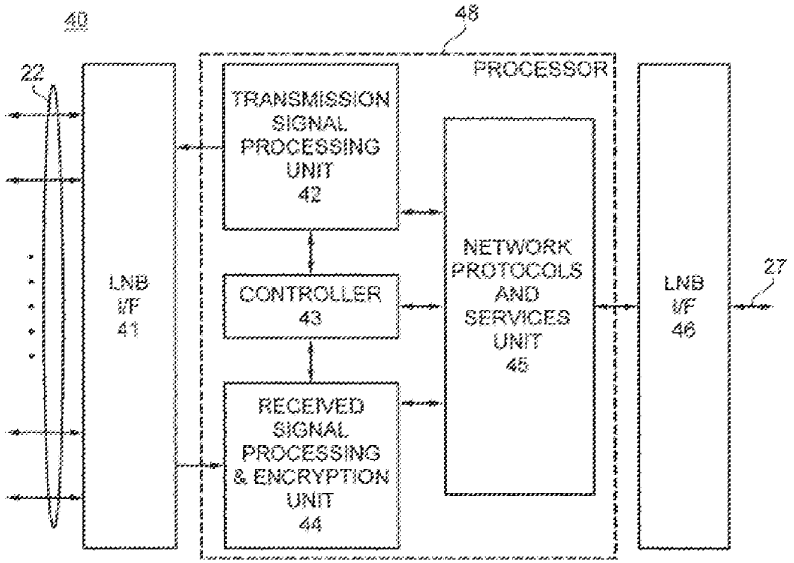
Asserted Claims	Davis '055
	In FIG. 3, the interface device 40 includes an RF signal transmitter/receiver 42 for transmitting data to and/or for receiving data from each of the IDUs 32 over the wireless LAN. The RF transmitter/receiver 42 of the interface device 40 replaces the LAN cable 27 illustrated in FIGS. 2 and 5. Each of the IDUs 32 includes an RF signal transmitter/receiver 34 for receiving data transmitted by the interface device 40. If a particular IDU 32 does not require the capability of transmitting data over the satellite communication network, then the RF transmitter/receiver 34 for the IDU 32 may be operable only to receive RRF [sic] signals. Davis '055 at Fig. 3:

Asserted Claims	Davis '055
	 *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one

Asserted Claims	Davis '055
	(power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple

Asserted Claims	Davis '055
	access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of:	Davis '055 discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining.

Asserted Claims	Davis '055
frequency translating the selected transponder channels to a variable frequency before combining; and	*See* claims 14, 16, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Davis '055 discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Davis '055 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. *See, e.g.*: Davis '055 at [0042]: Processing units 42, 44, and 45 are all connected to a controller 43. The network protocols and services processing unit 45 is connected to LAN interface 46. LAN cable 27 connects the LAN interface 46 to the wired LAN 50. Davis '055 at Fig. 5:

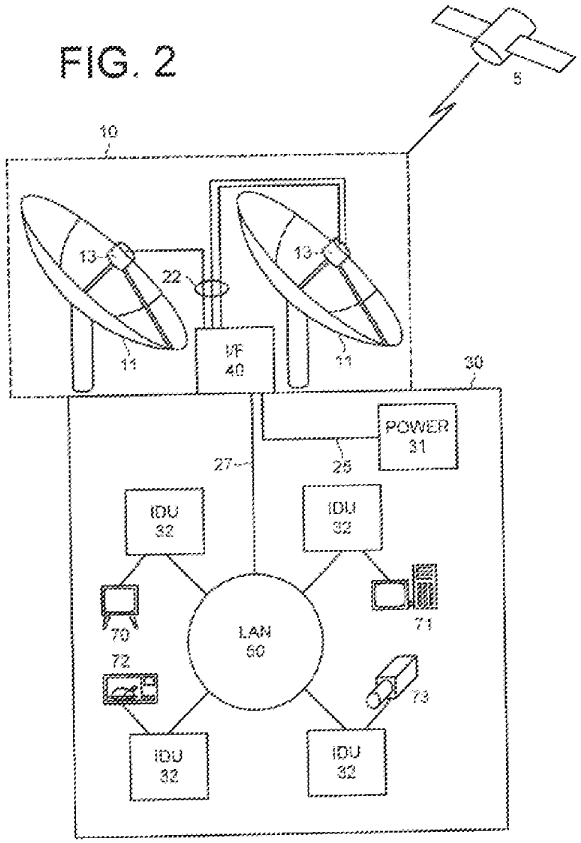
Asserted Claims	Davis '055
	 FIG. 5 Davis '055 at [0055]-[0056]: By utilizing the wired LAN 50 of the present invention, a plurality of IDUs 32 (PCs) configured for satellite Internet service can receive content from the same satellite antenna 11 without requiring a plurality of cables running from the ODU 10 to the IDU. Further, each IDU 32 can transmit requests over the same cable connection, which connects the data bus of LAN 50 to the ISP. Further, the present invention is in no way limited to satellite Internet services, where requests must be transmitted over a physical cable to the ISP. In another exemplary embodiment, requests for digital content may be transmitted from an IDU 32 over the LAN

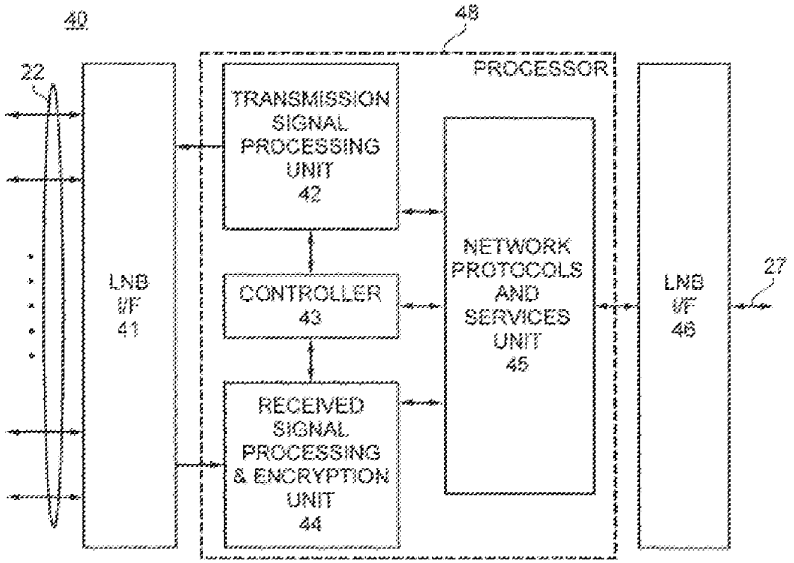
Asserted Claims	Davis '055
	50 to interface device 40, which forwards the request to an antenna 11 for transmission to a satellite 5. Accordingly, the satellite 5 may relay the request to a satellite antenna 11 of a satellite based ISP. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units)

Asserted Claims	Davis '055
	• Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.

Asserted Claims	Davis '055
	Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Davis '055 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Davis '055 discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Davis '055
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Davis '055 discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Davis '055 discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0041]: The elements of the LNB interface 41 may be conventional elements, such as a tuner/demodulator pair for processing an input from each cable 22. The tuner/demodulator pair processes an RF input from each cable 22 and produces a corresponding digital output. The digital outputs from each tuner/demodulator pair are multiplexed together and sent to the received signal processing and encryption unit 44. Similarly, the output from the transmission signal processing unit 42 is demultiplexed into plural inputs, sent to tuner/modulator pairs for conversion back into RF signals and sent out of cables 22. Davis '055 at Fig. 2:

Asserted Claims	Davis '055
	 Davis '055 at Fig. 5:

Asserted Claims	Davis '055
	 FIG. 5 Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein.

Asserted Claims	Davis '055
	See also Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Davis '055 discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*.

Asserted Claims	Davis '055
	To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Davis '055 discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or

Asserted Claims	Davis '055
	10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple

Asserted Claims	Davis '055
	access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized	Davis '055 discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.

Asserted Claims	Davis '055
broadband signal to locate a selected transponder channel at baseband.	*See* claim 38, *supra*. *See, e.g.*: Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13, the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein. Davis '055 at [0047]-[0048]: In an exemplary embodiment, the network protocols and services unit 45 may employ point-to-point communications to transmit packets of the baseband signal directly to the IDU 32 for which the signal is intended (e.g., signals are sent directly to the receiver at the site 30). The network protocols and services unit 45 may alternatively broadcast data packets to every IDU 32 in site 30. In this alternative embodiment, each IDU 32 may include a processor for examining the received packet and determining whether the data in the packet is intended for that IDU 32, or for another. Further, the network protocols and services processing unit 45 may be configured to choose between point-to-point or broadcast transmission of each baseband signal packet. The network protocols and services unit 45 may also receive packets from the LAN 50, via LAN interface 46, which contain data to be transmitted to another site 30 over the satellite

Asserted Claims	Davis '055
	network. Accordingly, the network protocols and services unit 45 can reassemble the packets into the original digital baseband signal. The reassembled signal may be sent to transmission signal processing unit 42, where it is processed and converted back into an RF signal, suitable for transmission. The converted RF signal is then sent back to a transmitting antenna via LNB interface 41 and cable 22. Davis '055 at Claims 1-3: 1. A satellite communication system, comprising: at least one satellite antenna for receiving a signal transmitted from a satellite, wherein said satellite antenna includes at least one Low Noise Block (LNB) converter; an interface device including a connection to said LNB, and further including a connection to a local area network (LAN) connecting together a plurality of indoor units (IDUs), wherein said interface device converts said transmitted signal received from said LNB into a digital baseband signal to be transmitted across said LAN to at least one of the plurality of IDUs. 2. The satellite communication system of claim 1, wherein said digital baseband signal is transmitted from said interface device to said at least one of the plurality of IDUs according to point-to-point communications across said LAN. 3. The satellite communication system of claim 1, wherein said digital baseband signal is broadcast from said interface device to each of the plurality of IDUs across said LAN. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or

Asserted Claims	Davis '055
	a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables • Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. ... Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and

Asserted Claims	Davis '055
	performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast. Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel	Davis '055 discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.

Asserted Claims	Davis '055
translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	*See* claim 14, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Davis '055 discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Davis '055 discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Davis '055 at [0045]: The operation of the interface device 40 will now be described in connection with FIGS. 2 and 5. Once the RF signal transmitted by a satellite 5 is received into a particular LNB 13,

Asserted Claims	Davis '055
	the signal may be sent to a corresponding input/ output port of LNB interface 41. The RF signal may then be sent to the received signal processing and encryption unit 44, where the signal is converted into a digital baseband signal. The received signal processing and encryption unit 44 may perform other signal processing on the baseband signal, such as filtering noise and other unwanted information. In addition, the received signal processing and encryption unit 44 may encrypt the digital baseband signal, such that only IDUs having a certain decryption key will be able to decrypt the signal and access the information contained therein. *See also* Davis Provs. at 3: Current satellite anntennas use cables to connect the antenna with what is commonly called the "indoor unit", the device that the user connects to to send/receive data. (Data can include digitized A/V material, such as DIRECTV). As satellite based services evolve, more and more cables are required. Units are now being built that have 2 receive cables, or a receive and transmit cable. In the short term the number of cables could increase to 5 or 10 with currently envisioned services. This invention replaces these cables with one (power) or two (power plus phone, or power plus wired LAN), using industry standard interface mechanisms, while simultaneously greatly increasing the flexibility of the installation to allow future services without adding any new cables. EXPLAIN THE PURPOSE AND ADVANTAGES OF YOUR INVENTION (WHAT WILL THE INVENTION .... DO BETTER THAN DONE PREVIOUSLY?) • Minimizes number of cables to be run from the outdoor unit (maximum 2); • Minimizes cables to be run between outdoor unit and any particular indoor unit • Allows many indoor units to access one outdoor unit. • Allows new indoor units/new services to be added after initial installation without any new cables

Asserted Claims	Davis '055
	• Greatly simplifies installation in MDU's (Multi dwelling units) • Enables subscription services like home security and diagnostics/maintenance of appliances. Davis Provis. at 5: The interface between the indoor units(s) and outdoor unit of DirecPC/DIRECTV/ DirecWay/Spaceway all could use this invention. … Wireless connections between ODU and IOU have been proposed before. As far as I know, these have been analog repeaters of the signals on the IDU/ODU cable, and performing esentially [sic] the same functions as the cable. Using a LAN allows multiple access, and greatly increased flexibility for future services via an industry standard method. Davis Provis. at 7: Current practice will often use what is called a "multiswitch" in an installation. This is a device that has one cable for each LNB on the ODU side, and one cable for each IDU satellite input on the IDU side. The multiswitch is responsible for connecting the correct LNB to each IDU as commanded by the IDU. This multiswitch can be colocated with the antenna, or remotely mounted. This invention uses the same connectivity as the multiswitch on the ODU side (one cable for each LNB) but replaces the multiswitch to IDU cable with a LAN. To do this, this invention has receivers inside for each LNB that convert the RF input to digital base band information. This digital baseband information can be filtered to discard unwanted information, can be compressed if it is not already, and can be encrypted for privacy if desired. The digital baseband data is then multiplexed together and sent via the LAN to the receiving IDU (s). Data can be sent point to point or broadcast.

Asserted Claims	Davis '055
	Data to be transmitted over the satellite and control data for the receivers in this invention is sent over the LAN to the unit from the transmitting IDU. A cable connection exists from this invention to the transmitter on the ODU, as is current practice. To the extent Davis '055 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '055 alone or it would have been obvious to combine Davis '055 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Davis '730

U.S. Patent No. 6,600,730 ("Davis '730") was filed on Aug. 20, 1998 and issued on July 29, 2003. Davis '730 therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Davis '730 invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, in Appendix A, or in combination with various prior art references identified in the chart, as discussed below, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Davis '730
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Davis '730 discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Davis '730 at Abstract:

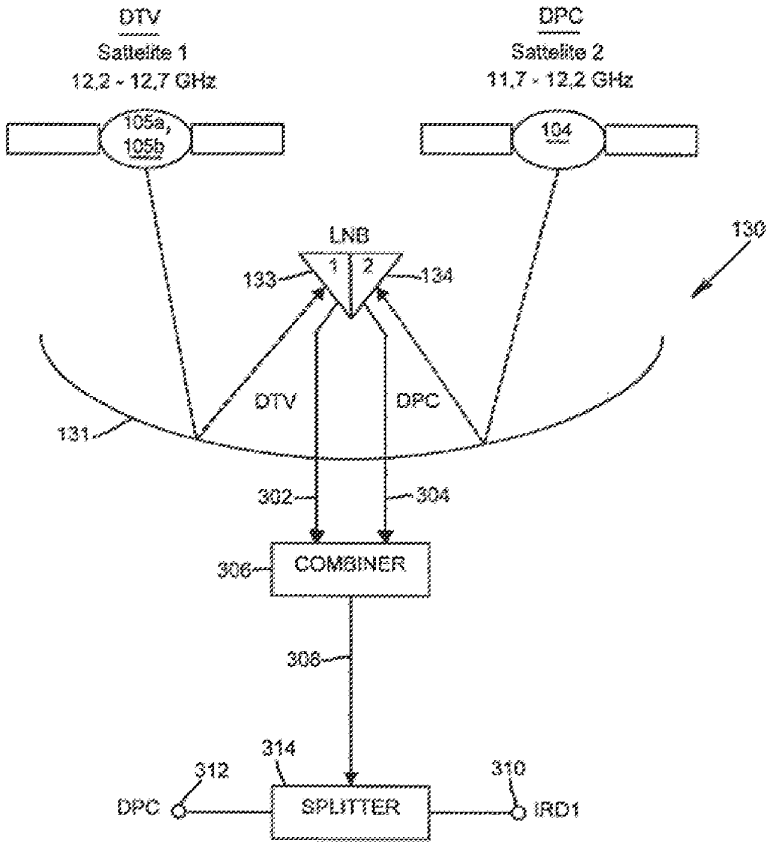
[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

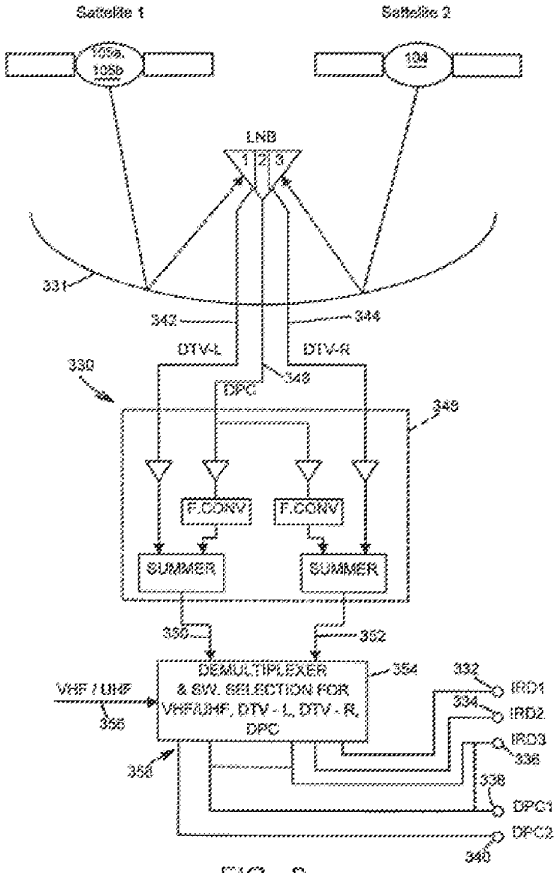
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Asserted Claims	Davis '730
	A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 1:10–14: The present invention relates in general to satellite receive earth stations and, more particularly, to a system for receiving satellite signals from separate and multiple satellites and distributing the signals received from the satellites on a single cable line. Davis '730 at 2:1–11: In a pending application, U.S. Ser. No. 08/544,423 filed Oct. 10, 1995, assigned to the same assignee as herein, there is described a satellite receive antenna capable of simultaneously receiving signals from satellites at different geostationary positions. The aforementioned application Ser. No. 08/544,423 is incorporated herein by reference. This enables one to receive separate multiple satellite communication services signals on a single antenna which therefor eliminates the requirement for a costly antenna array for a household desiring to subscribe to more than one satellite communication service. Davis '730 at 2:24–39: The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the

Asserted Claims	Davis '730
	present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40–56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are

Asserted Claims	Davis '730
	adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:51–68: A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as. Davis '730 at 7:1–8: Accordingly, it can be seen that in either of the illustrated embodiments, separate multiple satellite communication service signals are supplied on a single cable line at the local earth receiver site. Secondly, with respect to the embodiment shown in FIG. 8, all of the communication satellite signals from each of the separate satellites is available simultaneously on each of the single cable lines connected, for instance, to terminals 332, 334, 336, 338, 340. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 8:

Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art

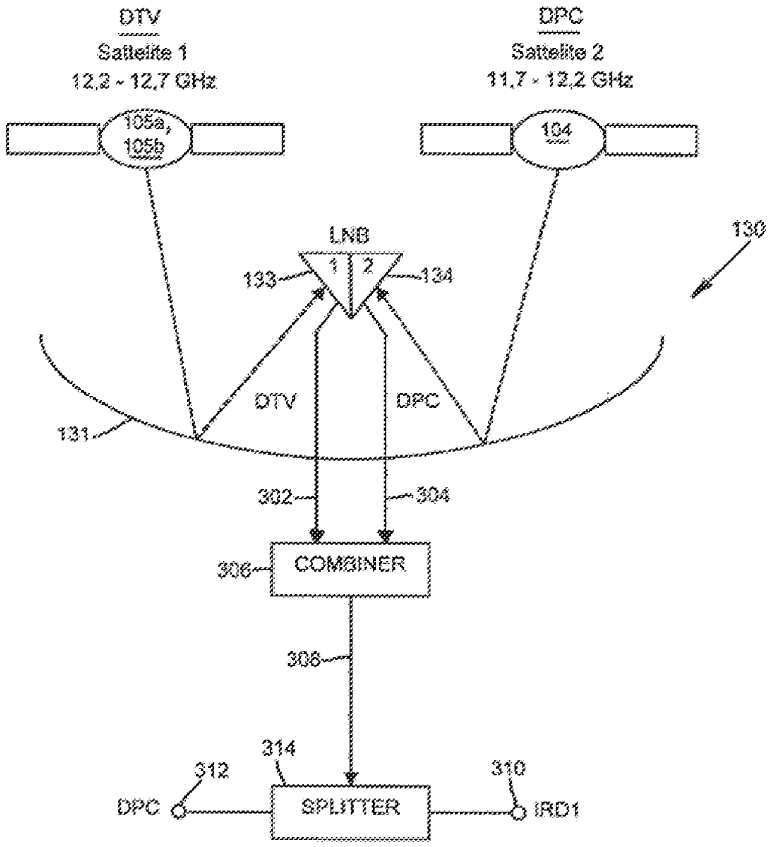
Asserted Claims	Davis '730
	in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Davis '730 discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Davis '730 at 6:51–68: A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as. Davis '730 at 7:1–8: Accordingly, it can be seen that in either of the illustrated embodiments, separate multiple satellite communication service signals are supplied on a single cable line at the local earth receiver site. Secondly, with respect to the embodiment shown in FIG. 8, all of the communication satellite signals from each of the separate satellites is available

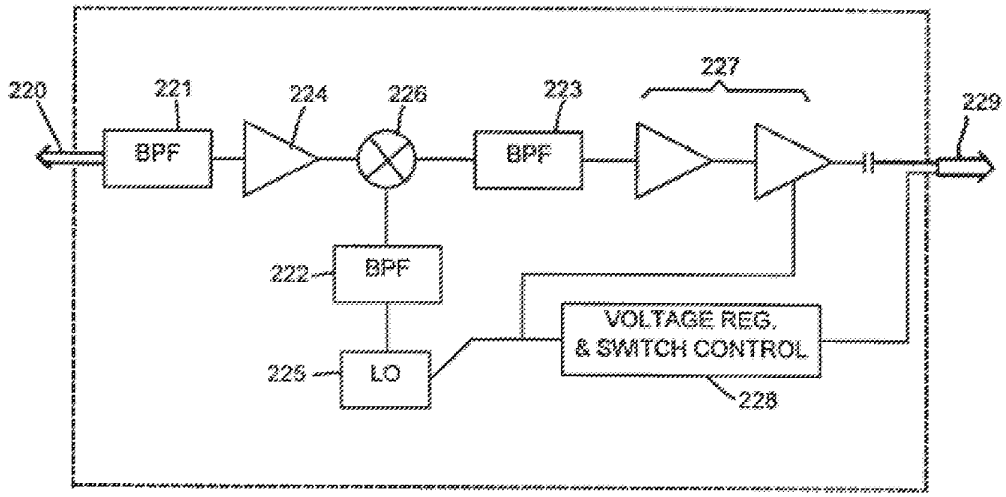
Asserted Claims	Davis '730
	simultaneously on each of the single cable lines connected, for instance, to terminals 332, 334, 336, 338, 340. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Davis '730 discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver.

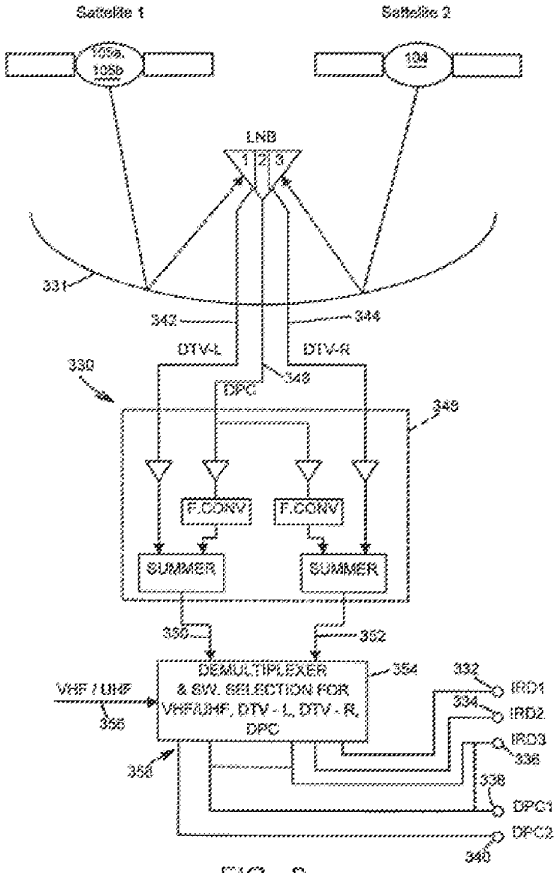
Asserted Claims	Davis '730
	Davis '730 at 2:40–56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:14–23: Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art. Davis '730 at 5:33–47: Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the

Asserted Claims	Davis '730
	indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:51–68: A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer

Asserted Claims	Davis '730
	354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 5:

Asserted Claims	Davis '730
	 FIG. 5 Davis '730 at Fig. 8:

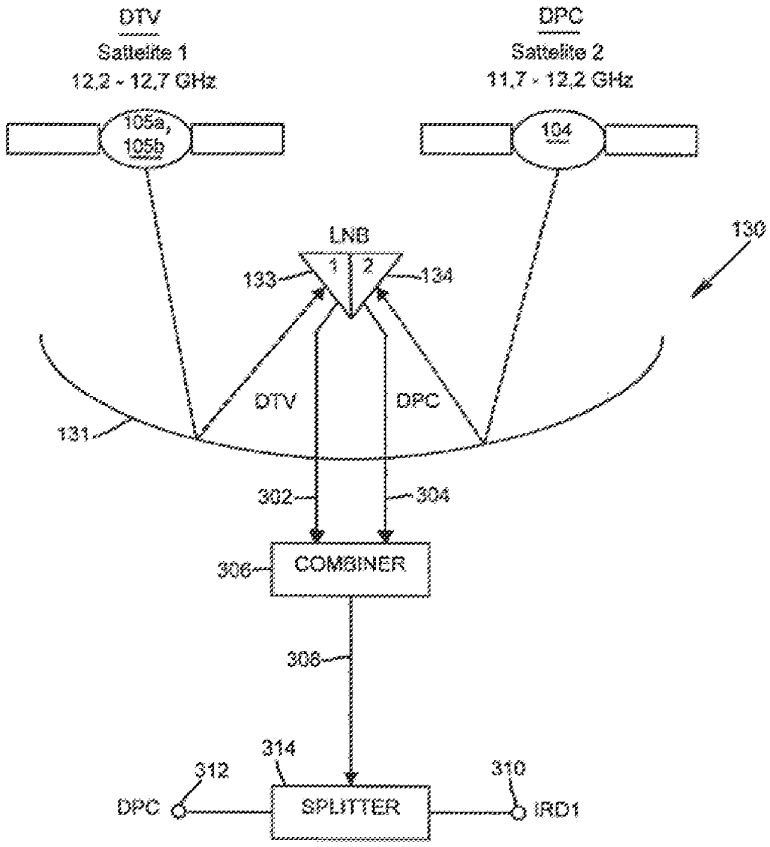
Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

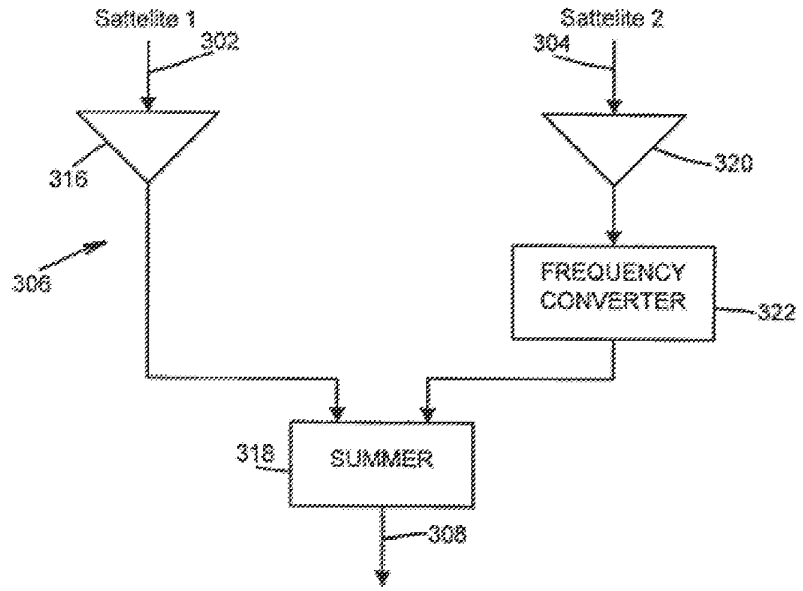
Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Davis '730 discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 2:24–39: The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of

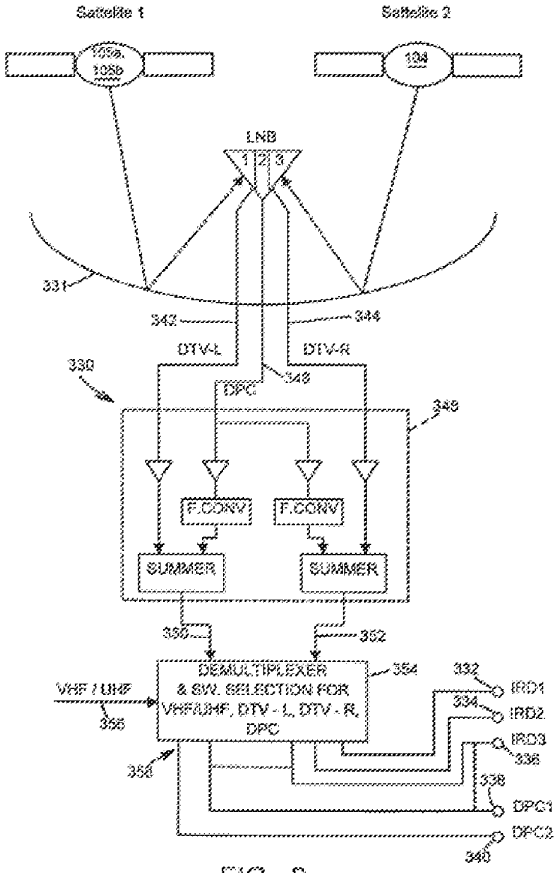
Asserted Claims	Davis '730
	frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40–56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.

Asserted Claims	Davis '730
	Davis '730 at 5:62–6:4: Referring to FIG. 6, there is illustrated the details of the combiner 306. Input line 302 containing the DTV, either left-hand or right-hand polarized signals is coupled to a buffer amplifier 316 and then supplied to a summer 318. Input line 304 containing the DPC frequency band also at 950-1450 MHz is coupled to a buffer amplifier 320 and thereafter coupled to a frequency converter 322 for upconverting the 95014 1450 MHz band to a band between about 1550-2050 MHz. Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 6:33–50: The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b)

Asserted Claims	Davis '730
	shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 6:

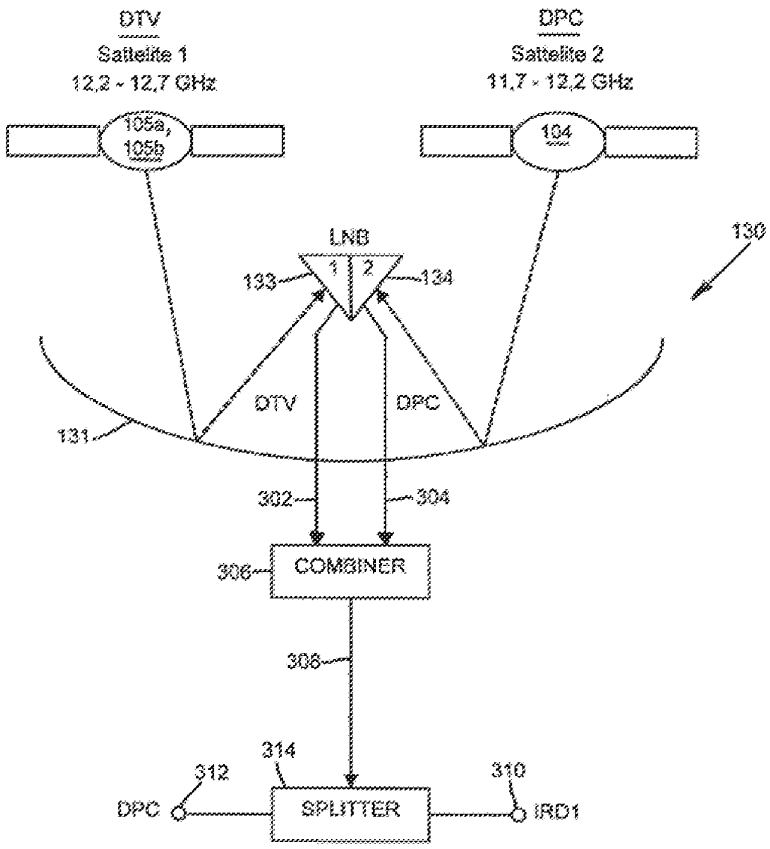
Asserted Claims	Davis '730
	 FIG. 6 Davis '730 at Fig. 8:

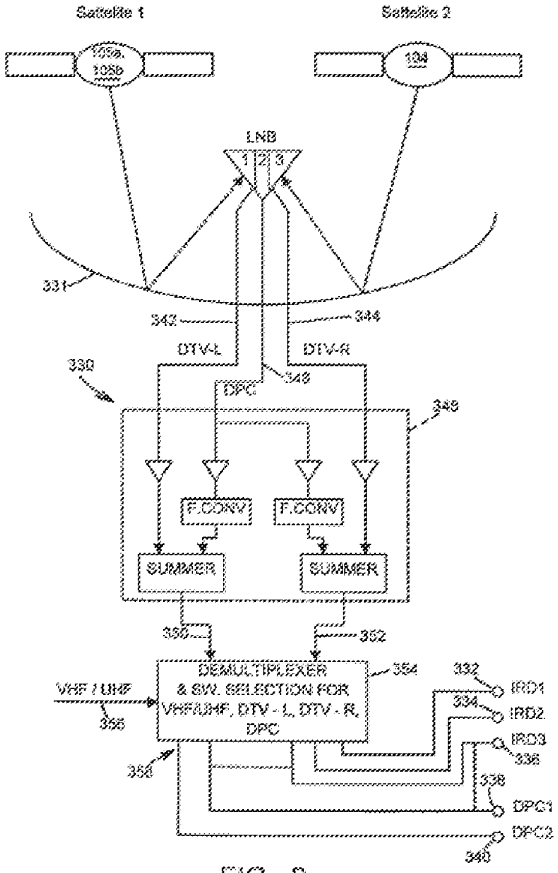
Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Davis '730 discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 1:10–14: The present invention relates in general to satellite receive earth stations and, more particularly, to a system for receiving satellite signals from separate and multiple satellites and distributing the signals received from the satellites on a single cable line. Davis '730 at 2:24–39:

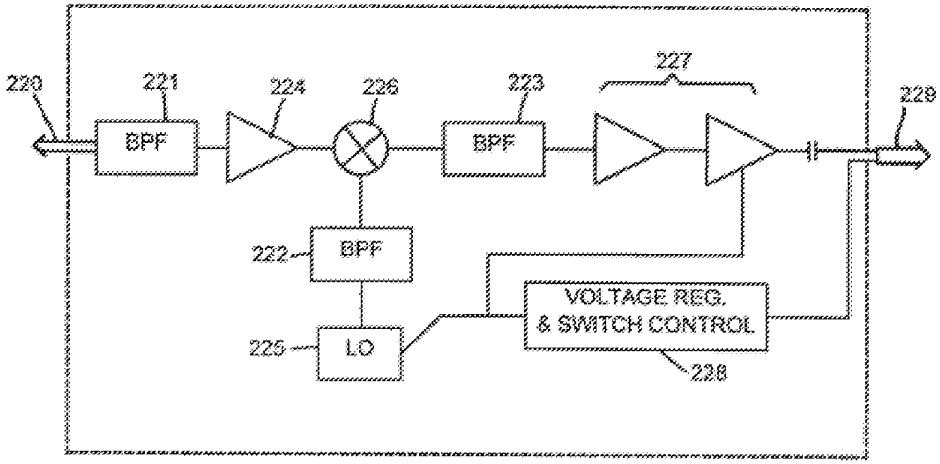
Asserted Claims	Davis '730
	The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40--56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:48--61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-

Asserted Claims	Davis '730
	1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 7:1–8: Accordingly, it can be seen that in either of the illustrated embodiments, separate multiple satellite communication service signals are supplied on a single cable line at the local earth receiver site. Secondly, with respect to the embodiment shown in FIG. 8, all of the communication satellite signals from each of the separate satellites is available simultaneously on each of the single cable lines connected, for instance, to terminals 332, 334, 336, 338, 340. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 8:

Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Davis '730 discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Davis '730 at 4:62–5:13: As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, 134 are located as previously described. An LNB is preferably comprised of an integrated low noise amplifier and a low noise frequency converter, and such devices are well-known to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB. Davis '730 at Fig. 5:

Asserted Claims	Davis '730
	 FIG. 5 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Davis '730 discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Davis '730
	Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 2:24–39: The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40–56:

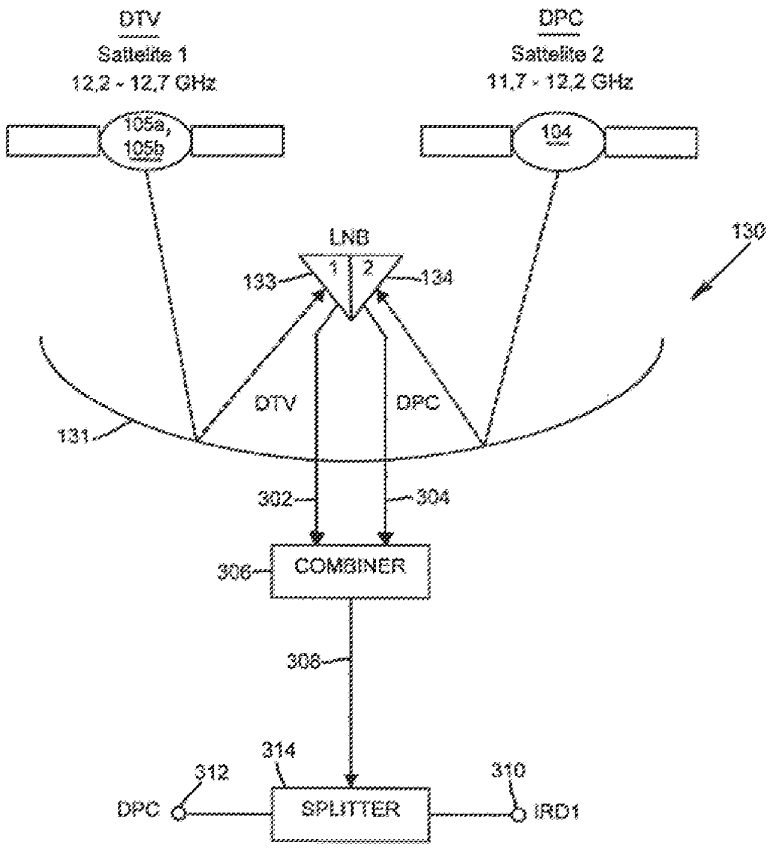
Asserted Claims	Davis '730
	According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 3:27–42: Preferably, uplink transmitter 102 modulates a digital signal onto the assigned frequency carriers for uplink to satellites 105 a, 105 b. Satellites 105 a, 105 b translate the uplink carriers to the assigned Ku2-band downlink frequency carriers, (over 12 GHz), for downlink to the satellite receiver 130. The satellites 105 a, 105 b ordinarily transmit carrier signals with alternating left-hand circularly polarized (LHCP) and right-hand circularly polarized (RHCP) signals. Preferably, satellites 105 a, 105 are high-power satellites that transmit downlink signals in a focused beam pattern 108. Similarly, the uplink transmitter 101 uplinks signals to satellite 104. The satellite 104 translates the carrier signals to the assigned C-band or Ku-band downlink frequencies for subsequent demodulation and downlink to the satellite receiver 130. The satellite 104, ordinarily transmits carriers with alternating vertical and horizontal polarity. Davis '730 at 4:62–5:13: As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, 134 are located as previously described. An LNB is preferably comprised of an integrated

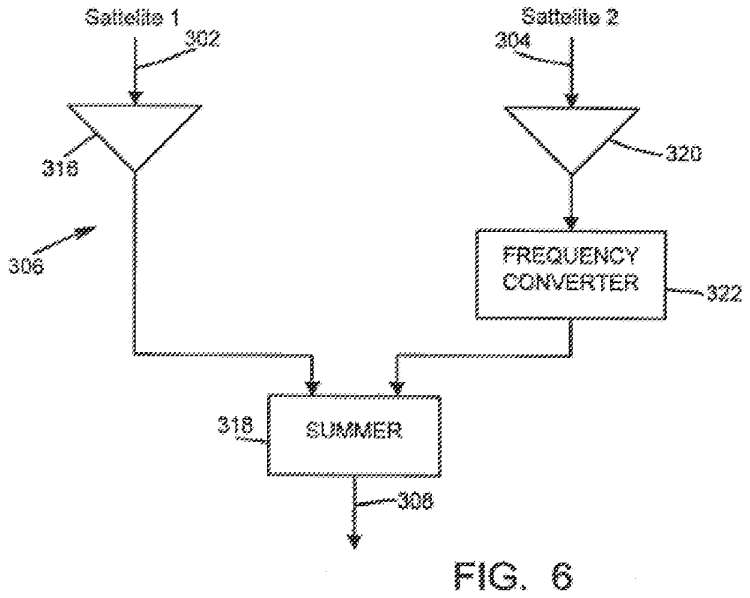
Asserted Claims	Davis '730
	low noise amplifier and a low noise frequency converter, and such devices are well-known to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB. Davis '730 at 5:14–23: Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art. Davis '730 at 5:24–32: The LNBs 133, 134 detect signals relayed from the feedhorn 132, convert the signals to an electrical current, amplify the signals, and downconvert the signals to a lower frequency. LNBs typically downconvert signals from the received satellite carrier frequencies to intermediate frequencies between 900 MHz and 2000 MHz. In the preferred embodiment, the LNB downconverts the satellite carrier signals to the intermediate frequency range of 950 to 1450 MHz. Davis '730 at 5:33–47: Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is

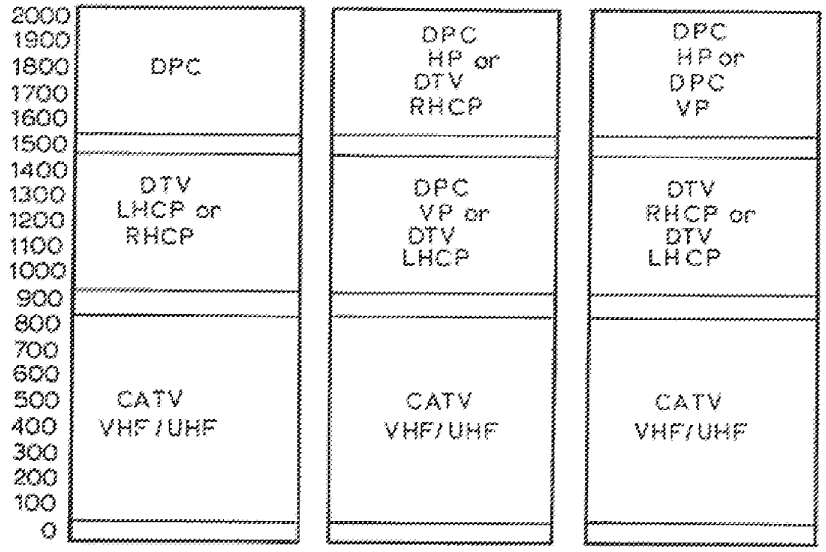
Asserted Claims	Davis '730
	viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 5:62–6:4: Referring to FIG. 6, there is illustrated the details of the combiner 306. Input line 302 containing the DTV, either left-hand or right-hand polarized signals is coupled to a buffer amplifier 316 and then supplied to a summer 318. Input line 304 containing the DPC frequency band also at 950-1450 MHz is coupled to a buffer amplifier 320 and thereafter coupled to a frequency converter 322 for upconverting the 95014 1450 MHz band to a band between about 1550-2050 MHz. Davis '730 at 6:5–14:

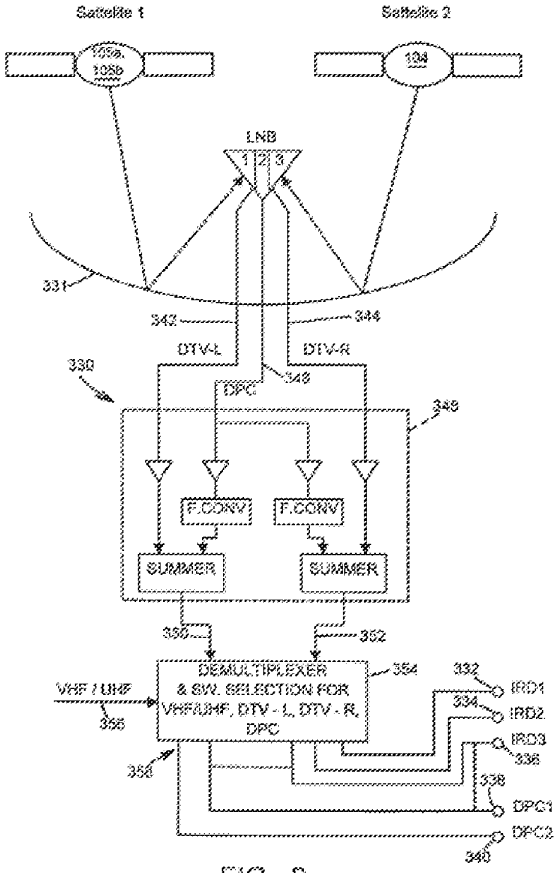
Asserted Claims	Davis '730
	Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 6:15–32: Reference may be made now to FIG. 8 wherein there is illustrated a local earth site distribution system 330 which enables each of the users at terminals 332, 334 . . . 340 to have access to both the left-hand as well as the right-hand DTV signals from satellites 105 a, 105 b, as well as having access to the DPC signals from satellite 104. In the embodiment 330 shown in FIG. 8, the receiving antenna 331 includes an LNB with three outputs. One of the LNB outputs is a downconverted intermediate frequency from satellite 105 a, 105 b representing the left-hand polarized signals in the range 950 MHz to 1450 MHz, and is labelled DTV-L and is supplied on output line 342. Similarly, output line 344 contains the downconverted right-hand polarized portion of the 950 MHz to 1450 MHz signals from satellites 105 a, 105 b and is indicated in FIG. 8 as DTVR. The third output line 346 of the LNB provides the downconverted intermediate frequencies received from satellite 104, and this output line is accordingly labelled DPC. Davis '730 at 6:33–50: The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The

Asserted Claims	Davis '730
	DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 6:

Asserted Claims	Davis '730
	 FIG. 6 Davis '730 at Fig. 7:

Asserted Claims	Davis '730
	 FIG. 7A FIG. 7B FIG. 7C Davis '730 at Fig. 8:

Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Davis '730 discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 2:24–39: The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second

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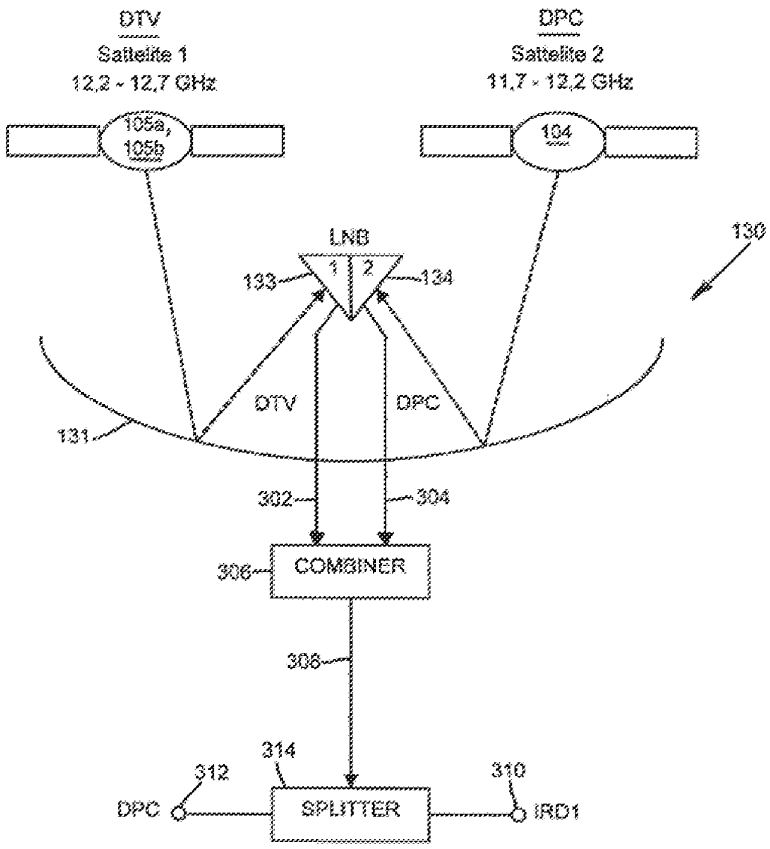
Asserted Claims	Davis '730
	broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40–56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 3:27–42: Preferably, uplink transmitter 102 modulates a digital signal onto the assigned frequency carriers for uplink to satellites 105 a, 105 b. Satellites 105 a, 105 b translate the uplink carriers to the assigned Ku2-band downlink frequency carriers, (over 12 GHz), for downlink to the satellite receiver 130. The satellites 105 a, 105 b ordinarily transmit carrier signals with alternating left-hand circularly polarized (LHCP) and right-hand circularly polarized (RHCP) signals. Preferably, satellites 105 a, 105 are high-power satellites that transmit downlink signals in a focused beam pattern 108. Similarly, the uplink transmitter

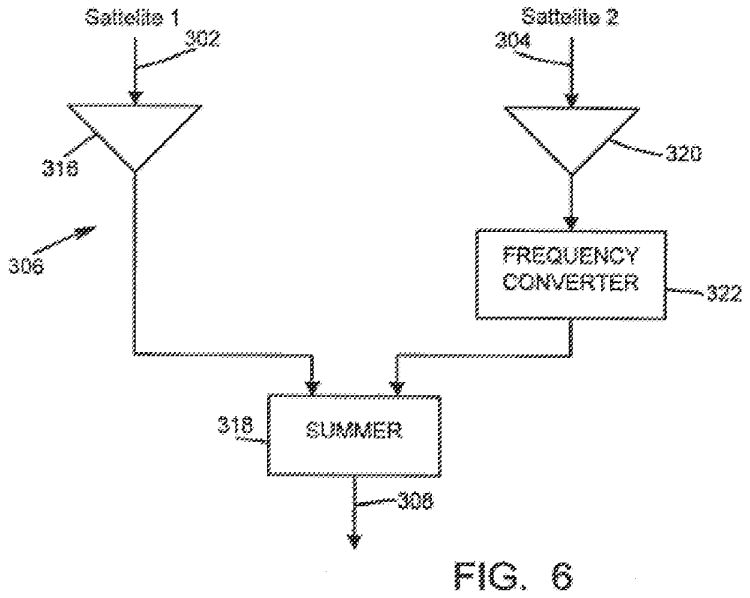
Asserted Claims	Davis '730
	101 uplinks signals to satellite 104. The satellite 104 translates the carrier signals to the assigned C-band or Ku-band downlink frequencies for subsequent demodulation and downlink to the satellite receiver 130. The satellite 104, ordinarily transmits carriers with alternating vertical and horizontal polarity. Davis '730 at 4:62–5:13: As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, 134 are located as previously described. An LNB is preferably comprised of an integrated low noise amplifier and a low noise frequency converter, and such devices are well-known to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB. Davis '730 at 5:14–23: Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art. Davis '730 at 5:24–32:

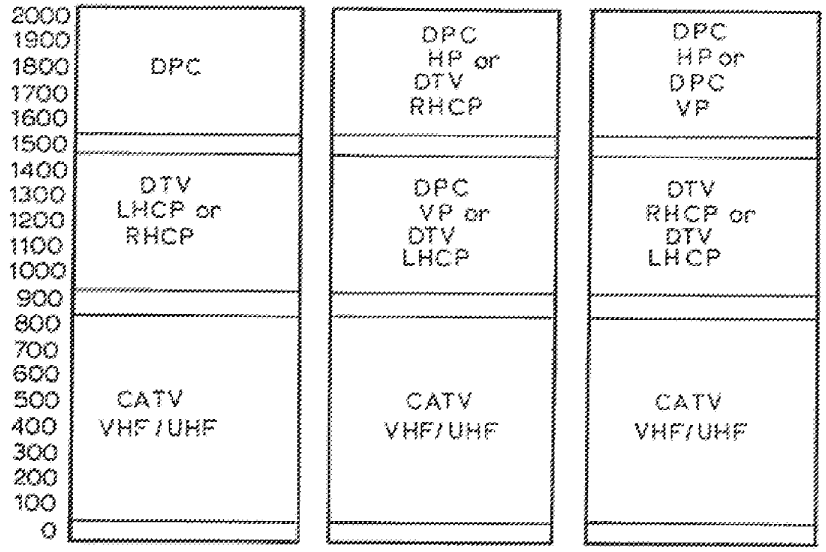
Asserted Claims	Davis '730
	The LNBs 133, 134 detect signals relayed from the feedhorn 132, convert the signals to an electrical current, amplify the signals, and downconvert the signals to a lower frequency. LNBs typically downconvert signals from the received satellite carrier frequencies to intermediate frequencies between 900 MHz and 2000 MHz. In the preferred embodiment, the LNB downconverts the satellite carrier signals to the intermediate frequency range of 950 to 1450 MHz. Davis '730 at 5:33–47: Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308.

Asserted Claims	Davis '730
	Davis '730 at 5:62–6:4: Referring to FIG. 6, there is illustrated the details of the combiner 306. Input line 302 containing the DTV, either left-hand or right-hand polarized signals is coupled to a buffer amplifier 316 and then supplied to a summer 318. Input line 304 containing the DPC frequency band also at 950-1450 MHz is coupled to a buffer amplifier 320 and thereafter coupled to a frequency converter 322 for upconverting the 95014 1450 MHz band to a band between about 1550-2050 MHz. Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 6:15–32: Reference may be made now to FIG. 8 wherein there is illustrated a local earth site distribution system 330 which enables each of the users at terminals 332, 334 . . . 340 to have access to both the left-hand as well as the right-hand DTV signals from satellites 105 a, 105 b, as well as having access to the DPC signals from satellite 104. In the embodiment 330 shown in FIG. 8, the receiving antenna 331 includes an LNB with three outputs. One of the LNB outputs is a downconverted intermediate frequency from satellite 105 a, 105 b representing the left-hand polarized signals in the range 950 MHz to 1450 MHz, and is labelled DTV-L and is supplied on output line 342. Similarly, output line 344 contains the downconverted right-hand polarized portion of the 950 MHz to 1450 MHz signals from satellites 105 a, 105 b and is indicated in FIG. 8 as DTVR. The third output line 346 of the

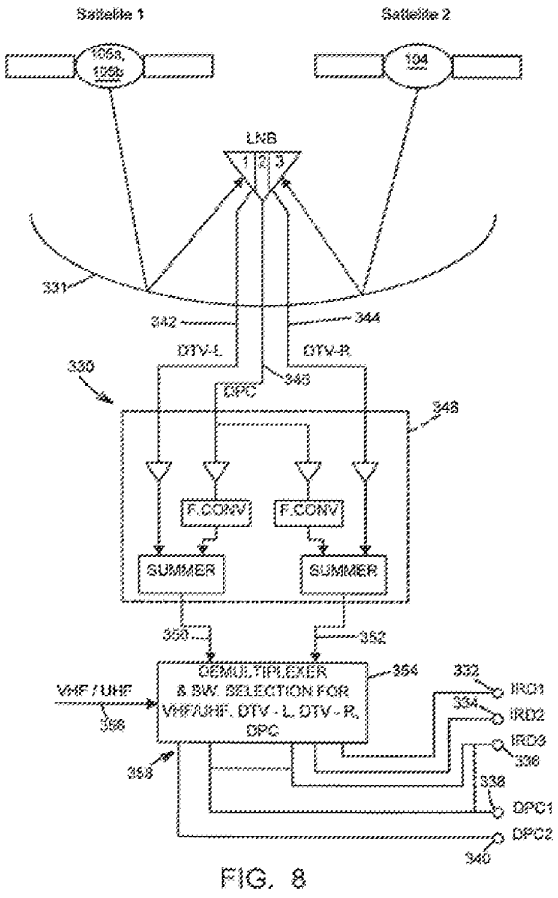
Asserted Claims	Davis '730
	LNB provides the downconverted intermediate frequencies received from satellite 104, and this output line is accordingly labelled DPC. Davis '730 at 6:33–50: The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b) shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 6:

Asserted Claims	Davis '730
	 FIG. 6 Davis '730 at Fig. 7:

Asserted Claims	Davis '730
	 FIG. 7A FIG. 7B FIG. 7C Davis '730 at Fig. 8:

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Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art

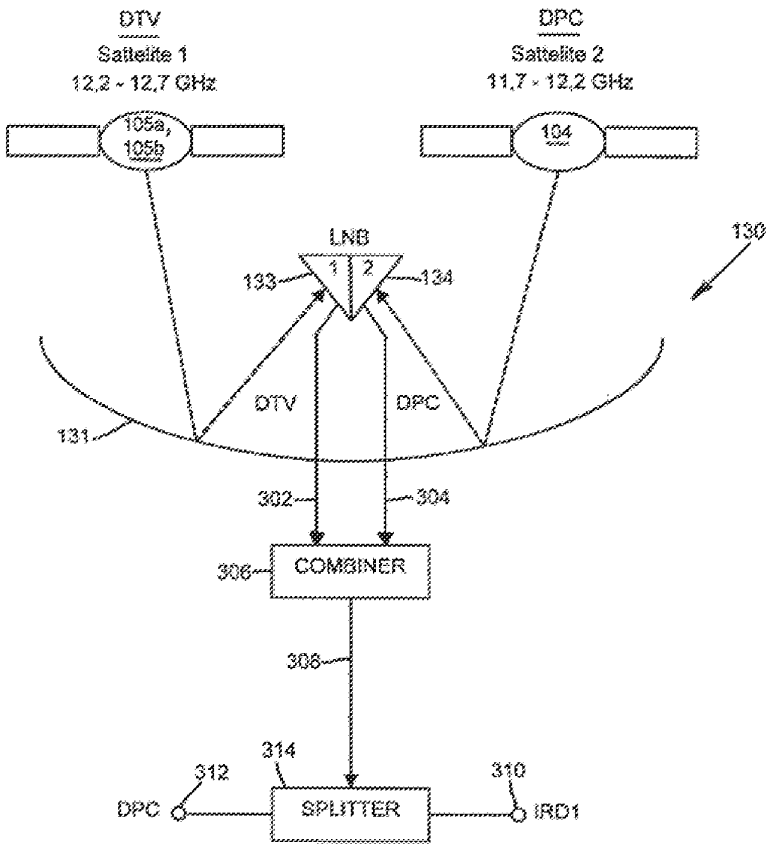
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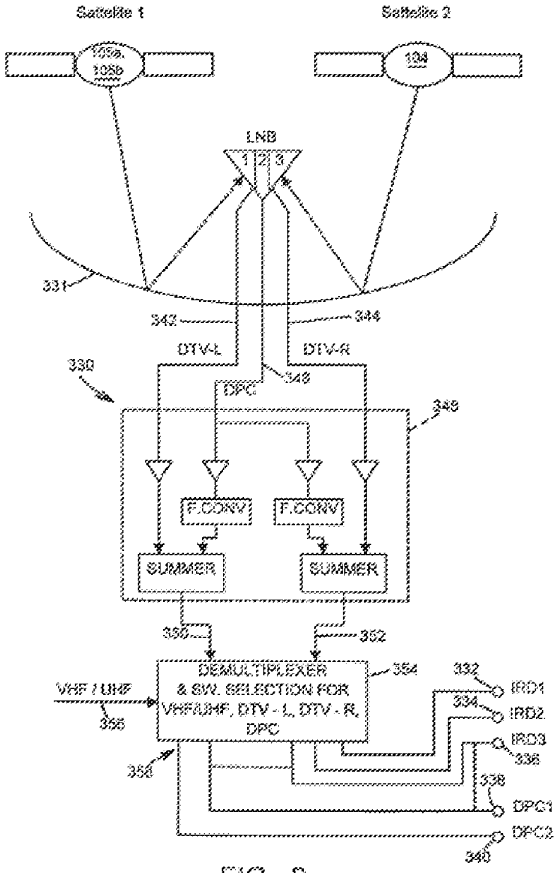
Asserted Claims	Davis '730
	in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Davis '730 discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 2:24–39: The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a

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Asserted Claims	Davis '730
	first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40–56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:48–61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line

Asserted Claims	Davis '730
	308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:51–68: A demultiplexer 354 includes respective inputs for receiving output lines 350 and 352, and also an input line 356 containing VHF/UHF broadcast signals. Demultiplexer 354 includes output lines 358 each of which can supply any of the signals from input lines 350, 352 and 356 for coupling to the respective terminals 332, 334 . . . 340. For instance, the IRD 1 unit coupled to terminal 332 has access to all of the signals received from both of the separate satellites 105 a, 105 b as well as from satellite 104. Coupling of the selected signals is accomplished automatically in a well-known manner, such as by using voltage biased levels supplied from IRD 1 to a switch selector in the multiplexer 354 to accomplish the selection of the particular signal desired. This switch selection may be accomplished in a manner similar to that previously described with respect to existing LNBs. Demultiplexer 354 is a standard commercially available unit, such as Channelmaster model 63141FD, or similar available units such as. Davis '730 at 7:1–8: Accordingly, it can be seen that in either of the illustrated embodiments, separate multiple satellite communication service signals are supplied on a single cable line at the local earth receiver site. Secondly, with respect to the embodiment shown in FIG. 8, all of the communication satellite signals from each of the separate satellites is available simultaneously on each of the single cable lines connected, for instance, to terminals 332, 334, 336, 338, 340. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 8:

Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

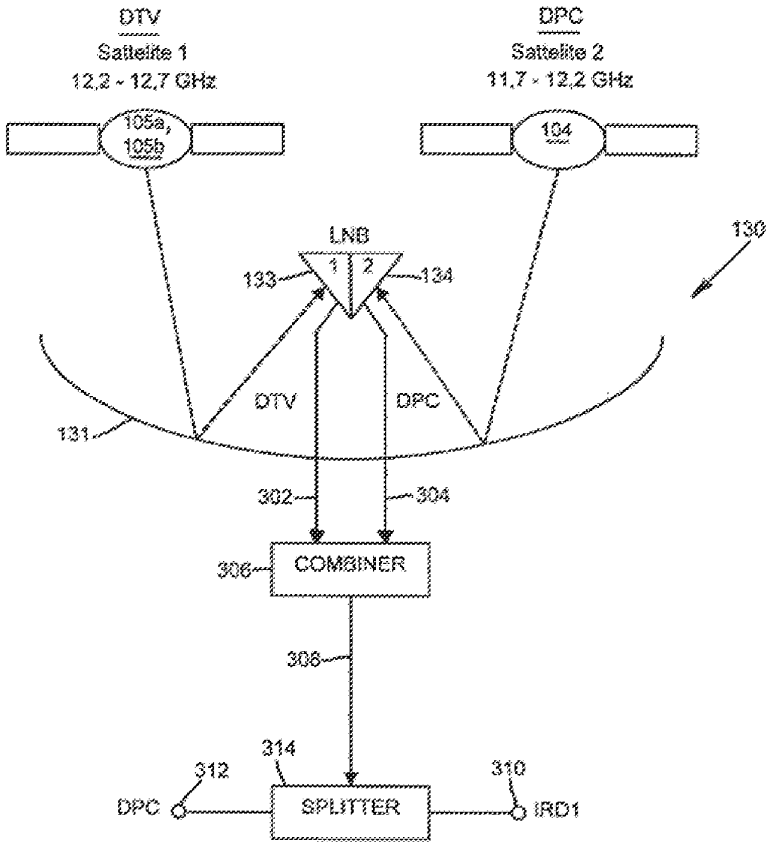
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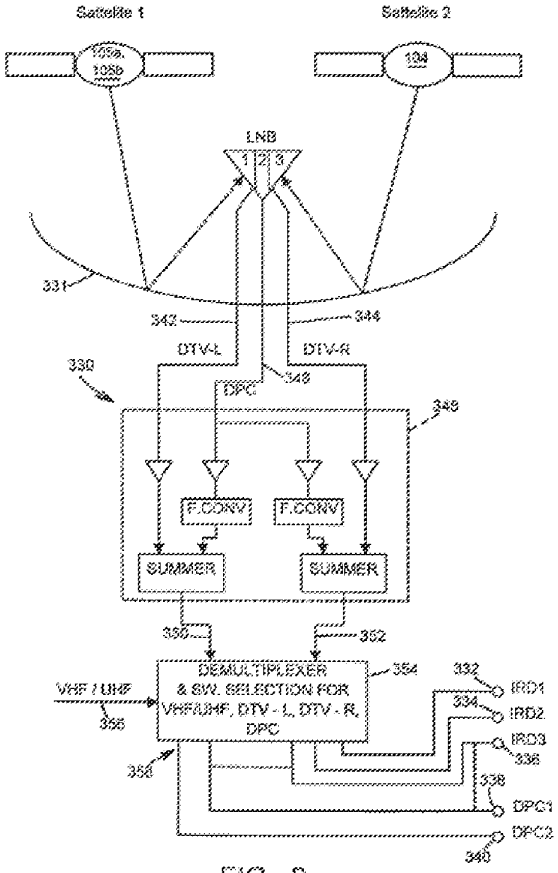
Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Davis '730 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Davis '730 at Abstract: A system for distributing separate multiple satellite communication services signals to receivers at a local earth site on a single cable line. A dual satellite antenna receives the signals from two separate satellites, each of which can correspond to a respective satellite communication service. The received satellite signals are processed into two separate frequency bands. A frequency converter using frequency division multiplexing converts at least one of the received frequency bands so as to position both of the frequency bands adjacent to each other. A summer receives the adjacent frequency bands and distributes them on a single cable line to receivers so that the receivers have access to the separate multiple satellite communication service signals on a single cable line. A demultiplexer coupled to the adjacent frequency bands from the summer enables the plurality of receivers at the output of the demultiplexer lines to obtain simultaneous access to both satellite communication services distributed over the single cable line to the receiver. Davis '730 at 1:10–14: The present invention relates in general to satellite receive earth stations and, more particularly, to a system for receiving satellite signals from separate and multiple satellites and distributing the signals received from the satellites on a single cable line. Davis '730 at 2:24–39:

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Asserted Claims	Davis '730
	The present invention relates to a system for distributing satellite communication signals from separate multiple satellites on a single cable line. According to one aspect of the present invention, a dual satellite receiving antenna receives a first broadband signal at a first set of frequency bands corresponding to first satellite service signals, and a second broadband signal at a second set of frequency bands corresponding to second satellite service signals. A frequency converter using frequency division multiplexing receives and converts at least one of the sets of frequency bands to position the converted set of frequency bands adjacent to the other frequency band. A combiner receives the two adjacent frequency bands and distributes them on a single cable line to one or more receivers at the local site for access of the separate multiple satellite communication service signals by the receivers. Davis '730 at 2:40--56: According to another aspect of the present invention, a dual mode or two-channel LNB provides both the right-hand polarized and the left-hand polarized signals of a DTV satellite system signal to be provided via separate lines. A frequency converter, utilizing frequency division multiplexing frequency converts the signals from a second satellite system, such as, DPC with each of the separate DTV-left-hand polarization and right-hand polarization signals to provide two adjacent bands of frequency signals, each of which is separately combined in a respective summer unit and distributed on a single coaxial line. A demultiplexer and switch selection circuitry is provided for receiving the two separate lines from the respective summer units and provides a plurality of single cable output lines on which each coupled receiver may simultaneously access any of the received separate satellite signals from the multiple satellites and on a single cable line supplied to the respective receiver. Davis '730 at 5:48--61: Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-

Asserted Claims	Davis '730
	1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 7:1–8: Accordingly, it can be seen that in either of the illustrated embodiments, separate multiple satellite communication service signals are supplied on a single cable line at the local earth receiver site. Secondly, with respect to the embodiment shown in FIG. 8, all of the communication satellite signals from each of the separate satellites is available simultaneously on each of the single cable lines connected, for instance, to terminals 332, 334, 336, 338, 340. Davis '730 at Fig. 4:

Asserted Claims	Davis '730
	 FIG. 4 Davis '730 at Fig. 8:

Asserted Claims	Davis '730
	 FIG. 8 To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one

Asserted Claims	Davis '730
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Davis '730 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Davis '730 discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Davis '730 discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*.

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Asserted Claims	Davis '730
	To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Davis '730 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Davis '730 discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer	Davis '730 discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.

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Asserted Claims	Davis '730
function to the digitized broadband signal.	*See* claims 14, 15, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Davis '730 discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Davis '730 discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

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Asserted Claims	Davis '730
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Davis '730 discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. *See, e.g.*: Davis '730 at 5:14–23: Local oscillator (LO) 225 and Schottky diode 226 mix the signal to the desired frequency. The signal is then amplified by amplifier stage 227 before being sent but on a shielded coaxial line 229 to an indoor receiver. A voltage regulator 228 preferably regulates the voltage provided by the LNB to the indoor receiver and incorporates a voltage level switch control for selecting either the right-hand or left-hand polarized signals in response to a switch control signal from the indoor receiver in a manner well-known to those skilled in the art. Davis '730 at 5:33–47: Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit.

Asserted Claims	Davis '730
	To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Davis '730 discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claim 14, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Davis '730 discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*: Davis '730 at 4:62–5:13: As shown in FIG. 4, each of the respectively received separate satellite signals from the separate satellites are focused by antenna 131 at a focal point where there the LNBs 133, 134 are located as previously described. An LNB is preferably comprised of an integrated low noise amplifier and a low noise frequency converter, and such devices are well-known

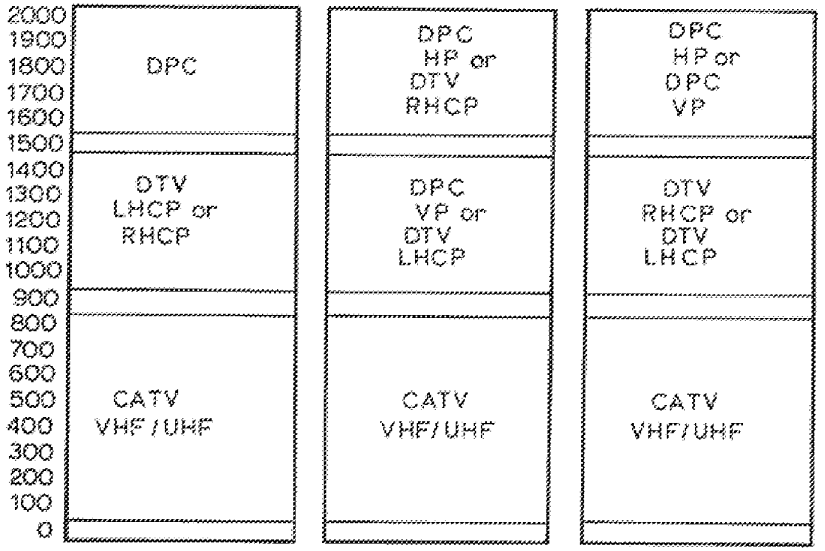
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Asserted Claims	Davis '730
	to those skilled in the art. Reference may be made for instance to FIG. 5 where there is illustrated a representative LNB with an input 220 receiving signals from the antenna, and an output 229 coupling the intermediate frequency band to a receiver. Bandpass filters (BPF) 221, 222, 223 remove unwanted frequency signals while allowing desired signals to pass. Preferably, a field effect transistor (FET) amplifier 224, pre-amplifies the signal before it is mixed to the desired frequency. FET amplifier 224 is preferably a GaAs amplifier that provides a gain of 10 dB with a noise figure of 0.9 dB or less. Preferably, FET amplifier 224 provides a gain of 30 dB to 60 dB. Davis '730 at 5:24–32: The LNBs 133, 134 detect signals relayed from the feedhorn 132, convert the signals to an electrical current, amplify the signals, and downconvert the signals to a lower frequency. LNBs typically downconvert signals from the received satellite carrier frequencies to intermediate frequencies between 900 MHz and 2000 MHz. In the preferred embodiment, the LNB downconverts the satellite carrier signals to the intermediate frequency range of 950 to 1450 MHz. Davis '730 at 5:33–47: Typically, only the RHCP signals or the LHCP signals are converted down to the intermediate frequency, depending on which particular receiver channel a DTV user is viewing. That is, when the viewer selects a particular DTV channel, an appropriate voltage switch control level is supplied to the LNB in a known manner to control the local oscillator 225 so as to provide either the RHCP or the LHCP signals for return to the indoor receiver. However, in systems having a dual mode or two-channel LNB, as well-known to those skilled in the art, both RHCP LHCP signals may be individually shifted down to a 500 MHz portion of L-Band (e.g. between 950 MHz and 1450 MHz) and provided, via separate lines, each like output line 229, to a set-top box or other integrated receiver and detector (IRD) associated with the receiver unit. Davis '730 at 5:48–61:

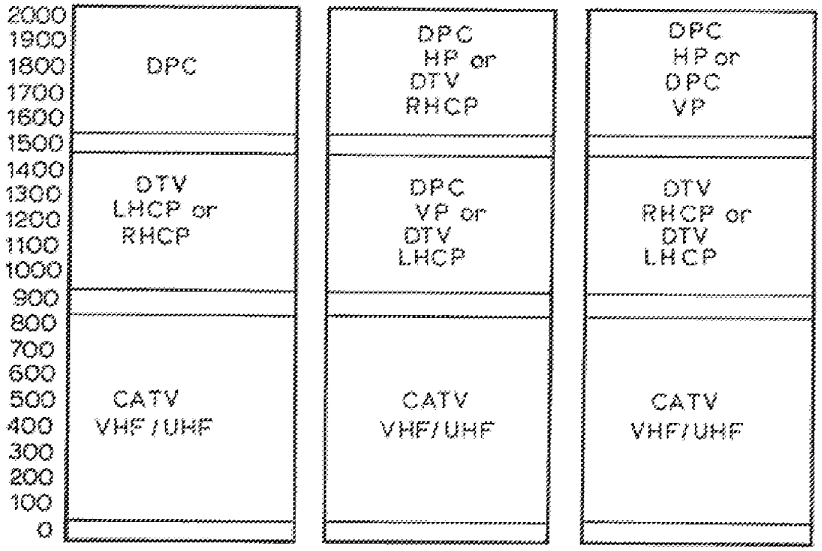
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Asserted Claims	Davis '730
	Accordingly, in FIG. 4, the output on line 302 is a DTV-left-hand or right-hand polarized signal in the frequency range 950-1450 MHz. On an output line 304 from the LNB 134, there is provided the DPC satellite signals at the intermediate frequency range also of 950-1450 MHz. A combiner 306 provides frequency division multiplexing to the two input signals on lines 302, 304 and locates the band of frequencies together so that they are adjacent and consecutive, thereby enabling them to be placed on a single coaxial cable line 308 for distribution to respective IRD and DPC units at respective terminals 310, 312, each of which is connected to a respective single coaxial line ultimately connected through a splitter 314 to the single coaxial line 308. Davis '730 at 6:15–32: Reference may be made now to FIG. 8 wherein there is illustrated a local earth site distribution system 330 which enables each of the users at terminals 332, 334 . . . 340 to have access to both the left-hand as well as the right-hand DTV signals from satellites 105 a, 105 b, as well as having access to the DPC signals from satellite 104. In the embodiment 330 shown in FIG. 8, the receiving antenna 331 includes an LNB with three outputs. One of the LNB outputs is a downconverted intermediate frequency from satellite 105 a, 105 b representing the left-hand polarized signals in the range 950 MHz to 1450 MHz, and is labelled DTV-L and is supplied on output line 342. Similarly, output line 344 contains the downconverted right-hand polarized portion of the 950 MHz to 1450 MHz signals from satellites 105 a, 105 b and is indicated in FIG. 8 as DTVR. The third output line 346 of the LNB provides the downconverted intermediate frequencies received from satellite 104, and this output line is accordingly labelled DPC. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Davis '730
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Davis '730 discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 6:33–50: The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b)

Asserted Claims	Davis '730
	shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing. Davis '730 at Fig. 7:  FIG. 7A FIG. 7B FIG. 7C To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Davis '730
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Davis '730 discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Davis '730 at 6:5–14: Reference may be made to FIG. 7(a) wherein the frequency distribution at the output of summer 318 on output line 308 is illustrated for convenience. As can be seen from this frequency distribution chart, the DPC band of frequencies has been located adjacent and consecutive with the DTV left-hand or right-hand polarized signals. For purposes of illustration, the lower band of frequencies between about 50 MHz to 850 MHz is illustrated as reserved for CATV or VHF/UHF cable signals which provide VHF/UHF broadcast channel signals in a known manner. Davis '730 at 6:33–50: The three LNB output lines 342, 344, 346 are coupled to a combiner 348 which includes frequency converters and summers for providing frequency division multiplexing of the input signals. Reference may be made to FIG. 7(c) wherein there is illustrated the results of the frequency division multiplexing supplied by combiner 348. In particular, it can be seen from FIG. 7(c) that the DTV left-hand and right-hand polarized signals are available in the frequency range 950 MHz to 1450 MHz, whereas all of the DPC signals have been frequency converted and positioned in the 1550 MHz to 2050 MHz frequency band. The DTV-left-hand polarized signals and the DPC vertical polarized signals are provided on combiner 348 output line 350. The DTV right-hand polarized signals and the DPC horizontally polarized signals are provided on combiner 348 output line 352. FIG. 7(b)

Asserted Claims	Davis '730
	shows an alternative distribution of the DTV and DPC signals using frequency division multiplexing. Davis '730 at Fig. 7:  FIG. 7A FIG. 7B FIG. 7C To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Davis '730
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Davis '730 discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. To the extent Davis '730 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Davis '730 alone or it would have been obvious to combine Davis '730 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Exhibit A6 – Gregoire Invalidity Claim Chart

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Gregoire

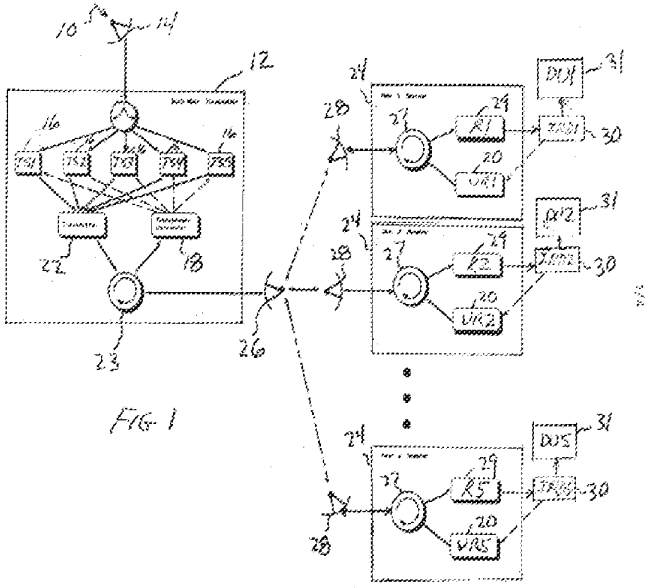
International Patent Publication No. WO 00/67401 ("Gregoire") was filed as PCT No. US00/12401 on May 4, 2000 and published on November 9, 2000. Greoigre claims priority to U.S. Patent Application No. 09/305,895, which was filed on May 5, 1999. Gregoire therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (e). For the reasons listed below, Gregoire invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Gregoire
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Gregoire discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Gregoire at 2:1-9:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

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Asserted Claims	Gregoire
	DTV's downlink signal consists of 32 transponder signals that lie in the range between 950 and 1450 MHz. Each transponder signal comes from a 120W or 240W Traveling Wave Tube (TWT) Power Amplifier on one of the broadcast satellites. Each transponder signal is 24 MHz wide with a 5.16 MHz guard band between transponders, and contains several television channels encoded in a proprietary format. The transponders are numbered from 1 to 32. The odd numbered ones are transmitted with right-hand polarization, while the even numbered transponders are left-hand polarized. Gregoire at 2:11-14: As is known in the prior art, DTH can be distributed to multiple users using a single earth station antenna system for reception and a cable network for each user. However, the single earth station antenna is typically very large and a large amount of cabling in the cable network is required. Gregoire at 3:22-29: In accordance with the present invention, an enhanced method and system is provided for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. Each user controls an IRD associated with a user display receiver, such as a television set. When the user switches channels on his IRD, a control processor senses the channel change. The processor uses this information to set control signals that are sent back on a wireless connection to a multiple-user transmitter unit that is connected to an earth station (satellite dish) antenna. Gregoire at 3:29-4:8: The multi-user transmitter processes the control signals and sends them to a user's (preferably dedicated) transponder selector, which filters out a single transponder signal for transmission to the user. Several transponder signals are sent forward, one for each of the users. A typical implementation of the invention would have five to ten users and the local wireless channel would accommodate a comparable number of transponders. Each

Asserted Claims	Gregoire
	user has a receiver at his location that filters the broadcast signal from the transponder signal that he requested. A much smaller bandwidth results than that which would be required to transmit signals from all 32 transponders to each user. Gregoire at Fig. 1:  FIG. 1 Gregoire at 10:25-31: Now referring to Fig. 3, MUT 12 is shown in more detail. MUT 12 can be installed in any central location where its broadcast signal can be accessed by all of the users. A convenient location would be near the Earth station antenna 14. MUT 12 consists of three

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Asserted Claims	Gregoire
	major integrated elements, namely, transponder selectors I 6, transmitter 22 and transponder controller 18. Each of these elements are described in more detail below. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Gregoire discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Gregoire at Abstract: A method and system for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. A multi-user transmitter is coupled to an earth satellite antenna to receive selectable satellite transponder signals. The multi-user transmitter includes a plurality of transponder selectors, each transponder selector preferably being associated with or even dedicated to a respective service-requesting user is provided with a user-controllable channel selector for accessing the selectable satellite transponder signals. The user-controllable channel selector is coupled to a respective user display unit and to a respective user receiver unit. A responder, which may be in the user receiver unit, is responsive to a service-requesting user-selected channel signal for transmitting a transponder selection signal to the multi-user transmitter. The transponder selection signal contains information indicative of a desired satellite transponder signal, to be transmitted to the service-requesting user associated with the respective (typically user-selected) channel signal. The multi-user transmitter transmits the selected satellite transponder signals to each of the plurality of service requesting users in response to the transponder selection signals, and may do so by broadcasting. The desired satellite transponder signal is then coupled to the service-requesting user receiver (which may

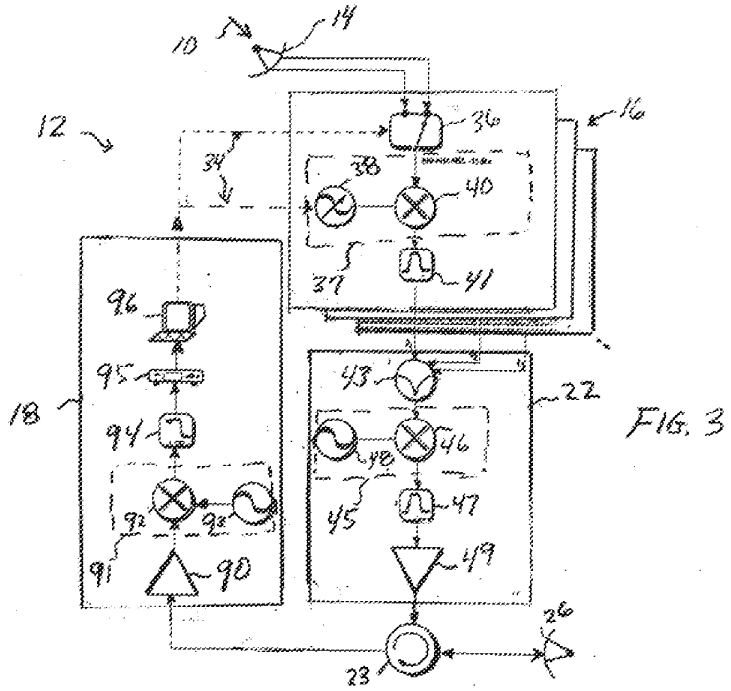
Asserted Claims	Gregoire
	contain the user-controllable channel selector) for display by the respective user display unit. Gregoire at 6:6-18 & associated table: Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Inside the MUT, the DTH signal is split off to five different transponder selectors 16, one for each user, namely TS 1, TS2, TS3, TS4 and TS5 for this five-user embodiment. The transponder selectors are controlled by transponder controller 18 internal to MUT 12. Each transponder selector outputs the signal from a single transponder and downconverts it in frequency so that it is centered at an intermediate frequency for further processing. Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. Gregoire at 9:9-20: Responder 20 accesses information from IRD 30 as the user changes channels, and uses the information to create control signals. One control signal is sent to frequency converter 50 in the user's receiver 29. Responder 20 includes processor 64 which is coupled to modem 66 (e.g., BroadCom Corp. Model No. BCM 93133). Modem 66 is coupled to frequency converter 68 which includes upconverter / mixer 70 (e.g., Mini-Circuits Laboratories Model No. ZLW-186MH) 15 coupled to local oscillator 72 (e.g., Luff Research Model No. SLSM2-3800-4300) for upconverting to the U-NII band. Frequency converter 68 passes the upconverted signal through bandpass filter 80 (e.g., K & L Microwave 5IB32-5200/ TlO0) to amplifier 82 (e.g., JCA Technology Model Number JCA048-F01) which feeds the signal to circulator 27 for broadcast to MUT 12 by user antenna 28.

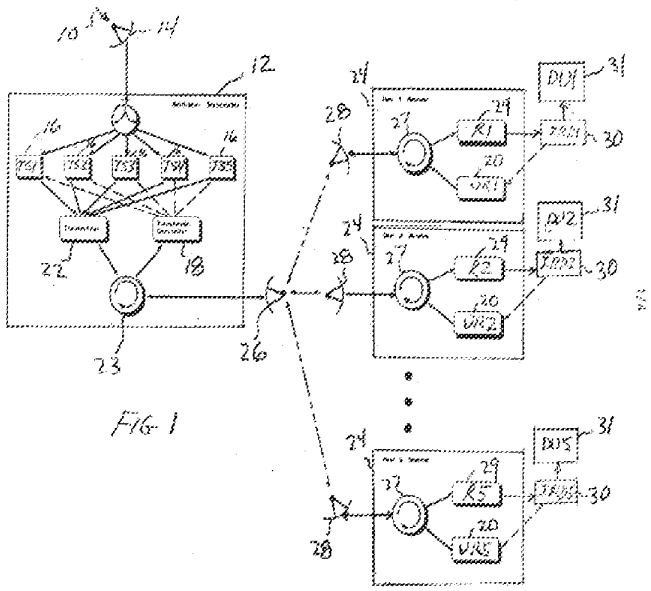
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Asserted Claims	Gregoire
	Gregoire at claim 1: 1. A method of wireless Direct To Home satellite services signal distribution to a plurality of service-requesting users, comprising: providing a multi-user transmitter coupled to an earth satellite antenna to receive a plurality of satellite transponder signals, the multi-user transmitter including a plurality of transponder-signal selectors; providing each service-requesting user with a user-controllable channel selector for accessing the satellite transponder signals, the user-controllable channel selector being coupled to a respective user display unit and to a respective user receiver unit; transmitting to the multi-user transmitter, in response to channel selections, transponder-signal selection information indicative of desired transponder signals; transmitting transponder signals, selected according to the transponder-signal selection information, from the multi-user transmitter to respective service-requesting users associated with the channel selections; and coupling each selected satellite-transponder signal to the requesting user-controllable channel selector for display by the respective user display unit. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband	Gregoire discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from

Asserted Claims	Gregoire
signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Gregoire at 11:1-28: 1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding 5 to each user in the distribution network. "Transponder selector" is abbreviated terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. Transponder selectors 16 each include an LNB selector 36 (a voltage-controlled L-band microwave switch), frequency converter 37 which has a down-converter mixer 40 coupled to tunable local oscillator 38, and a bandpass filter 41 (e.g., K&L Microwave Model 5TB32). Transponder selectors 16 are controlled by signals 34 from the MUT transponder controller 18 that determine which transponder signal should be output to the MUT transmitter for each user. Those signals go to a low-noise block (LNB) selector 36 (a voltage-controlled L-band microwave switch) and tunable local oscillator 38 (e.g., Luff Research frequency synthesizer PN SLSM2-5501050) controls the frequency shift in mixer 40 (e.g., Mini-Circuits Laboratories Model ZMX-10G). In the five-user embodiment, for example, the intermediate frequencies for the five users could be situated at 400 MHz, 430 MHz, 460 MHz, 490 MHz and 520 MHz respectively. However, those skilled in the art can appreciate that the invention can be practiced by embodiments utilizing other sets of frequencies and accommodating other numbers of users.

Asserted Claims	Gregoire
	To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Gregoire discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Gregoire at 6:6-9: Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Gregoire at 12:1-17: 1. The transmitter Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, three user selected transponder signals are packaged into the U-NII band at 5150 - 5350

Asserted Claims	Gregoire
	MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" corner reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150). Gregoire at Fig. 3:  FIG. 3 To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more

Asserted Claims	Gregoire
	prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Gregoire discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Gregoire at Fig. 1:  FIG. 1 Gregoire at 3:6-16:

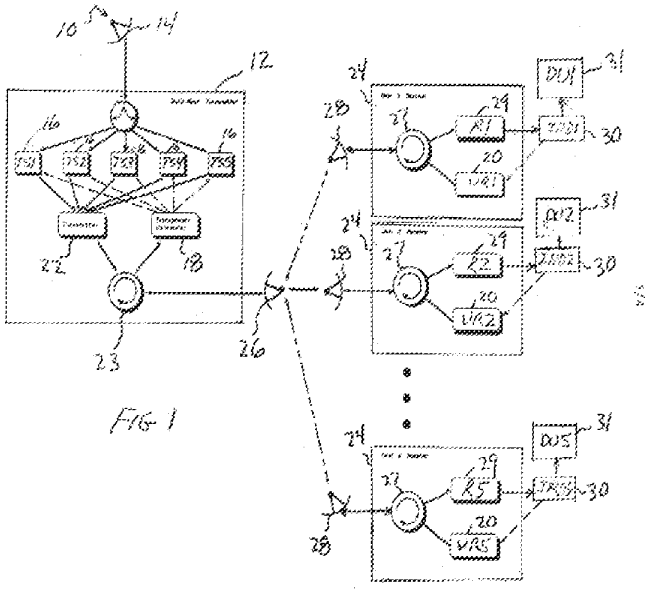
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Asserted Claims	Gregoire
	Therefore, there exists a need for an effective system for DTH distribution having a limited bandwidth local wireless transmission to multiple independent users in a setting where it is not possible to have a large antenna with its corresponding stringing of cable connections or where it is undesirable to erect multiple large DTH distribution antennas. Further, there is a need for an approach where the DTH signal does not need to be reformatted and exposed to noise degradation such that a high quality digital signal can be provided to the user. Also, by not decoding the signal until it reaches the TV or workstation, a variety of modulation formats (such as QPSK, FM, QAM) can be handled. Even mixed modulation formats could be utilized. Gregoire at 12:1-17: 1. The transmitter Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, three user selected transponder signals are packaged into the U-NII band at 5150 - 5350 MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" comer reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150). To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more

Asserted Claims	Gregoire
	prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Gregoire discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Gregoire at 11:1-14: 1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and	Gregoire discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.

Asserted Claims	Gregoire
extracted transponder channels to a variable frequency before combining.	*See* claim 14, *supra*. *See, e.g.*: Gregoire at 11:1-14: 1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Gregoire discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Gregoire at 11:1-14:

Asserted Claims	Gregoire
	1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Gregoire discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an	Gregoire discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*.

Asserted Claims	Gregoire
IRD and all IRDs receive the same composite signal.	*See, e.g.*: Gregoire at 6:6-9: Fig. 1 illustrates a block diagram of an embodiment of the invention that distributes a DTH signal to multiple independent users. A five user system is illustrated. DTH signal 10 is received at satellite Earth station antenna 14 and is provided to multi-user transmitter (MUT) 12. Gregoire at Fig. 1:  FIG. 1 Gregoire at 12:1-17:

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Asserted Claims	Gregoire
	1. The transmitter Transmitter 22 bundles via multi-user combiner 43 (e.g., Narda four-way combiner Model No. 431 lC-4) all of the selector signals into a reduced bandwidth package at the intermediate frequencies. It then upconverts them to the U-NII band, bandpass filters and amplifies the signal for transmission, using frequency converter 45 which includes up-converter/ mixer 46 (e.g., Mini-Circuits Laboratories Model ZMX-7GLHR) coupled to local oscillator 48 (e.g., Luff Research Model No. SLSM2-38004300), bandpass filter 47 (e.g., K & L Microwave Model No. 51B32-5275/f400), amplifier 49 (e.g., JCA Technology Model No. JCA048-F01), circulator 23 (e.g., Narda three port circulator Model No. 4914) and transmitter/ controller antenna 26 . In an example depicted in Fig. 4, three user selected transponder signals are packaged into the U-NII band at 5150 - 5350 MHz. This is considerably smaller than the 1000 MHz necessary to transmit all the DTH transponders. Transmitter/ controller antenna 26 can be a U-NII antenna, which is a small 3" x 3" comer reflector or an 18" long, 1.25"- diameter omnidirectional antenna (e.g., Mobile Mark N SCR14-5150). To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Gregoire discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. *See, e.g.*: Gregoire at 3:20-4:8:

Asserted Claims	Gregoire
	SUMMARY OF THE INVENTION In accordance with the present invention, an enhanced method and system is provided for wireless Direct To Home satellite services signal distribution to a plurality of service requesting users. Each user controls an IRD associated with a user display receiver, such as a television set. When the user switches channels on his IRD, a control processor senses the channel change. The processor uses this information to set control signals that are sent back on a wireless connection to a multiple-user transmitter unit that is connected to an earth station (satellite dish) antenna. The multi-user transmitter processes the control signals and sends them to a user's (preferably dedicated) transponder selector, which filters out a single transponder signal for transmission to the user. Several transponder signals are sent forward, one for each of the users. A typical implementation of the invention would have five to ten users and the local wireless channel would accommodate a comparable number of transponders. Each user has a receiver at his location that filters the broadcast signal from the transponder signal that he requested. A much smaller bandwidth results than that which would be required to transmit signals from all 32 transponders to each user. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Gregoire discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light

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Asserted Claims	Gregoire
	of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Gregoire discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Gregoire discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Gregoire discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light

Asserted Claims	Gregoire
	of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Gregoire discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Gregoire at 11:1-14: 1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a	Gregoire discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.

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Asserted Claims	Gregoire
digital to analog converter prior to combining.	*See* claim 14, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Gregoire discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Gregoire discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to	Gregoire discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.

Asserted Claims	Gregoire
selecting and extracting transponder signal.	*See* claim 14, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Gregoire discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Gregoire discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Gregoire at 4:10-18: Key Features of the invention include:

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Asserted Claims	Gregoire
	There is a bi-directional information exchange between the user and the MUT, preferably on the local wireless communication channel. There is preferably a dedicated bandwidth slot for control signals from the users to reach the central transmitter. The control signals command the transmitter to select and relay the small portion of the DTH signal that each user requires to watch his desired program. Gregoire at 6:15-18 & associated table: Each of the users has a dedicated intermediate frequency. The table below shows an example of frequency allocations for the five user embodiment wherein the U-NII communications band is at 5150 to 5350 MHz. However, the practice of the invention is not limited to the use of this band. User / Transponder Selector Center Frequency / MUT Frequency User 1 / 400 MHz / 5165 MHz User 2 / 430 MHz / 5195 MHz User 3 / 460 MHz / 5225 MHz User 4 / 490 MHz / 5255 MHz User 5 / 520 MHz / 5285 MHz control / NA / 5320 MHz To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more

Asserted Claims	Gregoire
	prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Gregoire discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Gregoire at 8:22-23: Local oscillator 62 is tuned to the proper frequency by control signals from the user's responder 20. Gregoire at 11:15-28: Transponder selectors 16 each include an LNB selector 36 (a voltage-controlled L-band microwave switch), frequency converter 37 which has a down-converter mixer 40 coupled to tunable local oscillator 38, and a bandpass filter 41 (e.g.. K&L Microwave Model 5TB32). Transponder selectors 16 are controlled by signals 34 from the MUT transponder controller 18 that determine which transponder signal should be output to the MUT transmitter for each user. Those signals go to a low-noise block (LNB) selector 36 (a voltage-controlled L-band microwave switch) and tunable local oscillator 38 (e.g.,Luff Research frequency synthesizer PN SLSM2-5501050) controls the frequency shift in mixer 40 (e.g., Mini-Circuits Laboratories Model ZMX-lOG). In the five-user embodiment, for example, the intermediate frequencies for the five users could be situated at 400 MHz, 430 MHz, 460 MHz, 490 MHz and 520 MHz respectively. However, those skilled in the art can appreciate that the invention can be practiced by embodiments utilizing other sets of frequencies and accommodating other numbers of users.

Asserted Claims	Gregoire
	To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Gregoire discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Gregoire at 11:1-14: 1. The transponder selectors There are multiple transponder selectors 16 built into MUT 12, one corresponding terminology for "transponder signal selector," for it selects the signal from a single transponder from the multiple transponder signals included in the DTH signal received from the satellite. The transponder selectors each receive DTH signal 10 from the satellite antenna 14, and downconverts it to an intermediate frequency so that the desired transponder signal is re-centered about a fixed intermediate frequency dedicated to that corresponding user. The unnecessary portion of the DTH signal is filtered out and the single transponder signal is sent to MUT transmitter 22. To the extent Gregoire does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Gregoire alone or it would have been obvious to combine Gregoire with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Exhibit A7 – Inose Invalidity Claim Chart

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Inose

European Patent Application EP1071286 ("Inose") was filed on January 11, 2000 and published on July 20, 2000. Inose therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Inose invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Inose
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Inose discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Inose at [0001]:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

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Asserted Claims	Inose
	The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0012]: A signal processing apparatus according to the invention is designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. The apparatus is characterized by comprising: first frequency-converting means for converting the frequency of the first digital broadcast signal, thereby to generate a first digital modulated signal; demodulating means for demodulating the first digital modulated signal supplied from the first frequency-converting means, thereby to generate digital broadcast data; table-detecting means for detecting a network information table which is physical information about a transmission path, from the digital broadcast data supplied from the demodulating means; table-changing means for changing at least transmission frequency data contained in the network information table detected by the table-detecting means, to data that complies with the second network; table-replacing means for replacing the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means; display means for displaying the contents described in the network information table of the digital broadcast data supplied from the demodulating means and complying with the first network, and also the contents described in the network information table of the digital broadcast data replaced by the table-changing means and complying with the second network; modulating means for modulating the digital broadcast data whose network information table has been replaced by the table-replacing means, thereby to generate a second digital modulated signal; and second frequency-converting means for converting the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Inose at [0018]:

Asserted Claims	Inose
	This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set

reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12.

Inose at Fig. 1:

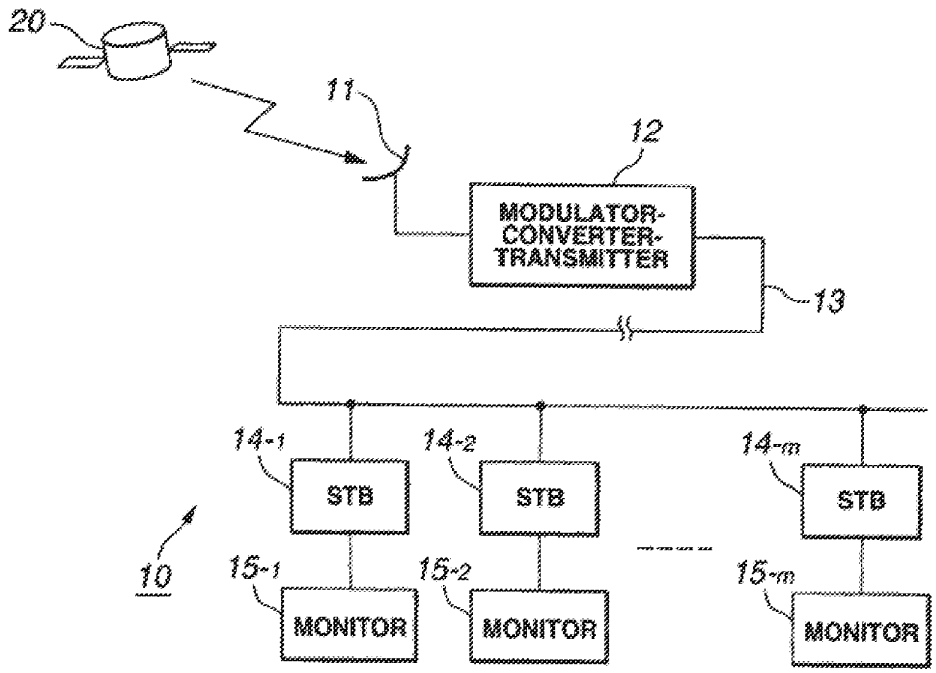


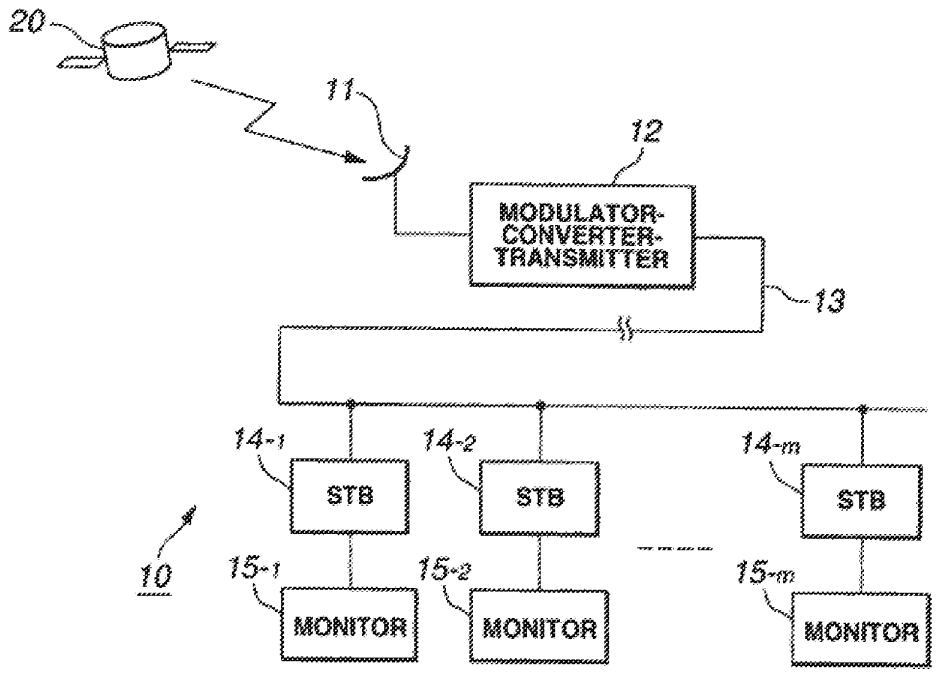
FIG.1

To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art

Asserted Claims	Inose
	references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Inose discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying)

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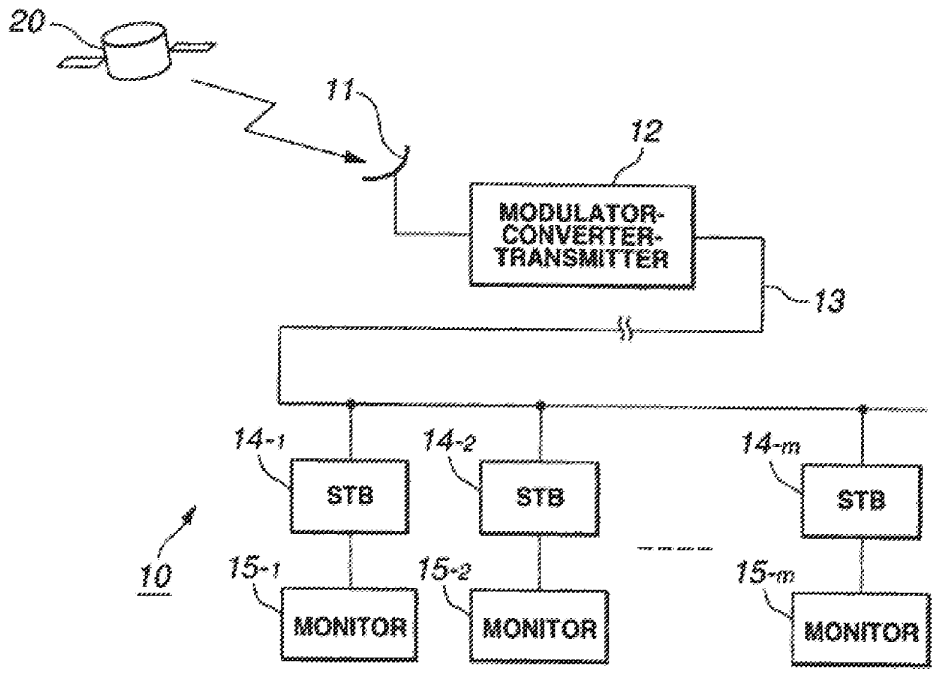
Asserted Claims	Inose
	modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at Fig. 1:

Asserted Claims	Inose
	 FIG.1 To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

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Asserted Claims	Inose
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Inose discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying)

Asserted Claims	Inose
	modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at Fig. 1:

Asserted Claims	Inose
	 FIG.1 To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Inose
14[c] combining extracted selected transponder signals into a composite signal;	Inose discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20.

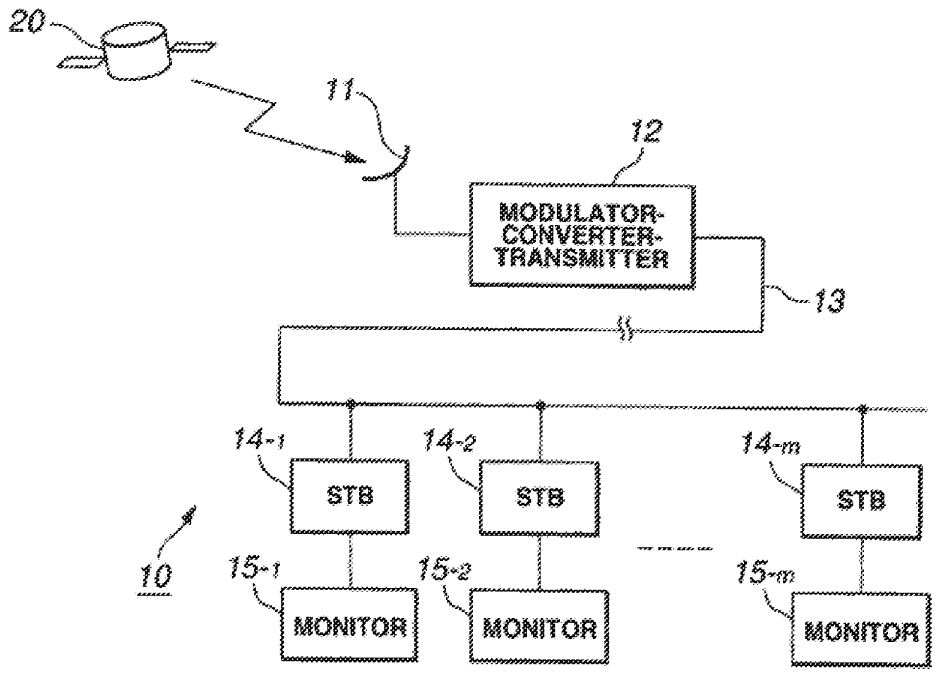
Asserted Claims	Inose
	Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth

Asserted Claims	Inose
	transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Inose discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13.

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Asserted Claims	Inose
	Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections

Asserted Claims	Inose
	32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at Fig. 1:

Asserted Claims	Inose
	 FIG.1 To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

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Asserted Claims	Inose
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Inose discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Inose discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: Inose at [0001]: The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a

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Asserted Claims	Inose
	modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set

Asserted Claims	Inose
	reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0036]: The signal-processing section 32-1 comprises a tuner 41, a demodulator 42, and an ECC (Error Correction Code) decoder 43. The tuner 41 selects the digital broadcast signal transmitted from the first transponder of the communications satellite 20, from among the SHF-band digital broadcast signals the antenna 11 has received, thus obtaining a QSPK-modulated signal S1. The demodulator 42 demodulates the QSPK-modulated signal S1, generating a DVB-frame signal S2. The ECC decoder 43 corrects the error in the DVB-frame signal S2, generating an MPEG2 transport packet S3, which is digital broadcast data. Inose at [0048]: The signal-processing section 32-1 has an ECC encoder 49, a modulator 50, and a frequency converter 51. The ECC encoder 49 add an error-correcting code of Read Solomon (204, 188) to any MPEG2 transport packet S4 in which the NIT has been replaced by the NIT-replacing circuit 48, thereby generating a signal S5 (see FIG. 2B) of the DVB-frame configuration. The modulator 50 is designed to perform 64 QAM (Quadrature Amplitude Modulation) on the signal S5 of the DVB-frame configuration. The frequency converter 51 converts the frequency of the 64 QAM-modulated signal output from the modulator 50, thus generating a CATV digital broadcast signal BS1 of either VHF band or UHF band. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-

Asserted Claims	Inose
	N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at [0053]: In the signal processing apparatus according to the present invention, the first frequency-converting means converts the frequency of the first digital broadcast signal having a prescribed transmission frequency on a first network, thereby to generate a first digital modulated signal. The first frequency-converting means converts the frequency of the first digital, thereby generating digital broadcast data. The table-detecting means detects a network information table, which is physical information about a transmission path, from the digital broadcast data. The table-changing means changes at least transmission frequency data contained in the network information table, to data that complies with the second network. The table-replacing means replaces the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means, thereby generating digital broadcast data that complies with the second network. The modulating means modulates this digital broadcast data, thereby generating a second digital modulated signal. The second frequency-converting means converts the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Therefore, the apparatus can convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network, and deliver the second digital broadcast signal. To the extent Inose does not explicitly and/or inherently disclose this element, it would

Asserted Claims	Inose
	have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Inose discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Inose at [0001]: The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13.

Asserted Claims	Inose
	Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0036]: The signal-processing section 32-1 comprises a tuner 41, a demodulator 42, and an ECC (Error Correction Code) decoder 43. The tuner 41 selects the digital broadcast signal transmitted from the first transponder of the communications satellite 20, from among the

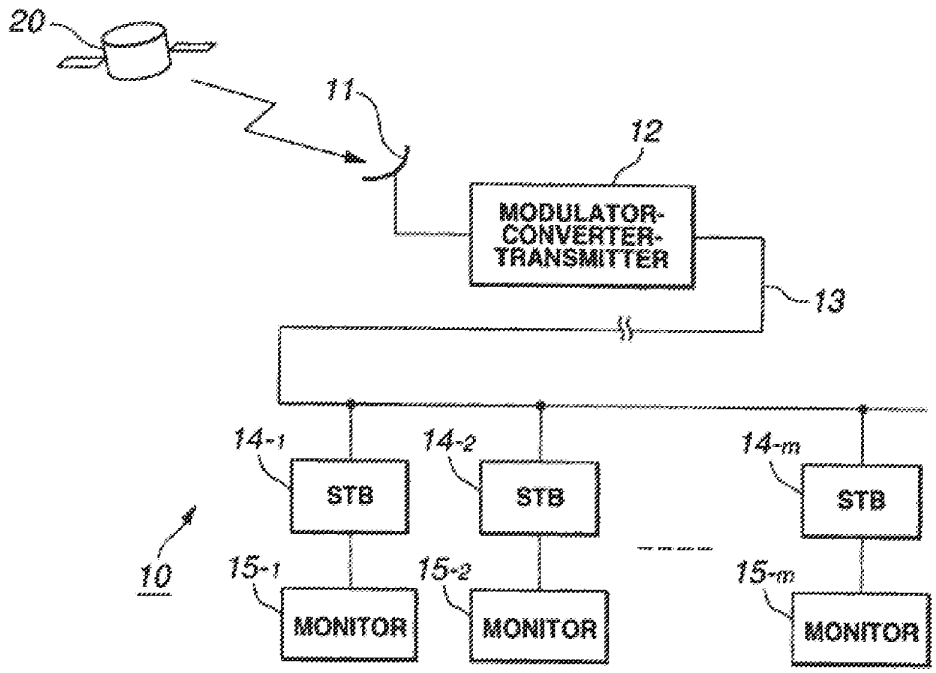
Asserted Claims	Inose
	SHF-band digital broadcast signals the antenna 11 has received, thus obtaining a QSPK-modulated signal S1. The demodulator 42 demodulates the QSPK-modulated signal S1, generating a DVB-frame signal S2. The ECC decoder 43 corrects the error in the DVB-frame signal S2, generating an MPEG2 transport packet S3, which is digital broadcast data. Inose at [0048]: The signal-processing section 32-1 has an ECC encoder 49, a modulator 50, and a frequency converter 51. The ECC encoder 49 add an error-correcting code of Read Solomon (204, 188) to any MPEG2 transport packet S4 in which the NIT has been replaced by the NIT-replacing circuit 48, thereby generating a signal S5 (see FIG. 2B) of the DVB-frame configuration. The modulator 50 is designed to perform 64 QAM (Quadrature Amplitude Modulation) on the signal S5 of the DVB-frame configuration. The frequency converter 51 converts the frequency of the 64 QAM-modulated signal output from the modulator 50, thus generating a CATV digital broadcast signal BS1 of either VHF band or UHF band. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the

Asserted Claims	Inose
	frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at [0053]: In the signal processing apparatus according to the present invention, the first frequency-converting means converts the frequency of the first digital broadcast signal having a prescribed transmission frequency on a first network, thereby to generate a first digital modulated signal. The first frequency-converting means converts the frequency of the first digital, thereby generating digital broadcast data. The table-detecting means detects a network information table, which is physical information about a transmission path, from the digital broadcast data. The table-changing means changes at least transmission frequency data contained in the network information table, to data that complies with the second network. The table-replacing means replaces the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means, thereby generating digital broadcast data that complies with the second network. The modulating means modulates this digital broadcast data, thereby generating a second digital modulated signal. The second frequency-converting means converts the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Therefore, the apparatus can convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network, and deliver the second digital broadcast signal. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the	Inose discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.

Asserted Claims	Inose
composite signal inside a home and distributing to a plurality of IRDs.	*See* claim 14, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Inose discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]:

Asserted Claims	Inose
	The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0033]: FIG. 11 illustrates the modulator-converter-transmitter 12 incorporated in the digital CATV system 10. The transmitter 12 receives digital broadcast signals from the first to Nth transponders (satellite relays) provided in the communications satellite 20. It changes the transmission frequency and modulation mode of each digital broadcast signal. In addition, the transmitter 12 replaces the satellite-delivery system descriptor in the NIT with a cable-delivery system descriptor, thus generating a CATV digital broadcast signal. The transmitter 12 transmits the CATV digital broadcast signal to the transmission path 13. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is

Asserted Claims	Inose
	frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at Fig. 1:

Asserted Claims	Inose
	 FIG.1 To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Inose
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Inose discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Inose discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Inose discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art

Asserted Claims	Inose
	references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Inose discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Inose discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Inose discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*.

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Asserted Claims	Inose
	To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Inose discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Inose discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating	Inose discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.

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Asserted Claims	Inose
phasor to the data samples to translate their frequency.	*See* claim 17, *supra*. *See, e.g.*: Inose at [0001]: The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2

Asserted Claims	Inose
	packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0036]: The signal-processing section 32-1 comprises a tuner 41, a demodulator 42, and an ECC (Error Correction Code) decoder 43. The tuner 41 selects the digital broadcast signal transmitted from the first transponder of the communications satellite 20, from among the SHF-band digital broadcast signals the antenna 11 has received, thus obtaining a QSPK-modulated signal S1. The demodulator 42 demodulates the QSPK-modulated signal S1, generating a DVB-frame signal S2. The ECC decoder 43 corrects the error in the DVB-frame signal S2, generating an MPEG2 transport packet S3, which is digital broadcast data. Inose at [0048]:

Asserted Claims	Inose
	The signal-processing section 32-1 has an ECC encoder 49, a modulator 50, and a frequency converter 51. The ECC encoder 49 add an error-correcting code of Read Solomon (204, 188) to any MPEG2 transport packet S4 in which the NIT has been replaced by the NIT-replacing circuit 48, thereby generating a signal S5 (see FIG. 2B) of the DVB-frame configuration. The modulator 50 is designed to perform 64 QAM (Quadrature Amplitude Modulation) on the signal S5 of the DVB-frame configuration. The frequency converter 51 converts the frequency of the 64 QAM-modulated signal output from the modulator 50, thus generating a CATV digital broadcast signal BS1 of either VHF band or UHF band. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at [0053]: In the signal processing apparatus according to the present invention, the first frequency-converting means converts the frequency of the first digital broadcast signal having a prescribed transmission frequency on a first network, thereby to generate a first digital

Asserted Claims	Inose
	modulated signal. The first frequency-converting means converts the frequency of the first digital, thereby generating digital broadcast data. The table-detecting means detects a network information table, which is physical information about a transmission path, from the digital broadcast data. The table-changing means changes at least transmission frequency data contained in the network information table, to data that complies with the second network. The table-replacing means replaces the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means, thereby generating digital broadcast data that complies with the second network. The modulating means modulates this digital broadcast data, thereby generating a second digital modulated signal. The second frequency-converting means converts the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Therefore, the apparatus can convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network, and deliver the second digital broadcast signal. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Inose discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, *supra*. *See, e.g.*: Inose at [0001]: The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission

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Asserted Claims	Inose
	frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0018]: This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0034]:

Asserted Claims	Inose
	The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0036]: The signal-processing section 32-1 comprises a tuner 41, a demodulator 42, and an ECC (Error Correction Code) decoder 43. The tuner 41 selects the digital broadcast signal transmitted from the first transponder of the communications satellite 20, from among the SHF-band digital broadcast signals the antenna 11 has received, thus obtaining a QSPK-modulated signal S1. The demodulator 42 demodulates the QSPK-modulated signal S1, generating a DVB-frame signal S2. The ECC decoder 43 corrects the error in the DVB-frame signal S2, generating an MPEG2 transport packet S3, which is digital broadcast data. Inose at [0048]: The signal-processing section 32-1 has an ECC encoder 49, a modulator 50, and a frequency converter 51. The ECC encoder 49 add an error-correcting code of Read Solomon (204, 188) to any MPEG2 transport packet S4 in which the NIT has been replaced by the NIT-replacing circuit 48, thereby generating a signal S5 (see FIG. 2B) of the DVB-frame configuration. The modulator 50 is designed to perform 64 QAM (Quadrature Amplitude Modulation) on the signal S5 of the DVB-frame configuration. The frequency converter 51 converts the frequency of the 64 QAM-modulated signal output

Asserted Claims	Inose
	from the modulator 50, thus generating a CATV digital broadcast signal BS1 of either VHF band or UHF band. Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at [0053]: In the signal processing apparatus according to the present invention, the first frequency-converting means converts the frequency of the first digital broadcast signal having a prescribed transmission frequency on a first network, thereby to generate a first digital modulated signal. The first frequency-converting means converts the frequency of the first digital, thereby generating digital broadcast data. The table-detecting means detects a network information table, which is physical information about a transmission path, from the digital broadcast data. The table-changing means changes at least transmission frequency data contained in the network information table, to data that complies with the second network. The table-replacing means replaces the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means, thereby generating digital broadcast data that complies with the

Asserted Claims	Inose
	second network. The modulating means modulates this digital broadcast data, thereby generating a second digital modulated signal. The second frequency-converting means converts the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Therefore, the apparatus can convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network, and deliver the second digital broadcast signal. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Inose discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*: Inose at [0001]: The present invention relates to a signal processing apparatus and a signal processing method, both designed to convert a first digital broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network. Inose at [0018]:

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Asserted Claims	Inose
	This invention is applied to, for example, a digital CATV (Cable Television) system 10 having the structure shown in FIG. 1. The CATV system 10 comprises an antenna 11, a modulator-converter-transmitter 12, a transmission path 13, and set top boxes (household receiver) 14-1 to 14-m. The antenna 11 receives digital broadcast signals from the transponders (satellite relays) provided in a satellite 20. The modulator-converter-transmitter 12 changes the transmission frequencies, modulation modes and the like of the digital broadcast signals, thereby generating CATV digital broadcast signals, and transmits the CATV broadcast signals to the transmission path 13. The set top boxes (household receiver) 4-1 to 4-m are connected to the transmission path 13. Inose at [0019]: The digital broadcast signals the satellite 20 transmits will be described. In the present embodiment, the digital broadcast signals comply with the DVB (Digital Video Broadcasting) system, i.e., the digital broadcasting standards adopted in Europe. FIG. 2B depicts the frame structure of the digital broadcast data complying with the DVB system. One frame is composed of eight transport packets (see FIG. 2A). In this case, each packet has a synchronization byte (=47H). One synchronization byte is inverted to B8H, thereby achieving the synchronization of the frame. Each MPEG2 transport packet (i.e., MPEG2 packet) contains a error-correcting code of Read Solomon (204, 188). The digital broadcast data shown in FIG. 2B is subjected first to QPSK (Quadrature Phase Shift Keying) modulation and then to frequency modulation. The data is thereby converted to digital broadcast signals of 27 MHz, which are transmitted from the satellite 20. Inose at [0034]: The transmitter 12 has a microcomputer. It comprises a control section 31, first to Nth signal-processing sections 32-1 to 32-N, and a mixer 23. The control section 31 controls the other components of the transmitter 12. The sections 32-1 to 32-N process the digital broadcast signal of SHF (Super High Frequency) band, transmitted from the transponders of the communications satellite 20, thereby generating CATV digital broadcast signals BS1 to BSN. The mixer 23 mixes the digital broadcast signals BS1 to BSN and supplies

Asserted Claims	Inose
	them to the transmission path 13. To the control section 31 there are connected an operation section 34 and a display section 35. The operation section 34 is operated to set reception frequencies for the tuners provided in the signal-processing sections 32-1 to 32-N. The display section 35 displays the operation state of the transmitter 12. Inose at [0036]: The signal-processing section 32-1 comprises a tuner 41, a demodulator 42, and an ECC (Error Correction Code) decoder 43. The tuner 41 selects the digital broadcast signal transmitted from the first transponder of the communications satellite 20, from among the SHF-band digital broadcast signals the antenna 11 has received, thus obtaining a QSPK-modulated signal S1. The demodulator 42 demodulates the QSPK-modulated signal S1, generating a DVB-frame signal S2. The ECC decoder 43 corrects the error in the DVB-frame signal S2, generating an MPEG2 transport packet S3, which is digital broadcast data. Inose at [0048]: The signal-processing section 32-1 has an ECC encoder 49, a modulator 50, and a frequency converter 51. The ECC encoder 49 add an error-correcting code of Read Solomon (204, 188) to any MPEG2 transport packet S4 in which the NIT has been replaced by the NIT-replacing circuit 48, thereby generating a signal S5 (see FIG. 2B) of the DVB-frame configuration. The modulator 50 is designed to perform 64 QAM (Quadrature Amplitude Modulation) on the signal S5 of the DVB-frame configuration. The frequency converter 51 converts the frequency of the 64 QAM-modulated signal output from the modulator 50, thus generating a CATV digital broadcast signal BS1 of either VHF band or UHF band. Inose at [0049]:

Asserted Claims	Inose
	The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. Inose at [0053]: In the signal processing apparatus according to the present invention, the first frequency-converting means converts the frequency of the first digital broadcast signal having a prescribed transmission frequency on a first network, thereby to generate a first digital modulated signal. The first frequency-converting means converts the frequency of the first digital, thereby generating digital broadcast data. The table-detecting means detects a network information table, which is physical information about a transmission path, from the digital broadcast data. The table-changing means changes at least transmission frequency data contained in the network information table, to data that complies with the second network. The table-replacing means replaces the network information table supplied from the demodulating means, with the network information table supplied from the table-changing means, thereby generating digital broadcast data that complies with the second network. The modulating means modulates this digital broadcast data, thereby generating a second digital modulated signal. The second frequency-converting means converts the frequency of the second digital broadcast signal, thereby to generate the second digital broadcast signal. Therefore, the apparatus can convert a first digital

Asserted Claims	Inose
	broadcast having a prescribed transmission frequency on a first network, to a second digital broadcast signal having a prescribed frequency on a second network, and deliver the second digital broadcast signal. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Inose discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the

Asserted Claims	Inose
	frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Inose discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the

Asserted Claims	Inose
	frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Inose discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Inose at [0049]: The other signal-processing sections 32-2 to 32-N are identical in structure. Each comprises a tuner 41, a modulator 42, an ECC decoder 43, an interface 47, an NIT-replacing circuit 48, an ECC encoder 49, a modulator 50 and a frequency converter 51. The NIT-replacing circuit 48 provided in each of the signal-processing sections 32-2 to 32-N replaces the NIT by using the table NITb that is stored in the memory 46 of the signal-processing section 32-1. The tuner 41 provided in each of the signal-processing sections 32-2 to 32-N selects one of the digital broadcast signals transmitted from the second to Nth transponders of the communications satellite 20. The digital broadcast signal selected is frequency-converted to a QPSK-modulated signal S1. The control section 31 controls, via the interface 47, the reception frequency of the tuner 41 provided in each of the signal-processing sections 32-2 to 32-N. In the signal-processing sections 32-2 to 32-N, the

Asserted Claims	Inose
	frequency converters 51 convert the frequencies of the modulated signals, so that the digital broadcast signals BS1 to BSN may have different transmission frequencies. To the extent Inose does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Inose alone or it would have been obvious to combine Inose with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of James

U.S. Patent No. 7,954,127 ("James") was filed on September 25, 2002 and issued on May 31, 2011. James therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, James invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	James
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, James discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: James at Abstract:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

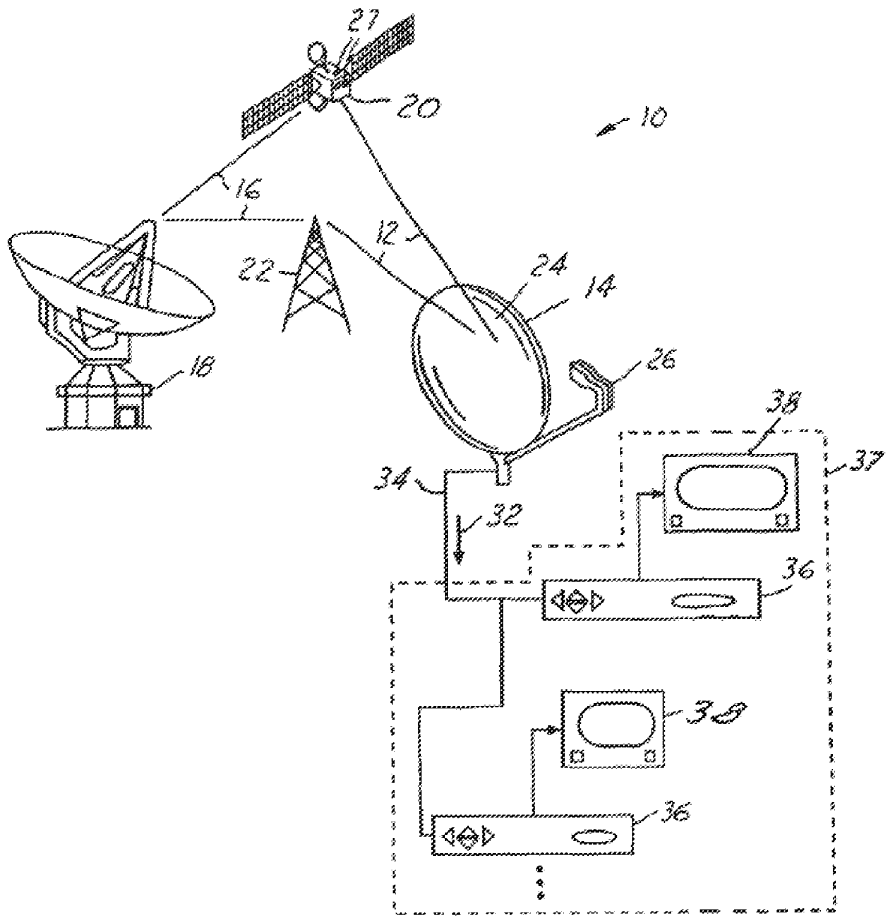
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Asserted Claims	James
	A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, includ-ing a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 1:6–9: The present invention relates generally to direct broadcast systems, and more particularly to methods and apparatuses for receiving broadcast signals within a direct broadcast system from an outdoor unit. James at 2:40–45: The present invention has several advantages over existing direct broadcast systems. One advantage of the present invention is that it provides reception by multiple integrated receiver and decoders (IRD)s from an outdoor unit (ODU) via a single distribution cable. Thus, the present invention minimizes cables between the ODU and the IRD(s). James at 2:63–3:13: The present invention provides a method and apparatus of receiving a plurality of broadcast signals within a direct broadcast system from an outdoor unit. A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an ODU electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU

Asserted Claims	James
	and selects a desired frequency of the broadcast signals. IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:4–10: Also, in the following description the terms "single distribution cable" refer to a single coaxial style cable having an inner and outer conductor. Various coaxial style cables exist and may be utilized such as RG59 cable, RG6 cable, and other coaxial cable known in the art. Non-coaxial style cable may also be used that serves a similar purpose as the coaxial style cable mentioned. James at 4:11–40: Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to

Asserted Claims	James
	integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is a given number of direct broadcast system devices shown, various numbers of devices may be utilized. James at 7:54–65: Referring now to FIG. 4, a block diagrammatic and schematic view of an ODU receiver 26‴ integrating a standard multi-switch 110 in accordance with an embodiment of the present invention is shown. The receiver 26‴ illustrates integration of an LNB selector 112, which may be either the transport LNB selector 45 or the service LNB selector 82, into a conventional multi-switch 114 for support of existing direct broadcast systems. The receiver 26‴ allows conventional style IRD(s) to be combined with IRD(s) of the present invention such as IRD(s) 36′ or 36″, that use the transport select methods and service select methods, which are described in detail below. James at 9:60–62: The multiplexer 92 multiplexes the service select unit output signals to generate the service ODU output signals, as generally indicated by step 178. James at 10:9–20: Referring now to FIG. 8, a logic flow diagram illustrating a direct broadcast system installation method in accordance with an embodiment of the present invention is shown. The ODU 14 is installed at a customer site 37, as generally indicated by step 200. The distribution cable 34 is coupled to the ODU 14 and to the IRD(s) 36, as generally indicated by step 202. The IRD(s) 36 generate ODU capability request signals to determine capability of the ODU 14, as generally indicated by step 204. The IRD(s) 36 are

Asserted Claims	James
	configured in response to the ODU capability request signal. The IRD(s) 36 utilize the ODU capability request signal for future tuning requests of the ODU 14. James at 10:21–29: The ODU 14 allocates and assign communication channels or frequencies for distribution of signals between the ODU 14 and the IRD(s) 36, as generally indicated by step 206. For the transport select system 40, the IRD tuners 68 then adjust to the assigned frequencies, as generally indicated by step 208. The ODU 14 selects broadcast signals on desired frequencies, corresponding to selected services, and transfers the broadcast signals to the IRD(s) 36 on the assigned channels, as generally indicated by step 210. James at Fig. 1:

Asserted Claims	James
	 FIG. 1

Asserted Claims	James
	To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	James discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: James at 4:11–40: Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is

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Asserted Claims	James
	a given number of direct broadcast system devices shown, various numbers of devices may be utilized. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 8:53–64: The transport receiver controller 60 operates the matrix switch 44 and the transport select units 46 in order to select desired LNB ports 43 in response to the content request signals corresponding to frequencies that are associated with the selected services, as generally indicated by step 152. The transport receiver controller 60 determines which transponders 27 are associated with the selected services and operates the matrix switch 44 and the transport select units 46 such that the appropriate LNB(s) 42 are in communication with the appropriate transport select units 46. The transport select units 46 then receive the associated frequencies assigned to the selected services. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art

Asserted Claims	James
	references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	James discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, includ-ing a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 2:63–3:13: The present invention provides a method and apparatus of receiving a plurality of broadcast signals within a direct broadcast system from an outdoor unit. A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an ODU electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU

Asserted Claims	James
	and selects a desired frequency of the broadcast signals. IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:11–40: Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is a given number of direct broadcast system devices shown, various numbers of devices may be utilized.

Asserted Claims	James
	James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 4:58–5:11: The LNBs 42 are electrically coupled to a transport LNB selector 45 via a matrix switch 44. The transport LNBs elector 45 includes multiple transport select units 46, which are electrically coupled to the matrix switch 44. Each select unit 46 includes a transport tuner 48, a transport filter 50, and a block converter 52, which convert the broadcast signals into transport select unit output signals. The tuners 48 select a frequency received from the LNBs 42. For example, a particular LNB of interest may receive broadcast signals on 16 different frequencies, corresponding to a single polarization, and the tuners, that are switched to the LNB of interest, select broadcast signals on one of the 16 frequencies. The filters 50 aid the tuners 48 in filtering out unselected frequencies. The filters 50 may be an integral portion of the tuners 48 or may be separate devices as shown. The block converters 52 shift the broadcast signals at the selected frequency to a transport select unit frequency. A combiner 54 is electrically coupled to the block converters 52 and combines transport select unit output signals to form the ODU receiver output signal. The ODU

Asserted Claims	James
	receiver output signal is then amplified by the amplifier 58 before being received by the IRD(s) 36′. James at 6:1–14: The IRD(s) 36′ are capable of determining the capabilities of the receiver and performing appropriate configuration adjustments. The IRD(s) 36′ include multiple IRD links 64, which are electrically coupled to transport-tuning controllers 66. A service is selected by the transport-tuning controllers 66, which generate content request signals. Multiple IRD tuners 68, which are electrically coupled to the amplifier 58 via the distribution cable 34, receive and select the ODU receiver output signals at desired frequencies in response to the content request signals. Multiple IRD transports 70 are also electrically coupled to the IRD tuners 68 and convert the ODU receiver output signals into audio or video format for a particular communication device 38, as known in the art. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same

Asserted Claims	James
	associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 6:43–54: The service LNB selector 82 includes service select units 83, a multiplexer 92, and a service receiver controller 96. The select units 83 select channels that correspond to selected services for transfer to the service IRD(s) 36″. The multiplexer 92 is electrically coupled to the select units 83 and multiplexes service select unit output signals in time to generate the service receiver output signals. An amplifier 58 is electrically coupled to the multiplexer 92 and the service IRD(s) 36″. The service select unit output signals are amplified before being received by the service IRD(s) 36″. A receiver link 94 is electrically coupled to the service IRD(s) 36″ and performs similarly to the receiver link 61. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service.

Asserted Claims	James
	James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that may correspond with a desired frequency from an LNB but do not correspond with a requested service. James at 7:25–45: The service IRD 36″ include IRD links 64 and transport tuning controllers 66. Link packet filters 98 are electrically coupled to the IRD links 64 and select appropriate packets for selected services, on the transport-tuning controllers 66, corresponding to associated IRD(s) 36″. A rate buffer 100 is electrically coupled to the link packet filters 98 and determines timing for the associated IRD(s) 36″ and adjusts link packet filter output signals appropriately. A clock recovery indicator 102 is electrically coupled to the link packet filters 98. When channels are shifted in time for multiplexing and linking purposes, the clock recovery indicator 102 signals a time stamp corrector 104, which is electrically coupled to the rate buffer 100, to undo what the multiplexer 90 or the links 64 and 94 have done. The time stamp correctors 104 are electrically coupled to the IRD transports 70. It will be appreciated that the IRD(s) 36″ do not include an IRD tuner but instead include broadband link circuitry such as the packet filters 98, buffer 100, indicator 102, and the corrector 104. The broadband link circuitry allows for use of a single link and flexibility to receive as many services as an IRD is capable of receiving. James at 7:54–65: Referring now to FIG. 4, a block diagrammatic and schematic view of an ODU receiver 26‴ integrating a standard multi-switch 110 in accordance with an embodiment of the present invention is shown. The receiver 26‴ illustrates integration of an LNB selector 112, which may be either the transport LNB selector 45 or the service LNB selector 82,

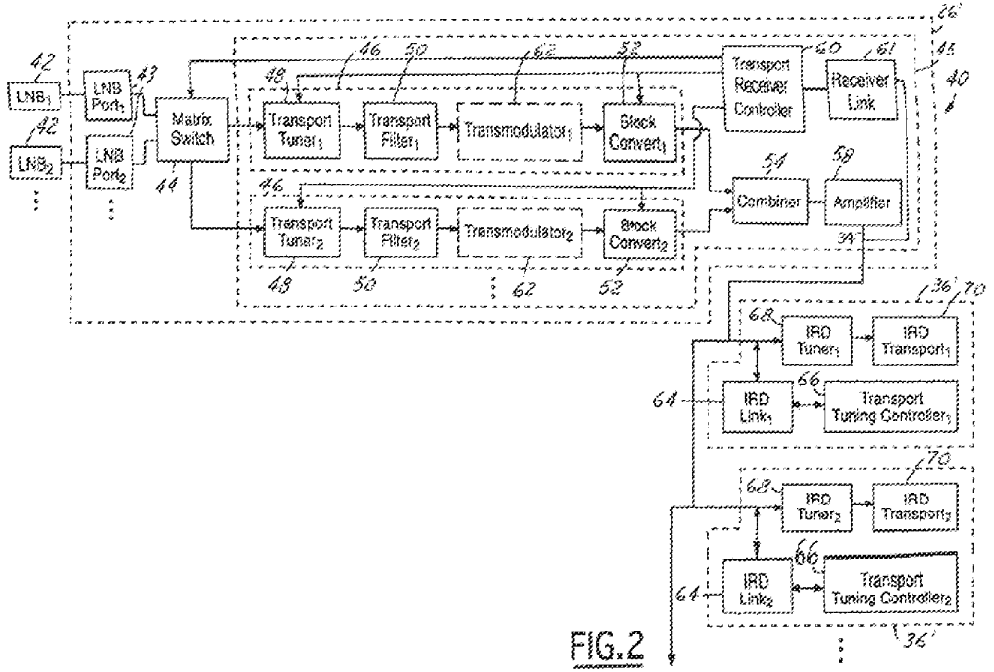
Asserted Claims	James
	into a conventional multi-switch 114 for support of existing direct broadcast systems. The receiver 26‴ allows conventional style IRD(s) to be combined with IRD(s) of the present invention such as IRD(s) 36′ or 36″, that use the transport select methods and service select methods, which are described in detail below. James at 7:66–8:4: The conventional multi-switch 114 has multiple LNB ports 43, a matrix switch 44′, and LNB control decoders 118. The LNB control decoders 118 select LNBs 36″ by using tone and/or voltage decoding methods known in the art. The matrix switch 44 is formed to accommodate both the LNB control decoders 118 and the LNB selector 112. James at 8:5–19: Referring now to FIG. 5, a block diagrammatic and schematic view of a service receiver 26⁗ of the service select system 80′ for wireless communication in accordance with an embodiment of the present invention is shown. Since the service select system 80′ significantly decreases the amount of signal bandwidth being utilized in the distribution of service receiver output signals from the service receiver 26⁗ to service IRD(s) 36‴, wireless communication is feasible between the service receiver 26⁗ and the service IRD(s) 36‴. The service select system 80′, as shown, accommodates for both wired and wireless communication between the service receiver 26⁗ and the IRD(s) 36‴. Of course, the system 80′ may be altered to accommodate only wireless communication. James at 10:21–29: The ODU 14 allocates and assign communication channels or frequencies for distribution of signals between the ODU 14 and the IRD(s) 36, as generally indicated by step 206. For the transport select system 40, the IRD tuners 68 then adjust to the assigned frequencies, as generally indicated by step 208. The ODU 14 selects broadcast signals on desired frequencies, corresponding to selected services, and transfers the broadcast signals to the IRD(s) 36 on the assigned channels, as generally indicated by step 210.

Asserted Claims	James
	To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	James discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: James at 4:58–5:11: The LNBs 42 are electrically coupled to a transport LNB selector 45 via a matrix switch 44. The transport LNBs elector 45 includes multiple transport select units 46, which are electrically coupled to the matrix switch 44. Each select unit 46 includes a transport tuner 48, a transport filter 50, and a block converter 52, which convert the broadcast signals into transport select unit output signals. The tuners 48 select a frequency received from the LNBs 42. For example, a particular LNB of interest may receive broadcast signals on 16 different frequencies, corresponding to a single polarization, and the tuners, that are switched to the LNB of interest, select broadcast signals on one of the 16 frequencies. The filters 50 aid the tuners 48 in filtering out unselected frequencies. The filters 50 may be an integral portion of the tuners 48 or may be separate devices as shown. The block converters 52 shift the broadcast signals at the selected frequency to a transport select unit frequency. A combiner 54 is electrically coupled to the block converters 52 and combines transport select unit output signals to form the ODU receiver output signal. The ODU receiver output signal is then amplified by the amplifier 58 before being received by the IRD(s) 36′. James at 5:12–17:

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Asserted Claims	James
	The transport tuners 48 may combine demodulation and remodulation characteristics to reduce channel bandwidth of distributed signals. For example, a nominal satellite modulation scheme of QPSK at 27 MHz to carry 30 Mbps to 64 QAM can reduce bandwidth per channel to 4 MHz, thus increasing number of allowable IRD(s) per ODU receiver. James at 7:54–65: Referring now to FIG. 4, a block diagrammatic and schematic view of an ODU receiver 26‴ integrating a standard multi-switch 110 in accordance with an embodiment of the present invention is shown. The receiver 26‴ illustrates integration of an LNB selector 112, which may be either the transport LNB selector 45 or the service LNB selector 82, into a conventional multi-switch 114 for support of existing direct broadcast systems. The receiver 26‴ allows conventional style IRD(s) to be combined with IRD(s) of the present invention such as IRD(s) 36′ or 36″, that use the transport select methods and service select methods, which are described in detail below. James at 9:10–12: The combiner 54 combines the transport select unit output signals to generate the transport ODU output signals, as generally indicated by step 156. James at Fig. 2:

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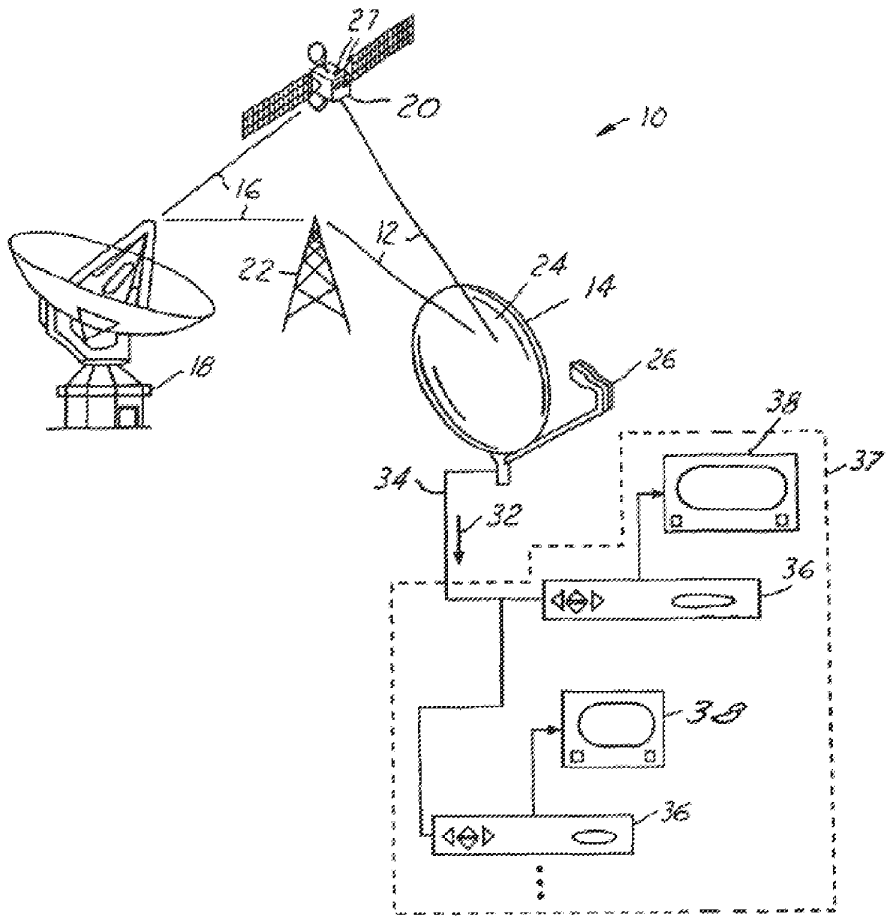
Asserted Claims	James
	 FIG.2 To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	James discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*:

Asserted Claims	James
	James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 2:40–45: The present invention has several advantages over existing direct broadcast systems. One advantage of the present invention is that it provides reception by multiple integrated receiver and decoders (IRD)s from an outdoor unit (ODU) via a single distribution cable. Thus, the present invention minimizes cables between the ODU and the IRD(s). James at 4:4–10: Also, in the following description the terms "single distribution cable" refer to a single coaxial style cable having an inner and outer conductor. Various coaxial style cables exist and may be utilized such as RG59 cable, RG6 cable, and other coaxial cable known in the art. Non-coaxial style cable may also be used that serves a similar purpose as the coaxial style cable mentioned. James at 4:11–40:

Asserted Claims	James
	Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is a given number of direct broadcast system devices shown, various numbers of devices may be utilized. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal.

Asserted Claims	James
	James at 6:1–14: The IRD(s) 36′ are capable of determining the capabilities of the receiver and performing appropriate configuration adjustments. The IRD(s) 36′ include multiple IRD links 64, which are electrically coupled to transport-tuning controllers 66. A service is selected by the transport-tuning controllers 66, which generate content request signals. Multiple IRD tuners 68, which are electrically coupled to the amplifier 58 via the distribution cable 34, receive and select the ODU receiver output signals at desired frequencies in response to the content request signals. Multiple IRD transports 70 are also electrically coupled to the IRD tuners 68 and convert the ODU receiver output signals into audio or video format for a particular communication device 38, as known in the art. James at 9:60–62: The multiplexer 92 multiplexes the service select unit output signals to generate the service ODU output signals, as generally indicated by step 178. James at 10:9–20: Referring now to FIG. 8, a logic flow diagram illustrating a direct broadcast system installation method in accordance with an embodiment of the present invention is shown. The ODU 14 is installed at a customer site 37, as generally indicated by step 200. The distribution cable 34 is coupled to the ODU 14 and to the IRD(s) 36, as generally indicated by step 202. The IRD(s) 36 generate ODU capability request signals to determine capability of the ODU 14, as generally indicated by step 204. The IRD(s) 36 are configured in response to the ODU capability request signal. The IRD(s) 36 utilize the ODU capability request signal for future tuning requests of the ODU 14. James at 10:21–29: The ODU 14 allocates and assign communication channels or frequencies for distribution of signals between the ODU 14 and the IRD(s) 36, as generally indicated by step 206. For the transport select system 40, the IRD tuners 68 then adjust to the assigned frequencies, as

Asserted Claims	James
	generally indicated by step 208. The ODU 14 selects broadcast signals on desired frequencies, corresponding to selected services, and transfers the broadcast signals to the IRD(s) 36 on the assigned channels, as generally indicated by step 210. James at Fig. 1:

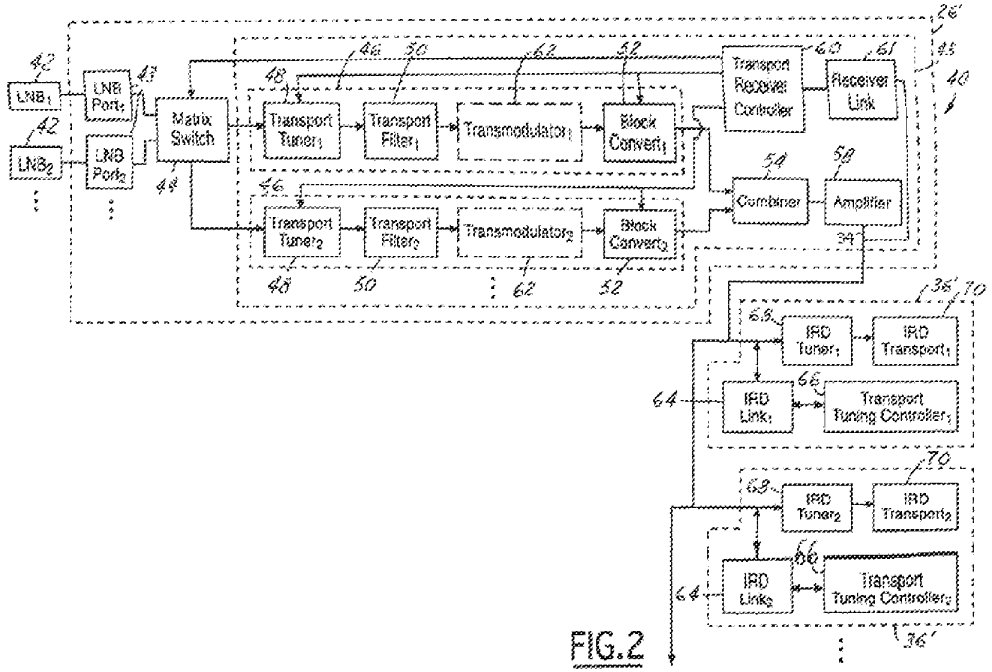
Asserted Claims	James
	 FIG. 1

Asserted Claims	James
	To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	James discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: James at 4:58–5:11: The LNBs 42 are electrically coupled to a transport LNB selector 45 via a matrix switch 44. The transport LNBs elector 45 includes multiple transport select units 46, which are electrically coupled to the matrix switch 44. Each select unit 46 includes a transport tuner 48, a transport filter 50, and a block converter 52, which convert the broadcast signals into transport select unit output signals. The tuners 48 select a frequency received from the LNBs 42. For example, a particular LNB of interest may receive broadcast signals on 16 different frequencies, corresponding to a single polarization, and the tuners, that are switched to the LNB of interest, select broadcast signals on one of the 16 frequencies. The filters 50 aid the tuners 48 in filtering out unselected frequencies. The filters 50 may be an integral portion of the tuners 48 or may be separate devices as shown. The block converters 52 shift the broadcast signals at the selected frequency to a transport select unit frequency. A combiner 54 is electrically coupled to the block converters 52 and combines transport select unit output signals to form the ODU receiver output signal. The ODU

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Asserted Claims	James
	receiver output signal is then amplified by the amplifier 58 before being received by the IRD(s) 36′. James at 5:40–48: A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data. James at 6:55–67: The service receiver controller 96 is electrically coupled to the receiver link 94, the service tuners 84, the demodulators 86, the service filters 88, and the packetizers 90. The service receiver controller 96 operates the service tuners 84, the demodulators 86, the service filters 88, and the packetizers 90 in response to the content request signal. The service receiver controller 96 as with the transport receiver controller 60 is preferably microprocessor-based such as a computer having a central processing unit, memory (RAM and/or ROM), and associated input and output buses. The service receiver controller 96 may also be an integral part of a central unit, as shown, or, alternatively, may be a separate stand-alone device. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more

Asserted Claims	James
	channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service. James at 7:25–45: The service IRD 36″ include IRD links 64 and transport tuning controllers 66. Link packet filters 98 are electrically coupled to the IRD links 64 and select appropriate packets for selected services, on the transport-tuning controllers 66, corresponding to associated IRD(s) 36″. A rate buffer 100 is electrically coupled to the link packet filters 98 and determines timing for the associated IRD(s) 36″ and adjusts link packet filter output signals appropriately. A clock recovery indicator 102 is electrically coupled to the link packet filters 98. When channels are shifted in time for multiplexing and linking purposes, the clock recovery indicator 102 signals a time stamp corrector 104, which is electrically coupled to the rate buffer 100, to undo what the multiplexer 90 or the links 64 and 94 have done. The time stamp correctors 104 are electrically coupled to the IRD transports 70. It will be appreciated that the IRD(s) 36″ do not include an IRD tuner but instead include broadband link circuitry such as the packet filters 98, buffer 100, indicator 102, and the corrector 104. The broadband link circuitry allows for use of a single link and flexibility to receive as many services as an IRD is capable of receiving. James at 9:1–3: The transport tuners 48 in combination with the transport filters 50 select broadcast signals at desired frequencies, as generally indicated by step 154 a. James at 9:39–45: The service tuners 84 and the service filters 88, as with the transport tuners 48 and transport filters 50, select broadcast signals at desired frequencies in response to the service select signals, as generally indicated by step 174 a. The service filters 88 receive a

Asserted Claims	James
	service channel identifier (SCID) list so as to filter out SCID numbers that do not correspond with channels of selected services. James at Fig. 2:  FIG.2 To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

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Asserted Claims	James
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	James discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP)

Asserted Claims	James
	signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 5:40–48: A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data. James at 5:49–58: Additionally, due to the configuration of the present invention more than one IRD may utilize a single tuner. When a first IRD is requesting a service that is on a frequency as that of a second service for which a second IRD is requesting, each IRD may utilize the same tuner. The ability to share tuners and receiver resources is unlike that of prior art broadcast systems. The present invention thus can provide an increased number of resources that may be used by an individual IRD, than is normally cost effective to incorporate into an individual IRD. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple

Asserted Claims	James
	distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift

Asserted Claims	James
	keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service. James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that may correspond with a desired frequency from an LNB but do not correspond with a requested service. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	James discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*:

Asserted Claims	James
	James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 5:40–48:

Asserted Claims	James
	A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data. James at 5:49–58: Additionally, due to the configuration of the present invention more than one IRD may utilize a single tuner. When a first IRD is requesting a service that is on a frequency as that of a second service for which a second IRD is requesting, each IRD may utilize the same tuner. The ability to share tuners and receiver resources is unlike that of prior art broadcast systems. The present invention thus can provide an increased number of resources that may be used by an individual IRD, than is normally cost effective to incorporate into an individual IRD. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may

Asserted Claims	James
	diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service.

Asserted Claims	James
	James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that may correspond with a desired frequency from an LNB but do not correspond with a requested service. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	James discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals.

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Asserted Claims	James
	Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 2:63–3:13: The present invention provides a method and apparatus of receiving a plurality of broadcast signals within a direct broadcast system from an outdoor unit. A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an ODU electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:11–40: Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each

Asserted Claims	James
	frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is a given number of direct broadcast system devices shown, various numbers of devices may be utilized. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 5:18–22:

Asserted Claims	James
	The frequencies distributed between the receiver 26′ and the IRD(s) 36′ may be configured to co-exist with other baseband frequencies such as phone, various types of digital subscriber line (xDSL), cable modem, or other broadband applications. James at 5:40–48: A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data. James at 5:49–58: Additionally, due to the configuration of the present invention more than one IRD may utilize a single tuner. When a first IRD is requesting a service that is on a frequency as that of a second service for which a second IRD is requesting, each IRD may utilize the same tuner. The ability to share tuners and receiver resources is unlike that of prior art broadcast systems. The present invention thus can provide an increased number of resources that may be used by an individual IRD, than is normally cost effective to incorporate into an individual IRD. James at 6:1–14: The IRD(s) 36′ are capable of determining the capabilities of the receiver and performing appropriate configuration adjustments. The IRD(s) 36′ include multiple IRD links 64, which are electrically coupled to transport-tuning controllers 66. A service is selected by the transport-tuning controllers 66, which generate content request signals. Multiple IRD tuners 68, which are electrically coupled to the amplifier 58 via the distribution cable 34, receive and select the ODU receiver output signals at desired frequencies in response to the content request signals. Multiple IRD transports 70 are also electrically coupled to the IRD

Asserted Claims	James
	tuners 68 and convert the ODU receiver output signals into audio or video format for a particular communication device 38, as known in the art. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 6:43–54: The service LNB selector 82 includes service select units 83, a multiplexer 92, and a service receiver controller 96. The select units 83 select channels that correspond to selected services for transfer to the service IRD(s) 36″. The multiplexer 92 is electrically coupled to the select units 83 and multiplexes service select unit output signals in time to

Asserted Claims	James
	generate the service receiver output signals. An amplifier 58 is electrically coupled to the multiplexer 92 and the service IRD(s) 36″. The service select unit output signals are amplified before being received by the service IRD(s) 36″. A receiver link 94 is electrically coupled to the service IRD(s) 36″ and performs similarly to the receiver link 61. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service. James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that may correspond with a desired frequency from an LNB but do not correspond with a requested service. James at 7:25–45: The service IRD 36″ include IRD links 64 and transport tuning controllers 66. Link packet filters 98 are electrically coupled to the IRD links 64 and select appropriate packets for

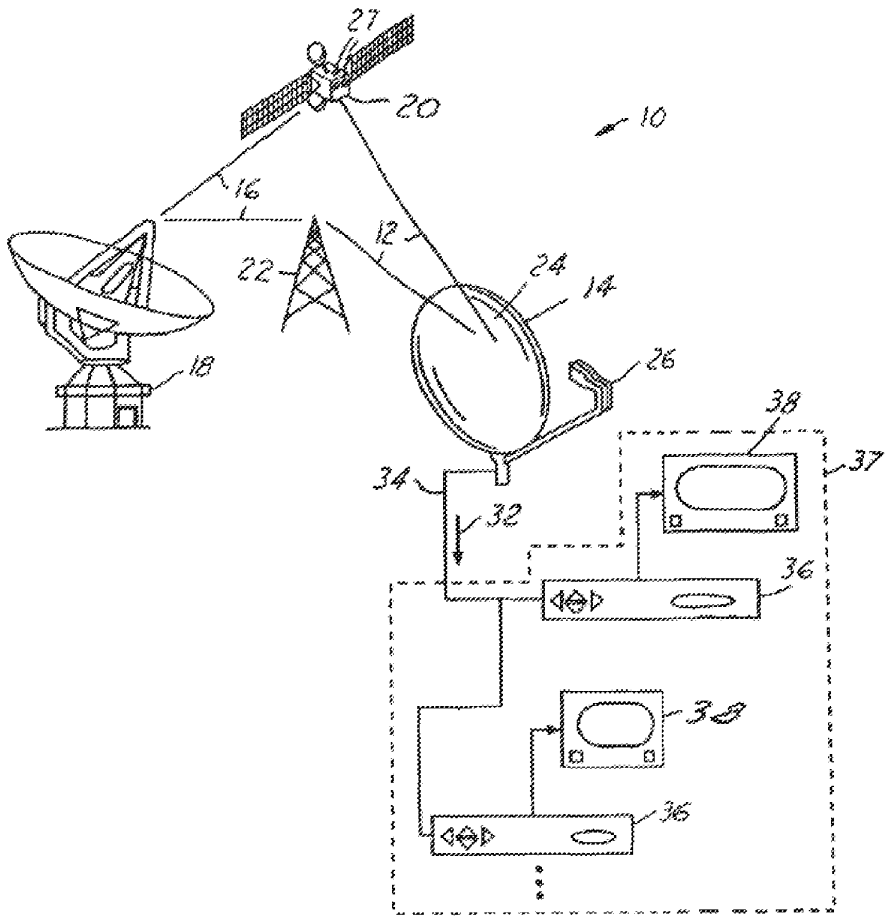
Asserted Claims	James
	selected services, on the transport-tuning controllers 66, corresponding to associated IRD(s) 36″. A rate buffer 100 is electrically coupled to the link packet filters 98 and determines timing for the associated IRD(s) 36″ and adjusts link packet filter output signals appropriately. A clock recovery indicator 102 is electrically coupled to the link packet filters 98. When channels are shifted in time for multiplexing and linking purposes, the clock recovery indicator 102 signals a time stamp corrector 104, which is electrically coupled to the rate buffer 100, to undo what the multiplexer 90 or the links 64 and 94 have done. The time stamp correctors 104 are electrically coupled to the IRD transports 70. It will be appreciated that the IRD(s) 36″ do not include an IRD tuner but instead include broadband link circuitry such as the packet filters 98, buffer 100, indicator 102, and the corrector 104. The broadband link circuitry allows for use of a single link and flexibility to receive as many services as an IRD is capable of receiving. James at 10:9–20: Referring now to FIG. 8, a logic flow diagram illustrating a direct broadcast system installation method in accordance with an embodiment of the present invention is shown. The ODU 14 is installed at a customer site 37, as generally indicated by step 200. The distribution cable 34 is coupled to the ODU 14 and to the IRD(s) 36, as generally indicated by step 202. The IRD(s) 36 generate ODU capability request signals to determine capability of the ODU 14, as generally indicated by step 204. The IRD(s) 36 are configured in response to the ODU capability request signal. The IRD(s) 36 utilize the ODU capability request signal for future tuning requests of the ODU 14. James at 10:21–29: The ODU 14 allocates and assign communication channels or frequencies for distribution of signals between the ODU 14 and the IRD(s) 36, as generally indicated by step 206. For the transport select system 40, the IRD tuners 68 then adjust to the assigned frequencies, as generally indicated by step 208. The ODU 14 selects broadcast signals on desired

Asserted Claims	James
	frequencies, corresponding to selected services, and transfers the broadcast signals to the IRD(s) 36 on the assigned channels, as generally indicated by step 210. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	James discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided.

Asserted Claims	James
	James at 2:40–45: The present invention has several advantages over existing direct broadcast systems. One advantage of the present invention is that it provides reception by multiple integrated receiver and decoders (IRD)s from an outdoor unit (ODU) via a single distribution cable. Thus, the present invention minimizes cables between the ODU and the IRD(s). James at 4:4–10: Also, in the following description the terms "single distribution cable" refer to a single coaxial style cable having an inner and outer conductor. Various coaxial style cables exist and may be utilized such as RG59 cable, RG6 cable, and other coaxial cable known in the art. Non-coaxial style cable may also be used that serves a similar purpose as the coaxial style cable mentioned. James at 4:11–40: Referring now to FIG. 1, a perspective view of a direct broadcast system 10, utilizing methods and apparatuses for receiving broadcast signals 12 within the direct broadcast system 10 from an outdoor unit (ODU) 14 in accordance with an embodiment of the present invention is shown. Radio frequency (RF) signals 16 are transmitted at one particular frequency from a ground-based station 18 to at least one high altitude device 20. The at least one device 20 transmits the RF signals 16 at a different frequency forming direct broadcast signals 12. The device 20 may be a satellite, a stratospheric platform or other communication device such as base tower 22. The direct broadcast signals 12 are received by a parabolic antenna 24 with an ODU receiver 26 from multiple transponders 27 within the device 20. Each transponder 27 transmits at a different frequency and each frequency is assigned to multiple customer services. The parabolic antenna 24 focuses the direct broadcast signals 12 to an ODU 14 located at a focal point of the antenna 24. The ODU 14 receives the direct broadcast signals 12 via a selection receiver 26. The selection receiver 26 converts the direct broadcast signals 12 into distribution signals or ODU receiver output signals 32, which are transferred by a single distribution cable 34 to

Asserted Claims	James
	integrated receivers and decoders (IRD(s)) 36 within a customer site 37. The IRD(s) 36 decode the programming on the output signals 32 for audio and visual display on one or more communication devices 38. The output signals 32 contain audio and video programming as well as data provided in direct broadcast transmission. Although, there is a given number of direct broadcast system devices shown, various numbers of devices may be utilized. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal. James at 6:1–14: The IRD(s) 36′ are capable of determining the capabilities of the receiver and performing appropriate configuration adjustments. The IRD(s) 36′ include multiple IRD links 64, which are electrically coupled to transport-tuning controllers 66. A service is selected by the transport-tuning controllers 66, which generate content request signals. Multiple IRD tuners 68, which are electrically coupled to the amplifier 58 via the distribution cable 34, receive and select the ODU receiver output signals at desired frequencies in response to the content request signals. Multiple IRD transports 70 are also electrically coupled to the IRD tuners 68 and convert the ODU receiver output signals into audio or video format for a particular communication device 38, as known in the art. James at 9:60–62: The multiplexer 92 multiplexes the service select unit output signals to generate the service ODU output signals, as generally indicated by step 178.

Asserted Claims	James
	James at 10:9–20: Referring now to FIG. 8, a logic flow diagram illustrating a direct broadcast system installation method in accordance with an embodiment of the present invention is shown. The ODU 14 is installed at a customer site 37, as generally indicated by step 200. The distribution cable 34 is coupled to the ODU 14 and to the IRD(s) 36, as generally indicated by step 202. The IRD(s) 36 generate ODU capability request signals to determine capability of the ODU 14, as generally indicated by step 204. The IRD(s) 36 are configured in response to the ODU capability request signal. The IRD(s) 36 utilize the ODU capability request signal for future tuning requests of the ODU 14. James at 10:21–29: The ODU 14 allocates and assign communication channels or frequencies for distribution of signals between the ODU 14 and the IRD(s) 36, as generally indicated by step 206. For the transport select system 40, the IRD tuners 68 then adjust to the assigned frequencies, as generally indicated by step 208. The ODU 14 selects broadcast signals on desired frequencies, corresponding to selected services, and transfers the broadcast signals to the IRD(s) 36 on the assigned channels, as generally indicated by step 210. James at Fig. 1:

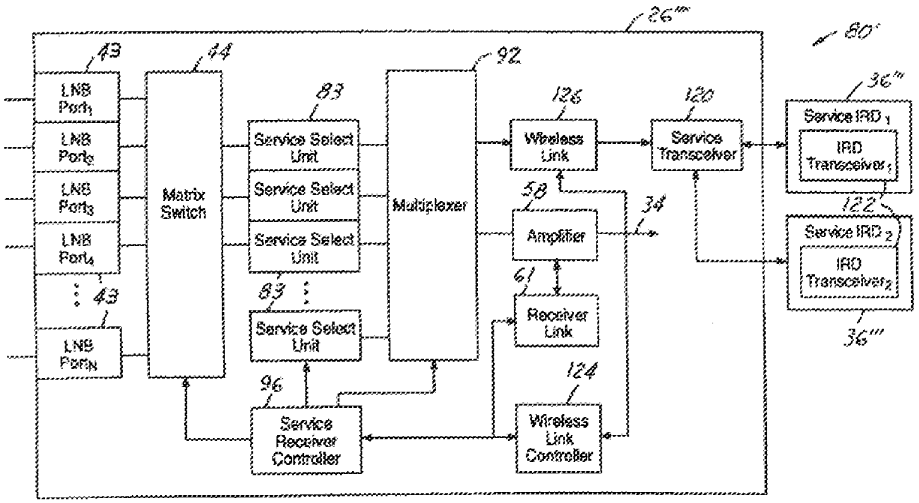
Asserted Claims	James
	 FIG. 1

Asserted Claims	James
	To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	James discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 2:54–62: Moreover, the present invention provides decreased distribution bandwidth from an ODU to IRD(s), thus, allowing for an increased number of IRD(s) per ODU and the ability of

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Asserted Claims	James
	utilizing wireless distribution between the ODU and the IRD(s). Additionally, with a reduced amount of bandwidth being utilized by the IRD(s) an increased amount of independent streams of data can be viewed without the need for an additional tuner, as is typically required in prior art direct broadcast systems. James at 2:63–3:13: The present invention provides a method and apparatus of receiving a plurality of broadcast signals within a direct broadcast system from an outdoor unit. A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an ODU electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 8:5–19: Referring now to FIG. 5, a block diagrammatic and schematic view of a service receiver 26″″ of the service select system 80′ for wireless communication in accordance with an embodiment of the present invention is shown. Since the service select system 80′ significantly decreases the amount of signal bandwidth being utilized in the distribution of service receiver output signals from the service receiver 26″″ to service IRD(s) 36‴, wireless communication is feasible between the service receiver 26″″ and the service IRD(s) 36‴. The service select system 80′, as shown, accommodates for both wired and wireless communication between the service receiver 26″″ and the IRD(s) 36‴. Of course, the system 80′ may be altered to accommodate only wireless communication.

Asserted Claims	James
	James at 8:20–25: For wireless communication the service receiver 26"" and the service IRD(s) 36''' include a service transceiver 120 and an IRD transceiver 122, respectively. A wireless link controller 124 is electrically coupled between the service receiver controller 96 and a wireless link 126, which is electrically coupled to the service transceiver 120. James at 8:26–36: The wireless link controller 124 determines transmit and receive timing of the wireless link 126. Signals may be transmitted between the service receiver 26"" and the service IRD(s) 36''' synchronously or sequentially, which is determined by the wireless link controller 124. The wireless link controller 124 may also be microprocessor-based such as a computer having a central processing unit, memory (RAM and/or ROM), and associated input and output buses. The wireless link controller 124 may also be an integral part of a central unit or, instead, may be a separate stand-alone device. James at 8:37–40: Although, wireless communication is described above for the service select system 80 it is also feasible and may be applied to the transport select system 40 or to other embodiments of the present invention. James at 9:49–59: The packetizers 90 packetize the desired channels in response to the service select signals, as generally indicated by step 176. Packets that were initially transported via the broadcast signals are wrapped within another packet to be received over the distribution cable or via wireless communication. An identifier is added to each packet so that the IRD(s) 36'' are able to de-multiplex the packets. In one embodiment of the present invention, real time stream carrying frequencies or channels are unidirectional to minimize signal collisions. Other non-real time stream carrying frequencies may be separate multiple access channels.

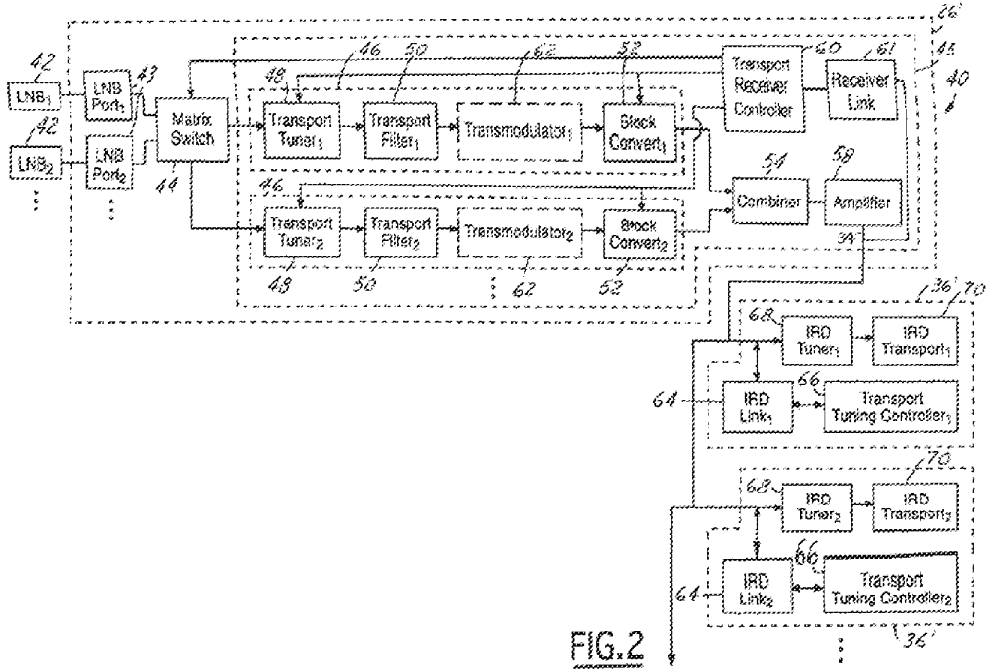
Asserted Claims	James
	James at Fig. 5:  FIG. 5 To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	James discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light

Asserted Claims	James
	of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	James discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	James discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	James discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*.

Asserted Claims	James
	To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	James discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	James discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	James discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain.

Asserted Claims	James
	See claim 14, *supra*. *See, e.g.*: James at 4:58–5:11: The LNBs 42 are electrically coupled to a transport LNB selector 45 via a matrix switch 44. The transport LNBs elector 45 includes multiple transport select units 46, which are electrically coupled to the matrix switch 44. Each select unit 46 includes a transport tuner 48, a transport filter 50, and a block converter 52, which convert the broadcast signals into transport select unit output signals. The tuners 48 select a frequency received from the LNBs 42. For example, a particular LNB of interest may receive broadcast signals on 16 different frequencies, corresponding to a single polarization, and the tuners, that are switched to the LNB of interest, select broadcast signals on one of the 16 frequencies. The filters 50 aid the tuners 48 in filtering out unselected frequencies. The filters 50 may be an integral portion of the tuners 48 or may be separate devices as shown. The block converters 52 shift the broadcast signals at the selected frequency to a transport select unit frequency. A combiner 54 is electrically coupled to the block converters 52 and combines transport select unit output signals to form the ODU receiver output signal. The ODU receiver output signal is then amplified by the amplifier 58 before being received by the IRD(s) 36'. James at 5:12–17: The transport tuners 48 may combine demodulation and remodulation characteristics to reduce channel bandwidth of distributed signals. For example, a nominal satellite modulation scheme of QPSK at 27 MHz to carry 30 Mbps to 64 QAM can reduce bandwidth per channel to 4 MHz, thus increasing number of allowable IRD(s) per ODU receiver. James at 7:54–65:

Asserted Claims	James
	Referring now to FIG. 4, a block diagrammatic and schematic view of an ODU receiver 26‴ integrating a standard multi-switch 110 in accordance with an embodiment of the present invention is shown. The receiver 26‴ illustrates integration of an LNB selector 112, which may be either the transport LNB selector 45 or the service LNB selector 82, into a conventional multi-switch 114 for support of existing direct broadcast systems. The receiver 26‴ allows conventional style IRD(s) to be combined with IRD(s) of the present invention such as IRD(s) 36′ or 36″, that use the transport select methods and service select methods, which are described in detail below. James at 9:10–12: The combiner 54 combines the transport select unit output signals to generate the transport ODU output signals, as generally indicated by step 156. James at Fig. 2:

Asserted Claims	James
	 FIG.2 To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	James discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*.

Asserted Claims	James
	See, e.g.: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz.

Asserted Claims	James
	James at 5:40–48: A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data. James at 5:49–58: Additionally, due to the configuration of the present invention more than one IRD may utilize a single tuner. When a first IRD is requesting a service that is on a frequency as that of a second service for which a second IRD is requesting, each IRD may utilize the same tuner. The ability to share tuners and receiver resources is unlike that of prior art broadcast systems. The present invention thus can provide an increased number of resources that may be used by an individual IRD, than is normally cost effective to incorporate into an individual IRD. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband

Asserted Claims	James
	Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have

Asserted Claims	James
	an associated audio channel, video channel, and data channel, which are combined to form the selected service. James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that may correspond with a desired frequency from an LNB but do not correspond with a requested service. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	James discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, *supra*. *See, e.g.*: James at Abstract: A direct broadcast system having a high altitude communication device that transmits broadcast signals, which are received by an antenna, is provided. The system includes an outdoor unit (ODU) electrically coupled to the antenna. The ODU includes a low noise block converter (LNB) that receives and amplifies the broadcast signals. An ODU receiver

Asserted Claims	James
	is electrically coupled to the ODU and selects a desired frequency of the broadcast signals. Integrated receiver and decoders (IRD(s) are electrically coupled to the ODU receiver via a single distribution cable. The IRD(s) convert the broadcast signals into IRD output signals. Methods of performing the same are also provided, herein, including a transport select method and a service select method for receiving the broadcast signals. A direct broadcast system installation method and wireless communication between the ODU and the IRD(s) are also provided. James at 4:41–57: Referring now to FIG. 2, a block diagrammatic and schematic view of a transport select system 40 in accordance with an embodiment of the present invention is shown. A transport ODU receiver 26′ is electrically coupled to multiple IRD(s) 36′ via the distribution cable 34. The transport receiver 26′ is electrically coupled to multiple low noise block converters (LNBs) 42, via LNB ports 43, that receive the broadcast signals 12 from the transponders 27 having dual polarizations. For example, the device 20 may have 32 transponders, half of which are assigned to right-hand circular polarized (RHCP) signals and the other half assigned to left-hand circular polarized (LHCP) signals. Each LNB 42 receives polarized signals from determined transponders 27 at particular frequencies. Each LNB receives either a RHCP signal or a LHCP signal. The bandwidth of the broadcast signals may be 500 MHz, such that the transport select unit frequency ranges are approximately between 950-1450 MHz. James at 5:40–48: A transmodulator 62 may be electrically coupled between the filters 50 and the block converters 52 to alter modulation of the broadcast signals. The broadcast signals are transmitted at a predetermined modulation rate, whereby a determined amount of data is transmitted for a first bandwidth. In altering the modulation rate the determined amount of data is transferred for a second bandwidth which is smaller than the first bandwidth. Thus, decreasing the amount of bandwidth used for a given amount of data.

Asserted Claims	James
	James at 5:49–58: Additionally, due to the configuration of the present invention more than one IRD may utilize a single tuner. When a first IRD is requesting a service that is on a frequency as that of a second service for which a second IRD is requesting, each IRD may utilize the same tuner. The ability to share tuners and receiver resources is unlike that of prior art broadcast systems. The present invention thus can provide an increased number of resources that may be used by an individual IRD, than is normally cost effective to incorporate into an individual IRD. James at 5:59–67: In overview, the selection receiver 26′ receives, transmodulates, and converts the dual polarized broadcast signals into the ODU receiver output signal, which utilizes a smaller amount of bandwidth to allow for use of the distribution cable 34 and for an increased number of IRD(s) over prior art systems. The present invention allows for multiple distribution signals to exist on the distribution cable 34, unlike that of the prior art in which each distribution cable has a single distribution signal. James at 6:15–22: In order for the multiple tuners 48 and the multiple IRD(s) 36′ to select signal content over shared media, a communication protocol is used. To accomplish the communication protocol, the receiver link 61 and the IRD links 64 may be in the form of broadband Ethernet interfaces or other interface devices known in the art. The IRD(s) 36′ may diagnose and indicate, via the monitors 38, any pointing errors or hardware misconfigurations. James at 6:26–42: Referring now to FIG. 3, a block diagrammatic and schematic view of a service select system 80 in accordance with an embodiment of the present invention is shown. The system 80 includes a service ODU receiver 26″ and multiple IRD(s) 36″. The service

Asserted Claims	James
	receiver 26″ includes a service LNB selector 82 that is electrically coupled to the LNB 42 via the matrix switch 44. Unlike the transport LNB selector 43, the service LNB selector 82 generates service receiver output signals that contain selected channel signals for a selected service without other channel signals for unselected service on the same associated frequency. An associated frequency may contain numerous channel signals for various services. Each service has corresponding channel signals. When services are selected on the IRD(s) 36″ the service LNB selector 82 provides the IRD(s) 36″ with channel signals that correspond to the selected service without other channel signals that may be on the associated frequencies as the selected services. James at 7:1–16: The service select units 83 include a service tuner 84, a demodulator 86, a service filter 88, and a packetizer 90. The service tuner 84 performs similarly as that of the transport tuner 48 in that it selects an associated frequency for a requested service. The demodulator 86 removes transmission modulation of the broadcast signals such as quaternary phase shift keying, quadrature amplitude modulation, and other forms of modulation known in the art. Unlike the transport filters 50 that select a frequency out of the above mentioned 16 frequencies, the service filters 88 demultiplex a selected frequency to select one or more channels out of approximately 10 channels contained therein. The packetizers 90 group channels corresponding with a selected service. For example, a selected service may have an associated audio channel, video channel, and data channel, which are combined to form the selected service. James at 7:17–24: The service select units further decrease distribution bandwidth between the service receiver 26″ and the IRD 36″ by efficient use of bandwidth. Bandwidth use is further reduced over the transport select system 40 by utilizing a reduced amount of bandwidth to distribute channels that correspond with a request service and not distributing channels that

Asserted Claims	James
	may correspond with a desired frequency from an LNB but do not correspond with a requested service. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	James discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	James discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art

Asserted Claims	James
	references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	James discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	James discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. To the extent James does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of James alone or it would have been obvious to combine James with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Kang

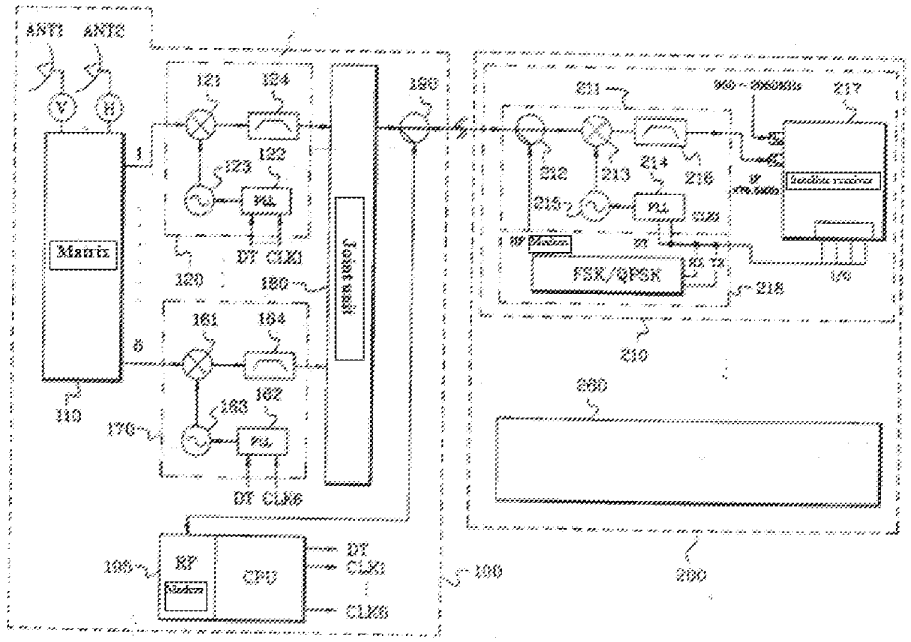
Korean Patent No. KR0142730 ("Kang") was filed on April 4, 1995 published on November 25, 1996. Kang therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a) and/or (b). For the reasons listed below, Kang invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Kang
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Kang discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Kang at Abstract:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Kang
	A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: In general, the Satellite Master Antenna Television (hereinafter abbreviated as "SMATV") is a system that receives satellite broadcasts through a central antenna used jointly and distributes them to public service areas (e.g., apartments, hotels, hospitals, etc.). Kang at 1:

Asserted Claims	Kang
	Fig. 1 is a block diagram showing such a conventional satellite broadcast joint reception circuit. A satellite signal received through a joint antenna (ANT) is distributed to a predetermined number of channels by the distributing unit (10). Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area. Kang at 2: Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable.

Asserted Claims	Kang
	Kang:  To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Kang discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD.

Asserted Claims	Kang
	See, e.g.: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a

Asserted Claims	Kang
	unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Kang discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection

Asserted Claims	Kang
	data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used

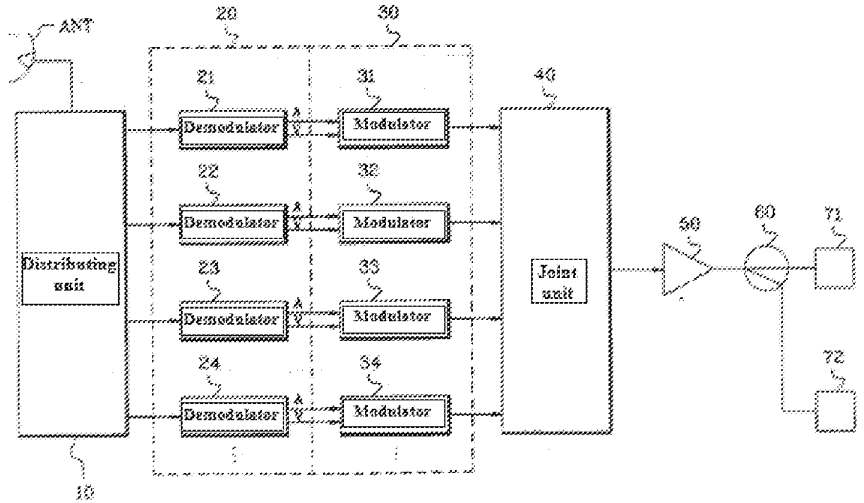
Asserted Claims	Kang
	jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area. Kang at 2: Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable. Kang at 2: At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber. Kang at 2: Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170). Kang at 2:

Asserted Claims	Kang
	And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 4: At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210). Kang at 4: Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123). Kang at 4: Here, the generator (123) controlled by I²C generates according to the output of the PLL (122) and outputs a generator frequency to the mixer (121), then the mixer (121) mixes the

Asserted Claims	Kang
	generator frequency with the vertically or horizontally polarized satellite signal output from the matrix (110) and outputs it to the joint unit (180) through the SAW filter (124). Kang at 4: In other words, the signal output from the tuning unit (120) is a channel frequency tuned by the first subscriber and is FM-modulated and output in the UHF band. Kang at 5: Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200). Kang at 5: The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215). Kang at 5: The generator (215) controlled by I^2C generates according to the output of the PLL (214) and outputs a generator frequency to the mixer (213), and the mixer (213) mixes the generator frequency with the satellite signal in the divider (212) and outputs the mix. Kang at 5:

Asserted Claims	Kang
	In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Kang discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined

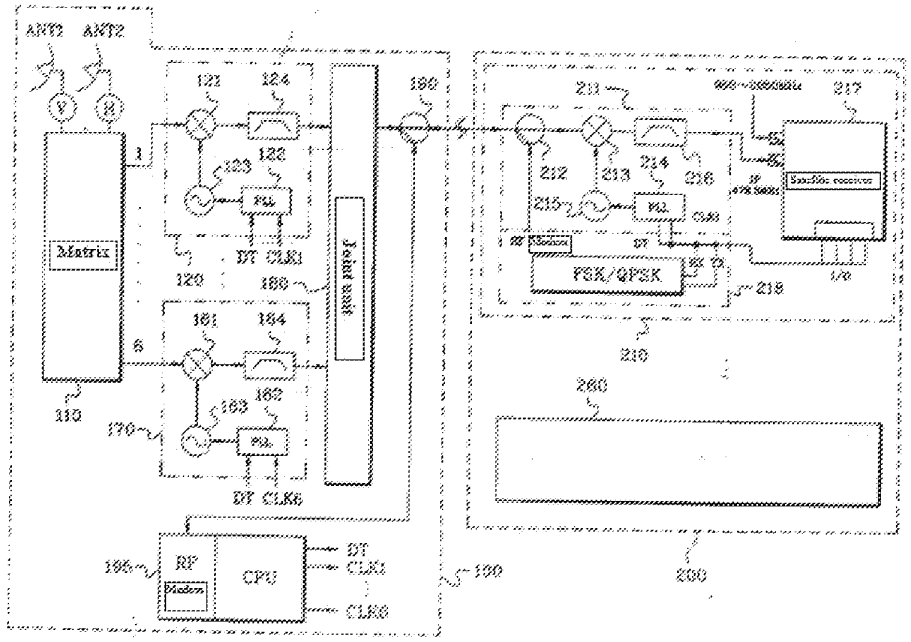
Asserted Claims	Kang
	channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: Furthermore, the frequencies of the modulated predetermined channels are combined in the joint unit (40) and then transmitted through a joint reception system line. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 3:

Asserted Claims	Kang
	Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 5: In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). Kang: 

Asserted Claims	Kang
	To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Kang discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each

Asserted Claims	Kang
	subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: Furthermore, the frequencies of the modulated predetermined channels are combined in the joint unit (40) and then transmitted through a joint reception system line. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each

Asserted Claims	Kang
	subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 5: In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). Kang:

Asserted Claims	Kang
	 To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth	Kang discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.

Asserted Claims	Kang
ranging from 5% to 100% wider than the bandwidth of the transponder signal.	*See* claim 14, *supra*. *See, e.g.*: Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Kang discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Kang
	Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the

Asserted Claims	Kang
	corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit

Asserted Claims	Kang
	(100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise. Kang at 5:

Asserted Claims	Kang
	Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217). Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Kang discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission

Asserted Claims	Kang
	circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver.

Asserted Claims	Kang
	Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217).

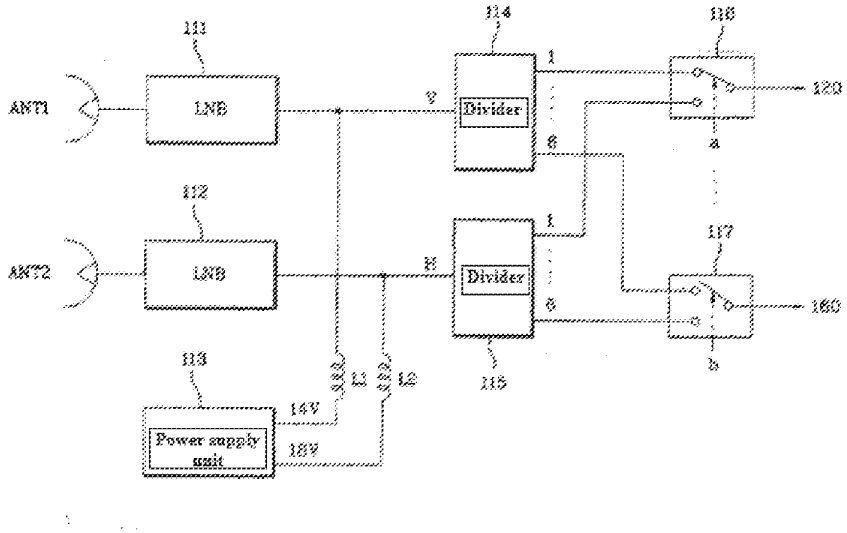
Asserted Claims	Kang
	Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise. Kang at 5: Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217).

Asserted Claims	Kang
	Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Kang discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Kang at 1: At this time, the satellite signal transmitted through the joint reception system line is amplified by the amplifier (50), then distributed by the divider (60) and input into the TVs in the public service areas (e.g., apartments, hotels, hospitals, buildings, etc.) connected to the joint reception system line. Kang at 2:

Asserted Claims	Kang
	Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214)

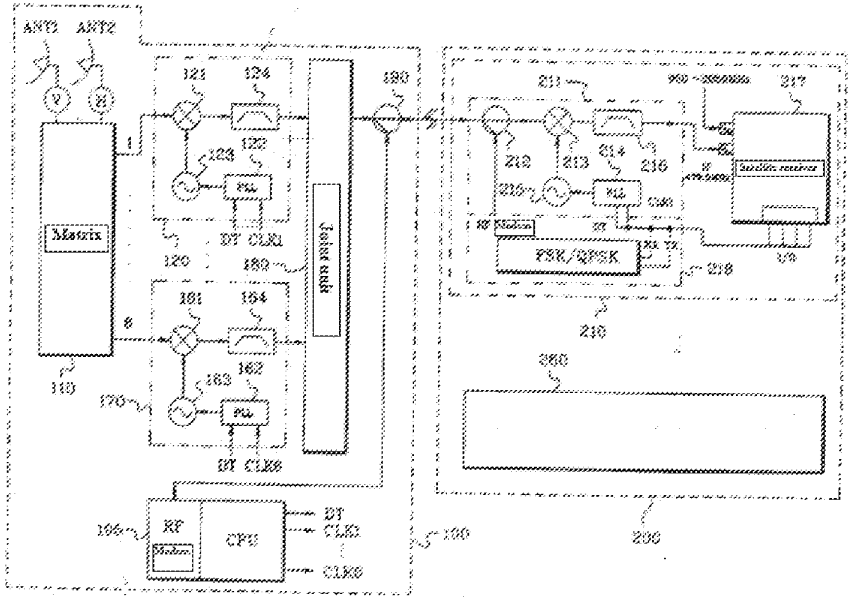
Asserted Claims	Kang
	and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: Accordingly, the first LNB (111) receives only the vertical polarized satellite signal (V), and the second LNB (113) receives only the horizontally polarized satellite signal (H) and outputs it to the divider (114, 115) connected to each output terminal. Kang at 4: On the other hand, as the first divider (114) that receives the vertically polarized satellite signal (V) and the second divider (115) that receives the horizontally polarized satellite signal (H) distribute the satellite signal to 6 channels since it is assumed that the number of subscribers in the public service area is 6. Kang at 4: The joint unit (180) outputs the satellite frequency of the tuned channel to each of the subscriber circuits (210, 260) of the reception circuit (200) through the divider (190). Kang at 4: In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1). Kang at 4:

Asserted Claims	Kang
	In other words, it is a bidirectional coaxial cable that, when the divider (212) receives a satellite signal from the transmission circuit (100) or when an error occurs in the first subscriber circuit (210), outputs the error, and outputs the channel data to the control unit (195) of the transmission circuit (100) together with a unique clock (CLK1) when a channel is selected. Kang at 4: Accordingly, the FM-modulated satellite signal in the UHF band received through the divider (212) is output to the mixer (213). Kang at 5: The generator (215) controlled by I^2C generates according to the output of the PLL (214) and outputs a generator frequency to the mixer (213), and the mixer (213) mixes the generator frequency with the satellite signal in the divider (212) and outputs the mix. Kang:

Asserted Claims	Kang
	 To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Kang discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Kang
	Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the

Asserted Claims	Kang
	corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area. Kang at 2: Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable. Kang:

Asserted Claims	Kang
	 To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Kang discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*.

Asserted Claims	Kang
	To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Kang discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each

Asserted Claims	Kang
	subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).

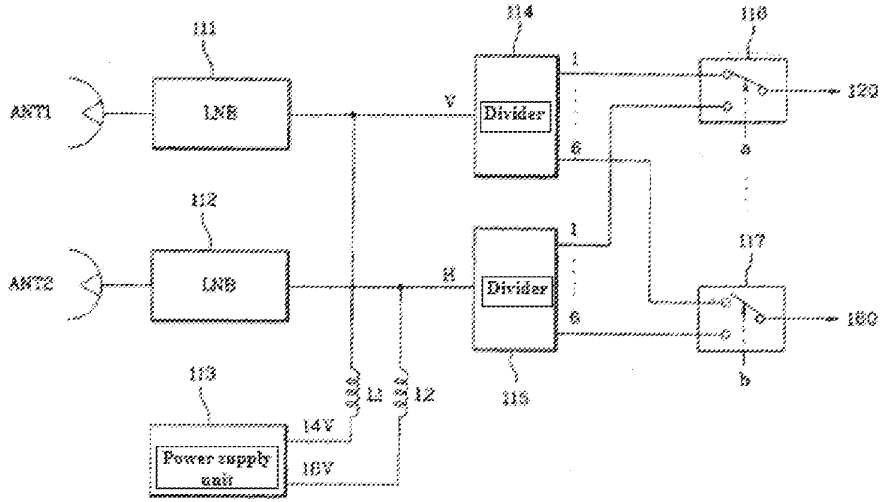
Asserted Claims	Kang
	Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213).

Asserted Claims	Kang
	Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise. Kang at 5: Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217). Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Kang
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Kang discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. *See, e.g.*: Kang at 1: At this time, the satellite signal transmitted through the joint reception system line is amplified by the amplifier (50), then distributed by the divider (60) and input into the TVs in the public service areas (e.g., apartments, hotels, hospitals, buildings, etc.) connected to the joint reception system line. Kang at 2: Here, the matrix (110) includes first and second low noise clocks (Low Noise Block; hereinafter referred to as LNB) (111, 112) connected to the respective antennas (ANT1, ANT2), a power supply unit (113) for supplying 14 V or more of DC, that is, 14 V or 18 V, to the LNBs (111, 112), the first and second dividers (114, 115) that distribute the vertical polarization (V) or horizontal polarization (B) satellite signals output through the first and second LNBs (111, 112) according to the voltage supplied from the power supply unit (113) by the number of subscribers in the public service area, and a predetermined number of switching elements (116, 117) corresponding to the number of subscribers in the public service area that switches the vertical polarization (V) and horizontal polarization (H) satellite signals output from the first and second dividers (114, 115) by control signals (a, b) and output them the tuning unite (120 [] 170). Kang at 3:

Asserted Claims	Kang
	Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: Accordingly, the first LNB (111) receives only the vertical polarized satellite signal (V), and the second LNB (113) receives only the horizontally polarized satellite signal (H) and outputs it to the divider (114, 115) connected to each output terminal. Kang at 4: On the other hand, as the first divider (114) that receives the vertically polarized satellite signal (V) and the second divider (115) that receives the horizontally polarized satellite

Asserted Claims	Kang
	signal (H) distribute the satellite signal to 6 channels since it is assumed that the number of subscribers in the public service area is 6. Kang at 4: The joint unit (180) outputs the satellite frequency of the tuned channel to each of the subscriber circuits (210, 260) of the reception circuit (200) through the divider (190). Kang at 4: In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1). Kang at 4: In other words, it is a bidirectional coaxial cable that, when the divider (212) receives a satellite signal from the transmission circuit (100) or when an error occurs in the first subscriber circuit (210), outputs the error, and outputs the channel data to the control unit (195) of the transmission circuit (100) together with a unique clock (CLK1) when a channel is selected. Kang at 4: Accordingly, the FM-modulated satellite signal in the UHF band received through the divider (212) is output to the mixer (213). Kang at 5:

Asserted Claims	Kang
	The generator (215) controlled by I²C generates according to the output of the PLL (214) and outputs a generator frequency to the mixer (213), and the mixer (213) mixes the generator frequency with the satellite signal in the divider (212) and outputs the mix. Kang:  To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is	Kang discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD.

Asserted Claims	Kang
transmitted over the cable from an IRD.	*See* claims 19, 21, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint

Asserted Claims	Kang
	reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: In Fig. 2, it is composed of a transmission circuit (100), an outdoor unit that transmits satellite broadcasting received through two central satellite antennas (ANT1, ANT2) used jointly to each subscriber in the public service area, and a reception circuit (200), an indoor unit composed of each subscriber in the public service area. Kang at 2: Here, the transmission circuit (100) serving as an outdoor unit and the reception circuit (200) serving as an indoor unit are connected by a coaxial cable. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Kang
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Kang discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Kang discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121).

Asserted Claims	Kang
	To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Kang discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Kang discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each

Asserted Claims	Kang
	subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: Furthermore, the frequencies of the modulated predetermined channels are combined in the joint unit (40) and then transmitted through a joint reception system line. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each

Asserted Claims	Kang
	subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 5: In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Kang discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*.

Asserted Claims	Kang
	See, e.g.: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a

Asserted Claims	Kang
	unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3:

Asserted Claims	Kang
	At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise.

Asserted Claims	Kang
	Kang at 5: Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217). Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Kang discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, *supra*. *See, e.g.*: Kang at Abstract:

Asserted Claims	Kang
	A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated

Asserted Claims	Kang
	composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to

Asserted Claims	Kang
	the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise. Kang at 5:

Asserted Claims	Kang
	Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217). Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Kang discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing

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Asserted Claims	Kang
	satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is

Asserted Claims	Kang
	provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: Also, the joint unit (180) for combining the corresponding frequency according to the channel selection output from each of the tuning units (120 [] 170) is connected to each tuning unit (120 [] 170), and a divider (190) for distributing satellite signals to each subscriber of the reception circuit (200) is connected to the output terminal of the joint unit (180). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to

Asserted Claims	Kang
	the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 3: In this case, the RF modem (218) modulates the signal using Frequency Shift Keying (FSK) or Quad Phase Shift Keying (QPSK). Kang at 3: Here, frequency shift keying is a frequency modulation method in which the transmission data "1" and "0" correspond to two frequencies and the amplitude is constant, and compared to amplitude modulation, it is less susceptible to level fluctuations or noise. Kang at 5:

Asserted Claims	Kang
	Furthermore, the UHF-FM signal output from the mixer (213) is converted to a satellite intermediate frequency (e.g. 479.5 MHz) through the SAW filter (216), so that the satellite receiver (217), which is the frequency of the channel selected by the first subscriber, can recognize it, and then output to the satellite receiver (217). Kang at 5: Similarly, in the second to sixth subscriber circuits, through the same operation as in the first subscriber circuit (210), only the frequency of the channel selected by each subscriber is selected in each subscriber circuit and then converted to a satellite intermediate frequency and output to the satellite receiver of each subscriber circuit. To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Kang discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing

Asserted Claims	Kang
	satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is

Asserted Claims	Kang
	provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2), respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: In addition, the transmission circuit (100) is provided with a control unit (195) for outputting channel selection data (DT) output from each subscriber, a unique clock (CLK1 [] CLK6) and error data to the tuning units (120 [] 170) through bidirectional communication with the reception circuit (200). Kang at 3:

Asserted Claims	Kang
	At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 4: At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210). Kang at 4:

Asserted Claims	Kang
	Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123). Kang at 4: In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1). Kang at 5: Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200). Kang at 5: The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215). Kang at 5:

Asserted Claims	Kang
	In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213). To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Kang discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Kang at Abstract: A satellite broadcast joint reception circuit advantageous for transmitting to a small number of subscribers through a joint reception system line after receiving and distributing satellite broadcast through a joint antenna is posted. This is composed of a transmission circuit that selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and the unique clock of each subscriber in the satellite broadcast received through the central antenna, modulates each FM in the UHF band, and combines them for output, and a reception circuit that, after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the predetermined number of UHF-FM

Asserted Claims	Kang
	modulated channel frequencies that are combined and output from the transmitting circuit, has a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to a satellite receiver. After selecting and receiving horizontal and vertical polarization satellite signals using a joint antenna, a predetermined channel is selected by each subscriber's tuning data and unique clock, modulated with UHF-FM, and transmitted through a joint reception system line, and each subscriber's receiver in the public area converts the UHF-FM signal of the channel selected by each subscriber into a satellite intermediate frequency. By doing so, paid channels and stereo are made possible, and as not as many demodulators and modulators as the number of satellite channels are required, the costs can be reduced and are suitable for a small system. Kang at 1: The features of the satellite broadcast joint reception circuit according to the present invention for achieving the above purpose are its composition: in a satellite broadcast joint reception circuit for receiving satellite broadcasts through a jointly used central antenna and distributing them to the public service area, in the satellite broadcast received through the central antenna, each subscriber selects a predetermined channel according to the channel selection data transmitted by each subscriber in the public service area and a unique clock of each subscriber, frequency-modulates each channel in the microwave band, and combines and outputs them, and after selecting the frequency of the corresponding channel according to the channel selection data and unique clock of each subscriber among the channel frequencies of the microwave frequency-modulated composition output combined and output by the transmitting means, a receiving means is provided with a predetermined number of subscriber circuits for converting to satellite intermediate frequencies and outputting them to the satellite receiver. Kang at 2: At this time, the transmission circuit (100) receives vertical polarization (V) and horizontal polarization (H) satellite broadcasts through two common antenna (ANT1, ANT2),

Asserted Claims	Kang
	respectively, and then a matrix(110) that distributes satellites signals as many as the number of subscribers is connected to a tuning unit (120 [] 170) that has a unique clock of each subscriber and selects a predetermined channel according to the channel selection data (DT) output from each subscriber. Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). Kang at 3: In addition, the transmission circuit (100) is provided with a control unit (195) for outputting channel selection data (DT) output from each subscriber, a unique clock (CLK1 [] CLK6) and error data to the tuning units (120 [] 170) through bidirectional communication with the reception circuit (200). Kang at 3: At this time, the first subscriber circuit (210) is composed of a tuning unit (211) that converts the frequency corresponding to the channel selection data value (DT) output from the first subscriber circuit (210) among the frequencies output from the transmission circuit (100) into an intermediate frequency and outputs the converted frequency to the satellite receiver (217) and an RF modem (218) for outputting the channel selection data (DT) to

Asserted Claims	Kang
	the control unit (195) of the transmission circuit (100) through the tuning unit (211) according to the channel selection in the satellite receiver (217). Kang at 3: Here, the tuning unit (211) is composed of a divider (212) for receiving a satellite signal transmitted through the divider (190) of the transmission circuit (100) or for outputting the channel selection data output from the RF modem (218) to the transmission circuit (100), a mixer (213) that mixes and outputs the generator frequency corresponding to the selected channel and the satellite broadcast frequency output through the divider (212), a PLL (214) that always maintains a constant signal frequency of an output according to the channel selection data (DT) output from the above RF modem (218) and a unique clock (CLK1) of each subscriber, a generator (215) that generates according to the output of the PLL (214) and outputs it to the mixer (213), and a SAW filter (216) that passes only a predetermined frequency among the frequencies output from the mixer (213). Kang at 4: At this time, taking each subscriber as an example, when the first subscriber of the first subscriber circuit (210) of the reception circuit (200) selects a channel through the satellite receiver (217), the channel data (DT) and the unique clock (CLK1) of the first subscriber are transmitted to the RF modem of the control unit (195) of the reception circuit (100) through the RF modem (210). Kang at 4: Also, the RF modem of the control unit (195) outputs the channel data (DT) and the unique clock (CLK1) of the first subscriber to the PLL (122) of the tuning unit (120) of the first subscriber, and the PLL (122) maintains a constant signal frequency of the output according to the channel selection data (DT) and the unique clock (CLK1) and outputs the output to the generator (123).

Asserted Claims	Kang
	Kang at 4: In this case, taking the first subscriber as an example, when an error occurs in the first subscriber circuit (210) of the RF modem (218) of the tuning unit (211) of the first subscriber circuit (210), the error is transmitted, and when a channel is selected, the channel selection data (DT) is transmitted to the RF modem of the control unit (195) of the transmission circuit (100) through the divider (212) together with the first subscriber's unique clock (CLK1). Kang at 5: Meanwhile, when the satellite receiver (217) of the first subscriber circuit (210) selects a channel, the channel selection data is output to the RF modem (218) through the signal input/output terminal (I/O), and the RF modem (218) outputs the channel selection data (DT) and the clock (CLK1) to the control unit (195) of the transmission circuit (100) and the PLL (214) of the first subscriber circuit (210) of the reception circuit (200). Kang at 5: The PLL (214) maintains a constant output signal frequency according to the channel selection data (DT) and the clock (CLK1) of the first subscriber and outputs it to the generator (215). Kang at 5: In other words, when a predetermined number of channel frequencies are combined and output in the transmission circuit (100), only the frequency of the channel selected by the first subscriber based on the channel data (DT) and the clock (CLK1) selected by the first subscriber is output through the mixer (213).

Asserted Claims	Kang
	To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Kang discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Kang at 2: And, the first tuning unit (120) of the transmission circuit (100) is composed of a mixer (121) that mixes and outputs the frequencies of satellite broadcasting output from the matrix (110) of generator frequencies corresponding to the selected channel, a Phase Locked Loop (hereinafter referred to as PLL) (122) that always keeps the signal frequency of the output constant according to the channel selection data (DT) and a unique clock (CLK1) of each subscriber, a generator (123) that generates according to the output of the PLL (122) and outputs it the mixer (121), and a filter (124) that passes only a predetermined frequency among frequencies output from the mixer (121). To the extent Kang does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Kang alone or it would have been obvious to combine Kang with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Lovinggood

U.S. Patent No. 6,697,603 ("Lovinggood") was filed on December 19, 1999 and issued on February 24, 2004. Lovinggood therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(e). For the reasons listed below, Lovinggood invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Lovinggood
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Lovinggood discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Lovinggood at Abstract:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Lovinggood
	A method of using a digital repeater for receiving and retransmitting radio frequency (RF) signals. The method including down converting a first RF signal to an intermediate frequency (IF) signal, converting the IF signal into a digital signal, processing the digital signal with a the [sic] digital signal processor, amplifying the digital signal into an amplified signal using the digital signal processor, and converting the amplified signal into an analog signal. The method further including up converting the analog signal to a second RF signal suitable for antenna transmission. Lovinggood at 1:42-2:11: Repeater systems are used in a variety of applications such as TV and radio transmission, cellular/PCS communications and pager services. Existing repeaters use analog technology and typically only provide one channel for the forward path and one channel for the reverse path. To obtain significant adjacent channel rejection, the RF signal must be converted to a fixed Intermediate Frequency (IF). Thus, each channel in a traditional repeater requires a dedicated down converter, a dedicated IF filter, a dedicated up converter and a dedicated synthesizer. A traditional analog repeater uses a Local Oscillator (LO) having a resolution of 12.5 kHz to 200 kHz. This sets the channel resolution of the entire repeater. The IF and bandwidth of an analog repeater are fixed based on the modulation format for which the repeater is designed. In addition, analog repeaters suffer from group delay and passband variations due to part-to-part variations in the IF surface acoustic wave (SAW) filter or crystal filter. Small impedance mismatches can create significant ripple in the passband response. In an analog repeater the shape factor of a SAW filter may have a 200 kHz to 400 kHz frequency difference between the 15 dB and 40 dB points. The passband response of an analog repeater is fixed by the IF SAW filter or crystal filter. Therefore, there is a need for a repeater capable of: transmitting and receiving multiple channels which uses only a single RF down converter/RF up converter pair for each path, greater local oscillator resolution, processing multiple modulation formats without changing the repeater hardware, virtually identical filter performance despite impedance mismatches, allowing more channels to be placed closer together due to filters that have a

Asserted Claims	Lovinggood
	shape factor with less than 1 kHz frequency difference between the 15 dB and 40 dB points, matching the modulation format used by the communications network, and automatically detecting the modulation format and changing the filter bandwidth based on the modulation format detected. The present invention is directed to addressing one or more of these needs. Lovinggood at 2:66-3:12: Referring to FIG. 1, there is shown an antenna system 5 for transmitting and receiving data between a base station antenna 6 and a receiving apparatus 14. The antenna system 5 includes a digital repeater 10 connected between a link antenna 8 and a broadcast antenna 12. The digital repeater 10 extends the coverage area of the originating base station antenna 6 and/or fills nulls in the coverage area of the originating base station antenna 6. The digital repeater 10 transmits and receives RF signals to and from the receiving apparatus 14, as shown in FIG. 2. The receiving apparatus 14 can comprise a pager, a TV or radio receiver, a cellular or PCS telephone, etc. The repeater 10 operates in both a transmit mode and a receive mode. For example, in one embodiment, the link antenna 8 is used to receive an incoming RF signal from the base station (BS) antenna 6 or from another repeater 10. The illustrated repeater 10 would therefore usually operate in the frequency band of the incoming RF signal or signals to be received. The broadcast antenna 12 is used in the broadcast/repeat mode to transmit (and receive) a signal(s) to the receiving apparatus 14, or to transmit a signal(s) to a further repeater 10 in a system using multiple repeaters 10 to broadcast or distribute an RF signal(s). Lovinggood at 3:13-39: Thus, the repeater 10 operates in full duplex mode (i.e., operates in two directions simultaneously) using two separate frequencies, one for each direction. As shown in FIG. 2, the digital repeater 10 includes a forward path 16 (downlink path) and a reverse path 18 (uplink path). Thus, the repeater 10 provides two-way communication with one or more receiving apparatus 14. The forward path 16 communicates an RF signal(s); from the BS

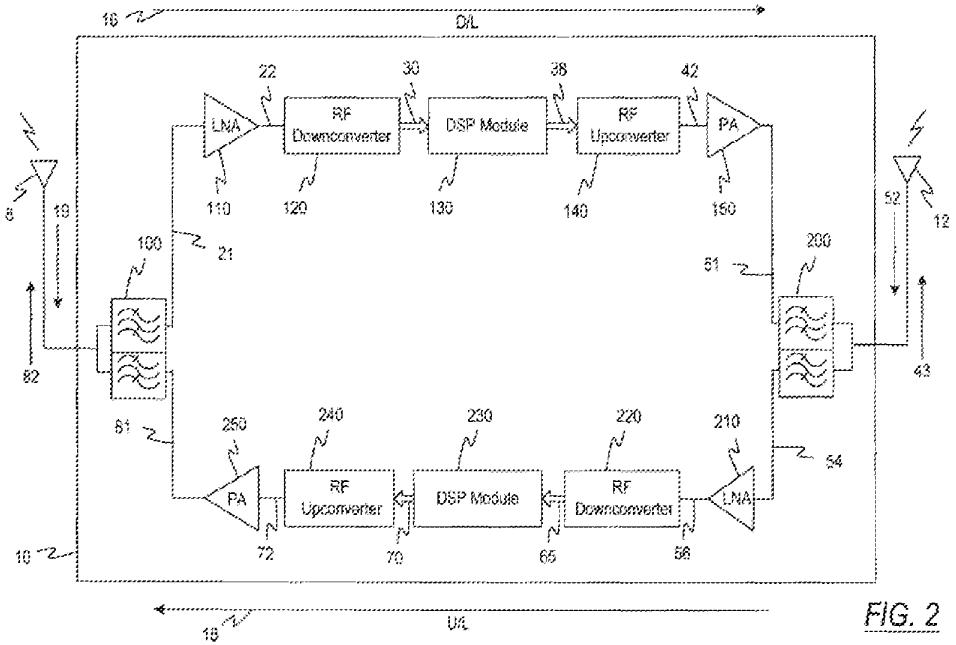
Asserted Claims	Lovinggood
	antenna 6 to the receiving apparatus 14 while the reverse path communicates an RF signal(s) from the receiving apparatus 14 to the BS antenna 6. A diplexer 100 is connected between the input of the forward path 16 and the output of the reverse path 18. Similarly, a second diplexer 200 is connected between the output of the forward path 16 and the input of the reverse path 18. The diplexers 100, 200 are used to separate the power for each path 16, 18 and to prevent noise wrap around from the forward path 16 to the reverse path 18, and vice-versa. RF signals 19 are received on the link antenna 8 and routed through the diplexer 100 and through the forward path 16. The second diplexer 200 then delivers filtered signals 43 to the broadcast antenna 12 which transmits the processed signals. In the reverse direction, the broadcast antenna 12 receives RF signals 52 which are fed through the diplexer 200 and through the reverse path 18. The first diplexer 100 then delivers filtered signals 82 to the link antenna 8 which transmits the processed signals. Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following: Lovinggood at Claim 1: 1. A method of repeating radio frequency (RF) signals comprising: in a downlink path, down converting a first RF signal to an intermediate frequency (IF) signal; converting the IF signal into a digital signal; processing the digital signal with a digital signal processor; amplifying the digital signal into an amplified signal;

Asserted Claims	Lovinggood
	converting the amplified signal into an analog signal; up converting the analog signal to a second RF signal suitable for antenna transmission and forwarding the second RF signal to a broadcast antenna; and in an uplink path operating generally independently of the downlink path, down converting a third RF signal to an intermediate frequency (IF) signal; converting the IF signal into a respective digital signal; processing the respective digital signal with a digital signal processor; amplifying the respective digital signal into an amplified signal; converting the amplified signal Into an analog signal; and up converting the analog signal to a fourth RF signal suitable for antenna transmission and forwarding the fourth RF signal to a link antenna; in at least one of the uplink and downlink paths producing an in-phase version of the digital signal and a quadrature version of the digital signal, and down converting the in-phase and the quadrature versions of the digital signal to a down converted signal without significantly varying the modulation scheme in that path. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Lovinggood discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD.

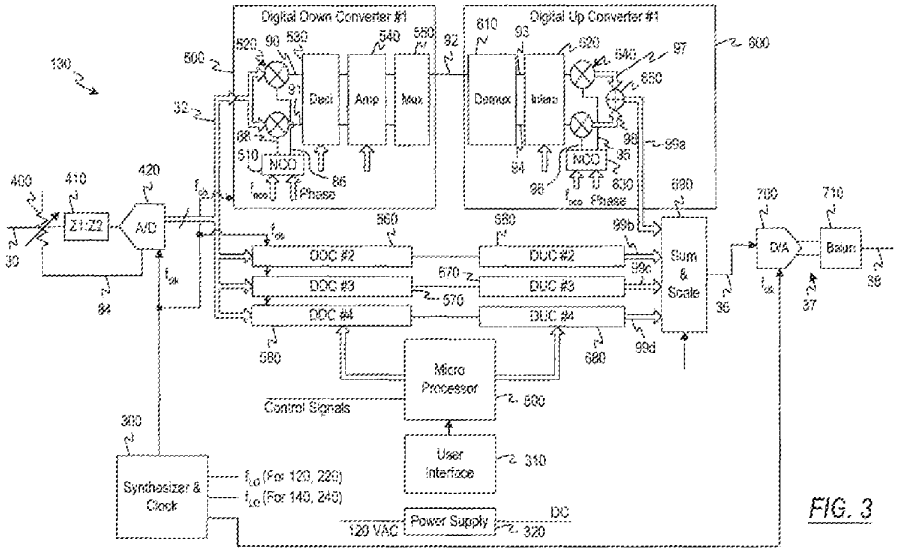
Asserted Claims	Lovinggood
	See, e.g.: Lovinggood at 2:66-3:12: Referring to FIG. 1, there is shown an antenna system 5 for transmitting and receiving data between a base station antenna 6 and a receiving apparatus 14. The antenna system 5 includes a digital repeater 10 connected between a link antenna 8 and a broadcast antenna 12. The digital repeater 10 extends the coverage area of the originating base station antenna 6 and/or fills nulls in the coverage area of the originating base station antenna 6. The digital repeater 10 transmits and receives RF signals to and from the receiving apparatus 14, as shown in FIG. 2. The receiving apparatus 14 can comprise a pager, a TV or radio receiver, a cellular or PCS telephone, etc. The repeater 10 operates in both a transmit mode and a receive mode. For example, in one embodiment, the link antenna 8 is used to receive an incoming RF signal from the base station (BS) antenna 6 or from another repeater 10. The illustrated repeater 10 would therefore usually operate in the frequency band of the incoming RF signal or signals to be received. The broadcast antenna 12 is used in the broadcast/repeat mode to transmit (and receive) a signal(s) to the receiving apparatus 14, or to transmit a signal(s) to a further repeater 10 in a system using multiple repeaters 10 to broadcast or distribute an RF signal(s). Lovinggood at 3:13-39: Thus, the repeater 10 operates in full duplex mode (i.e., operates in two directions simultaneously) using two separate frequencies, one for each direction. As shown in FIG. 2, the digital repeater 10 includes a forward path 16 (downlink path) and a reverse path 18 (uplink path). Thus, the repeater 10 provides two-way communication with one or more receiving apparatus 14. The forward path 16 communicates an RF signal(s); from the BS antenna 6 to the receiving apparatus 14 while the reverse path communicates an RF signal(s) from the receiving apparatus 14 to the BS antenna 6. A diplexer 100 is connected between the input of the forward path 16 and the output of the reverse path 18. Similarly, a second diplexer 200 is connected between the output of the forward path 16 and the input

Asserted Claims	Lovinggood
	of the reverse path 18. The diplexers 100, 200 are used to separate the power for each path 16, 18 and to prevent noise wrap around from the forward path 16 to the reverse path 18, and vice-versa. RF signals 19 are received on the link antenna 8 and routed through the diplexer 100 and through the forward path 16. The second diplexer 200 then delivers filtered signals 43 to the broadcast antenna 12 which transmits the processed signals. In the reverse direction, the broadcast antenna 12 receives RF signals 52 which are fed through the diplexer 200 and through the reverse path 18. The first diplexer 100 then delivers filtered signals 82 to the link antenna 8 which transmits the processed signals. Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following: To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Lovinggood discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Lovinggood at Abstract: A method of using a digital repeater for receiving and retransmitting radio frequency (RF) signals. The method including down converting a first RF signal to an intermediate frequency (IF) signal, converting the IF signal into a digital signal, processing the digital

Asserted Claims	Lovinggood
	signal with a the [sic] digital signal processor, amplifying the digital signal into an amplified signal using the digital signal processor, and converting the amplified signal into an analog signal. The method further including up converting the analog signal to a second RF signal suitable for antenna transmission. Lovinggood at 2:14-27: A digital repeater for transmitting and receiving radio frequency (RF) signals. The digital repeater includes a down converter for down converting a first RF signal to an intermediate frequency (IF) signal. An analog-to-digital converter for converting the to IF signal into a digital signal. A digital signal processor for filtering and amplifying the digital signal. A digital-to-analog converter for converting the digital signal into an analog signal. The digital repeater further includes an up converter for up converting the analog signal to a second RF signal suitable for antenna transmission. Lovinggood at 3:40-44: The digital repeater 10 is a multichannel repeater which can process multiple channels simultaneously in each path 16, 18. Therefore, the RF signals, such as the RF signals 19, 52, each contain one or more signals each at a different frequency (channel). Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass

Asserted Claims	Lovinggood
	filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at Fig. 2:  FIG. 2

Asserted Claims	Lovinggood
	Lovinggood at 7:57-8:41: Referring to FIG. 3, a detailed schematic of the DSP module 130 is shown. Because the DSP module 230 operates in the same manner as the DSP module 130, only the module 130 is illustrated and described in detail. In one embodiment, the DSP module 130 is a four channel DSP capable of processing four channels simultaneously; however, one or more DSPs each capable of processing one or more channels could alternatively be used. An adjustable attenuator 400 is provided to accommodate a variety of IF signal levels. An impedance transformer 410 converts the low impedance output of the attenuator 400 to a high impedance output suitable for the input of the analog-to-digital converter 420. If, for example, the input IF signals 30 are too large for the analog-to-digital converter 420, then a feedback signal 84 causes the attenuation to increase, thereby reducing the signal level present at the input of the impedance transformer 410. The analog-to-digital converter 420 converts the incoming wideband IF signals 30 to the digital signals 32 which are sampled at a rate determined by f_{clk} In one embodiment, the approximate value of f_{clk} is 60 MHz depending on the application. A digital down converter 500 is provided. Because each of the channels operate in the same manner, only the digital down converter 500 is described and illustrated in detail. The digital down converter 500 includes a numerically controlled oscillator (NCO) 510. The frequency of the NCO 510 determines which channel of the digital signals 32 is processed, i.e., it determines the center frequency around which the digital down converter 500 is tuned. The NCO 510 can be tuned (through the user interface 310) to discrete frequencies with a separation of less than, e.g., 1 Hz. In one embodiment, the useable frequency range of the NCO 510 is 0 Hz to approximately $0.4*f_{clk}$. The NCO 510 produces two LO signals at the same output frequency, an in-phase version 86 and a quadrature version 88 which is shifted 90 degrees (to produce a ¼ cycle delay) with respect to the in-phase version 86. The output frequency and the phase of the LO signals are programmable via the user interface 310. A pair of digital mixers 520 down convert the frequency of the specified channel of the digital signals 32 to a frequency determined by the NCO 510. When the frequency from

Asserted Claims	Lovinggood
	the NCO 510 is equal to the frequency of the specified channel, the output of the mixers are centered around 0 Hz. One of the mixers uses the in-phase version 86 of the LO signal from the NCO 510. This mixer converts the specified channel into an in-phase, down converted digital signal 90 centered around 0 Hz. The second one of the mixers uses the quadrature version 88 of the LO signal from the NCO 510. This mixer converts the specified channel into a quadrature, down converted digital signal 91 centered around 0 Hz. At this point, the rate of samples produced by each mixer is equal to the original sample rate, f_{clk}. Lovinggood at Fig. 3:  FIG. 3

Asserted Claims	Lovinggood
	Lovinggood at Claim 1: 1. A method of repeating radio frequency (RF) signals comprising: in a downlink path, down converting a first RF signal to an intermediate frequency (IF) signal; converting the IF signal into a digital signal; processing the digital signal with a digital signal processor; amplifying the digital signal into an amplified signal; converting the amplified signal into an analog signal; up converting the analog signal to a second RF signal suitable for antenna transmission and forwarding the second RF signal to a broadcast antenna; and in an uplink path operating generally independently of the downlink path, down converting a third RF signal to an intermediate frequency (IF) signal; converting the IF signal into a respective digital signal; processing the respective digital signal with a digital signal processor; amplifying the respective digital signal into an amplified signal; converting the amplified signal Into an analog signal; and up converting the analog signal to a fourth RF signal suitable for antenna transmission and forwarding the fourth RF signal to a link antenna; in at least one of the uplink and downlink paths producing an in-phase version of the digital signal and a quadrature version of the digital signal, and down converting the in-

Asserted Claims	Lovinggood
	phase and the quadrature versions of the digital signal to a down converted signal without significantly varying the modulation scheme in that path. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Lovinggood discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Lovinggood at 1:42-2:11: Repeater systems are used in a variety of applications such as TV and radio transmission, cellular/PCS communications and pager services. Existing repeaters use analog technology and typically only provide one channel for the forward path and one channel for the reverse path. To obtain significant adjacent channel rejection, the RF signal must be converted to a fixed Intermediate Frequency (IF). Thus, each channel in a traditional repeater requires a dedicated down converter, a dedicated IF filter, a dedicated up converter and a dedicated synthesizer. A traditional analog repeater uses a Local Oscillator (LO) having a resolution of 12.5 kHz to 200 kHz. This sets the channel resolution of the entire repeater. The IF and bandwidth of an analog repeater are fixed based on the modulation format for which the repeater is designed. In addition, analog repeaters suffer from group delay and passband variations due to part-to-part variations in the IF surface acoustic wave (SAW) filter or crystal filter. Small impedance mismatches can create significant ripple in the passband response. In an analog repeater the shape factor of a SAW filter may have a 200 kHz to 400 kHz frequency difference between the 15 dB and 40 dB points. The passband response of an analog repeater is fixed by the IF SAW filter or crystal filter.

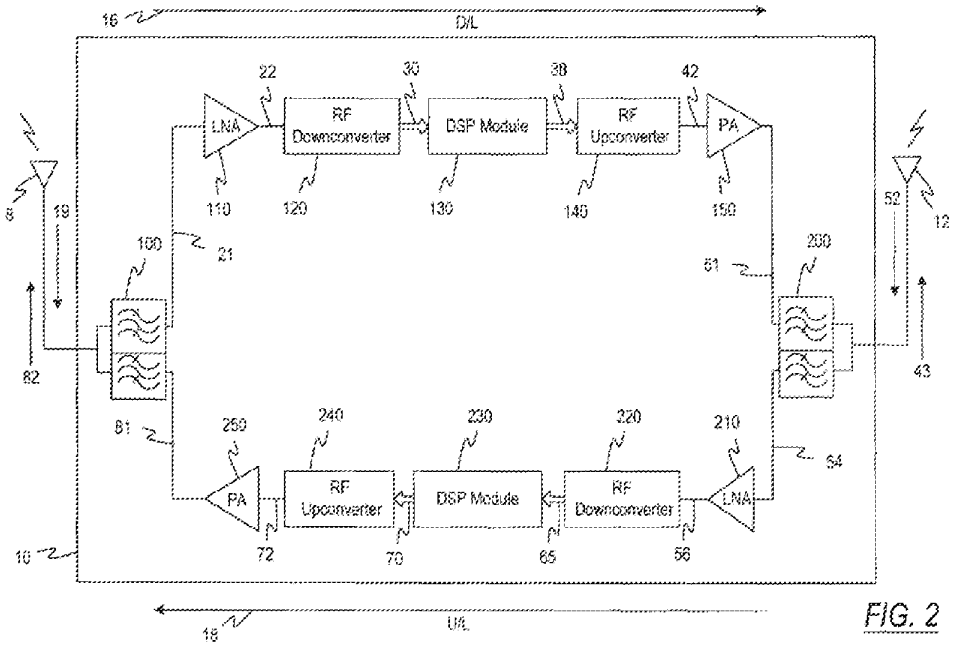
Asserted Claims	Lovinggood
	Therefore, there is a need for a repeater capable of: transmitting and receiving multiple channels which uses only a single RF down converter/RF up converter pair for each path, greater local oscillator resolution, processing multiple modulation formats without changing the repeater hardware, virtually identical filter performance despite impedance mismatches, allowing more channels to be placed closer together due to filters that have a shape factor with less than 1 kHz frequency difference between the 15 dB and 40 dB points, matching the modulation format used by the communications network, and automatically detecting the modulation format and changing the filter bandwidth based on the modulation format detected. The present invention is directed to addressing one or more of these needs. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 9:58-10:9:

Asserted Claims	Lovinggood
	A multichannel digital adder 690 is included. The digital adder 690 algebraically adds the digital output signals, e.g., 99 a-99 d, and applies a programmable scale factor (from 0 to 1) to the sum of the output signals 99 a-99 d. The scale factor prevents the summed channels from overflowing. For example, where there are four channels and each channel processes 16-bit words, the sum of the four 16-bit words could be greater than 16 bits. Therefore, the sum is scaled to prevent an overflow situation. The digital scale factor is programmable via the user interface 310. The digital-to-analog converter 700 converts the sum of the output signals, e.g., 99 a-99 d, to a differential analog signal 37. A differential signal is a signal with a magnitude equal to the difference between the voltage potentials at two ports. A balanced to unbalanced signal transformer 710 is provided for converting the differential analog signal 37 to a single, low impedance analog output signal (the second IF signals 38 of FIG. 2). This single output signal uses ground (0 volts) as its reference. Lovinggood at 11:46-63: Furthermore, the digital repeater 10 is capable of transmitting and receiving multiple channels using only a single RF down converter/RF up converter pair for each path. The digital repeater 10 provides greater channel resolution which allows more channels to be placed closer together. This is accomplished by using precise digital filters that have less than a 1 kHz frequency difference between the 15 dB and 40 dB points. The digital repeater 10 can process multiple modulation formats without changing the repeater hardware; instead, the digital signal processors are programmable such that changing the modulation format is quick and easy. In fact, the digital repeater 10 is programmable to match the modulation format used by many communications networks. The digital repeater 10 can even automatically detect the modulation format used by a particular network and change the bandwidth of the filters based on the modulation format detected. Moreover, the digital repeater 10 provides virtually identical filter performance despite impedance mismatches.

Asserted Claims	Lovinggood
	To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Lovinggood discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Lovinggood at Abstract: A method of using a digital repeater for receiving and retransmitting radio frequency (RF) signals. The method including down converting a first RF signal to an intermediate frequency (IF) signal, converting the IF signal into a digital signal, processing the digital signal with a the [sic] digital signal processor, amplifying the digital signal into an amplified signal using the digital signal processor, and converting the amplified signal into an analog signal. The method further including up converting the analog signal to a second RF signal suitable for antenna transmission. Lovinggood at 2:14-27: A digital repeater for transmitting and receiving radio frequency (RF) signals. The digital repeater includes a down converter for down converting a first RF signal to an intermediate frequency (IF) signal. An analog-to-digital converter for converting the to IF signal into a digital signal. A digital signal processor for filtering and amplifying the digital signal. A digital-to-analog converter for converting the digital signal into an analog signal. The digital repeater further includes an up converter for up converting the analog signal to a second RF signal suitable for antenna transmission.

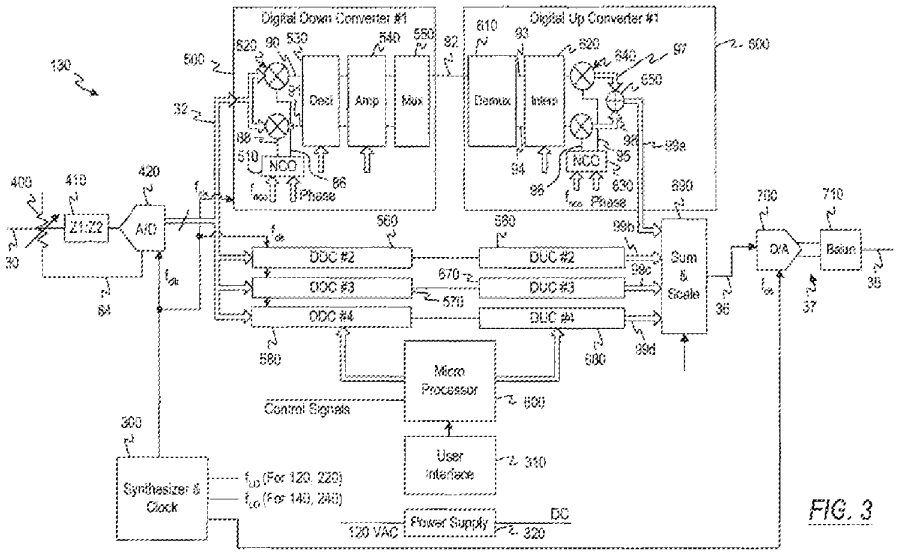
Asserted Claims	Lovinggood
	Lovinggood at 2:66-3:12: The digital repeater 10 transmits and receives RF signals to and from the receiving apparatus 14, as shown in FIG. 2. The receiving apparatus 14 can comprise a pager, a TV or radio receiver, a cellular or PCS telephone, etc. The repeater 10 operates in both a transmit mode and a receive mode. For example, in one embodiment, the link antenna 8 is used to receive an incoming RF signal from the base station (BS) antenna 6 or from another repeater 10. The illustrated repeater 10 would therefore usually operate in the frequency band of the incoming RF signal or signals to be received. The broadcast antenna 12 is used in the broadcast/repeat mode to transmit (and receive) a signal(s) to the receiving apparatus 14, or to transmit a signal(s) to a further repeater 10 in a system using multiple repeaters 10 to broadcast or distribute an RF signal(s). Lovinggood at 3:13-39: Thus, the repeater 10 operates in full duplex mode (i.e., operates in two directions simultaneously) using two separate frequencies, one for each direction. As shown in FIG. 2, the digital repeater 10 includes a forward path 16 (downlink path) and a reverse path 18 (uplink path). Thus, the repeater 10 provides two-way communication with one or more receiving apparatus 14. The forward path 16 communicates an RF signal(s); from the BS antenna 6 to the receiving apparatus 14 while the reverse path communicates an RF signal(s) from the receiving apparatus 14 to the BS antenna 6. A diplexer 100 is connected between the input of the forward path 16 and the output of the reverse path 18. Similarly, a second diplexer 200 is connected between the output of the forward path 16 and the input of the reverse path 18. The diplexers 100, 200 are used to separate the power for each path 16, 18 and to prevent noise wrap around from the forward path 16 to the reverse path 18, and vice-versa. RF signals 19 are received on the link antenna 8 and routed through the diplexer 100 and through the forward path 16. The second diplexer 200 then delivers filtered signals 43 to the broadcast antenna 12 which transmits the processed signals. In the reverse direction, the broadcast antenna 12 receives RF signals 52 which are fed through

Asserted Claims	Lovinggood
	the diplexer 200 and through the reverse path 18. The first diplexer 100 then delivers filtered signals 82 to the link antenna 8 which transmits the processed signals. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at Fig. 2:

Asserted Claims	Lovinggood
	 FIG. 2 Lovinggood at 10:10-53: A microprocessor 800 controls the digital down converter 500 and the digital up converter 600. The microprocessor 800 provides the multichannel DSP module 130 with programming data and reports the status of the module 130. The microprocessor 800 interacts with the user interface 310 to allow a user to program and configure the DSP module 130 to set, e.g., the gain of the digital signal processors, the frequency and phase of the in-phase and the quadrature versions of the first digital signal, the rate at which the first digital signal is decimated, the amplification of the digital signal to control the coverage

Asserted Claims	Lovinggood
	area of the digital repeater, the rate at which the separate signals are interpolated, and the digital scale factor. Referring to FIGS. 6a and 6 b, there is shown a flowchart depicting how the multichannel DSP module 130 is programmed. The microprocessor 800 begins executing the program in block 900. The microprocessor 800 then monitors the user interface 310 to determine whether a new channel setup is desired by a user (block 902). If a no is indicated, the microprocessor 800 returns to block 900. Otherwise, if a yes is indicated, the microprocessor 800 determines whether the new channel requested by the user is installed on the DSP module, i.e., is the channel available (block 904). The DSP module may have, for example, between 1 and 16 available channels. If the new channel is not available, the microprocessor 800 reports an allocation error in block 906 and the program ends (block 908). Otherwise, if the requested channel is installed and available, the microprocessor 800 determines whether the entered frequency is a valid frequency, i.e., whether the frequency is available (block 910). For example, the valid center frequencies may be multiples of 5 kHz. Therefore, if a frequency of 27 kHz were selected, this frequency would not be available. If the frequency is not available, the microprocessor 800 reports a frequency error in block 912 and the program ends (block 908). Otherwise, the microprocessor 800 determines in block 914 whether the modulation format corresponding to the new channel is available. If the modulation format is not available, the microprocessor 800 reports a format error in block 916 and the program ends (block 908). Otherwise, the microprocessor 800 programs the digital down converter NCO 510 (block 918) and the digital up converter NCO 630 (block 920) by using data from the NCO look-up table (block 922). Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following:

Asserted Claims	Lovinggood
	Lovinggood at 11:46-63: Furthermore, the digital repeater 10 is capable of transmitting and receiving multiple channels using only a single RF down converter/RF up converter pair for each path. The digital repeater 10 provides greater channel resolution which allows more channels to be placed closer together. This is accomplished by using precise digital filters that have less than a 1 kHz frequency difference between the 15 dB and 40 dB points. The digital repeater 10 can process multiple modulation formats without changing the repeater hardware; instead, the digital signal processors are programmable such that changing the modulation format is quick and easy. In fact, the digital repeater 10 is programmable to match the modulation format used by many communications networks. The digital repeater 10 can even automatically detect the modulation format used by a particular network and change the bandwidth of the filters based on the modulation format detected. Moreover, the digital repeater 10 provides virtually identical filter performance despite impedance mismatches. Lovinggood at Fig. 3:

Asserted Claims	Lovinggood
	 FIG. 3 To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than	Lovinggood discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.

Asserted Claims	Lovinggood
the bandwidth of the transponder signal.	*See* claim 14, *supra*. *See, e.g.*: Lovinggood at 1:42-2:11: Repeater systems are used in a variety of applications such as TV and radio transmission, cellular/PCS communications and pager services. Existing repeaters use analog technology and typically only provide one channel for the forward path and one channel for the reverse path. To obtain significant adjacent channel rejection, the RF signal must be converted to a fixed Intermediate Frequency (IF). Thus, each channel in a traditional repeater requires a dedicated down converter, a dedicated IF filter, a dedicated up converter and a dedicated synthesizer. A traditional analog repeater uses a Local Oscillator (LO) having a resolution of 12.5 kHz to 200 kHz. This sets the channel resolution of the entire repeater. The IF and bandwidth of an analog repeater are fixed based on the modulation format for which the repeater is designed. In addition, analog repeaters suffer from group delay and passband variations due to part-to-part variations in the IF surface acoustic wave (SAW) filter or crystal filter. Small impedance mismatches can create significant ripple in the passband response. In an analog repeater the shape factor of a SAW filter may have a 200 kHz to 400 kHz frequency difference between the 15 dB and 40 dB points. The passband response of an analog repeater is fixed by the IF SAW filter or crystal filter. Therefore, there is a need for a repeater capable of: transmitting and receiving multiple channels which uses only a single RF down converter/RF up converter pair for each path, greater local oscillator resolution, processing multiple modulation formats without changing the repeater hardware, virtually identical filter performance despite impedance mismatches, allowing more channels to be placed closer together due to filters that have a shape factor with less than 1 kHz frequency difference between the 15 dB and 40 dB points, matching the modulation format used by the communications network, and automatically detecting the modulation format and changing the filter bandwidth based on

Asserted Claims	Lovinggood
	the modulation format detected. The present invention is directed to addressing one or more of these needs. Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added

Asserted Claims	Lovinggood
	together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 8:42-54: A digital decimator 530 includes a digital low pass filter. The digital decimator 530 discards samples of the down converted digital signals 90, 91 that are not needed. This is possible because the signal of interest is centered around 0 Hz and occupies a narrow bandwidth. The decimation rate is a measure of the number of samples discarded. As the decimation rate increases, the bandwidth of the undiscarded samples decreases. The decimation rate is programmable via the user interface 310. The digital low pass filter is a Finite Impulse Response (FIR) type filter with programmable coefficients that define the shape of the filter. The filter coefficients are also programmable via the user interface 310. Lovinggood at 9:13-23: A digital interpolator 620 includes a digital low pass filter. The digital low pass filter is a FIR type filter with programmable coefficients. These coefficients define the shape of the filter. The filter coefficients are programmable via the user interface 310. The digital interpolator 620 generates data samples that are needed in order to increase the sample rate to the original fclk frequency. The interpolation rate is a measure of how many samples are generated. Generally, the interpolation rate is equal to the decimation rate used for the digital decimator 530. The interpolation rate is also programmable via the user interface 310. Lovinggood at Claim 2: 2. The method of claim 1, wherein the processing includes filtering and decimating the digital signal. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art

Asserted Claims	Lovinggood
	in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Lovinggood discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The

Asserted Claims	Lovinggood
	digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Lovinggood discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is

Asserted Claims	Lovinggood
	1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Lovinggood
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Lovinggood discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Lovinggood discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Lovinggood at 2:66-3:12: Referring to FIG. 1, there is shown an antenna system 5 for transmitting and receiving data between a base station antenna 6 and a receiving apparatus 14. The antenna system 5 includes a digital repeater 10 connected between a link antenna 8 and a broadcast antenna 12. The digital repeater 10 extends the coverage area of the originating base station antenna 6 and/or fills nulls in the coverage area of the originating base station antenna 6. The digital repeater 10 transmits and receives RF signals to and from the receiving apparatus 14, as shown in FIG. 2. The receiving apparatus 14 can comprise a pager, a TV or radio receiver, a cellular or PCS telephone, etc. The repeater 10 operates in both a transmit mode and a receive mode. For example, in one embodiment, the link antenna 8 is used to receive an incoming RF signal from the base station (BS) antenna 6 or from another repeater 10. The illustrated repeater 10 would therefore usually operate in the

Asserted Claims	Lovinggood
	frequency band of the incoming RF signal or signals to be received. The broadcast antenna 12 is used in the broadcast/repeat mode to transmit (and receive) a signal(s) to the receiving apparatus 14, or to transmit a signal(s) to a further repeater 10 in a system using multiple repeaters 10 to broadcast or distribute an RF signal(s). Lovinggood at 3:13-39: Thus, the repeater 10 operates in full duplex mode (i.e., operates in two directions simultaneously) using two separate frequencies, one for each direction. As shown in FIG. 2, the digital repeater 10 includes a forward path 16 (downlink path) and a reverse path 18 (uplink path). Thus, the repeater 10 provides two-way communication with one or more receiving apparatus 14. The forward path 16 communicates an RF signal(s); from the BS antenna 6 to the receiving apparatus 14 while the reverse path communicates an RF signal(s) from the receiving apparatus 14 to the BS antenna 6. A diplexer 100 is connected between the input of the forward path 16 and the output of the reverse path 18. Similarly, a second diplexer 200 is connected between the output of the forward path 16 and the input of the reverse path 18. The diplexers 100, 200 are used to separate the power for each path 16, 18 and to prevent noise wrap around from the forward path 16 to the reverse path 18, and vice-versa. RF signals 19 are received on the link antenna 8 and routed through the diplexer 100 and through the forward path 16. The second diplexer 200 then delivers filtered signals 43 to the broadcast antenna 12 which transmits the processed signals. In the reverse direction, the broadcast antenna 12 receives RF signals 52 which are fed through the diplexer 200 and through the reverse path 18. The first diplexer 100 then delivers filtered signals 82 to the link antenna 8 which transmits the processed signals. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is	Lovinggood discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.

Asserted Claims	Lovinggood
transmitted over a wireless link to the ODU.	*See* claim 14, *supra*. *See, e.g.*: Lovinggood at 2:66-3:12: Referring to FIG. 1, there is shown an antenna system 5 for transmitting and receiving data between a base station antenna 6 and a receiving apparatus 14. The antenna system 5 includes a digital repeater 10 connected between a link antenna 8 and a broadcast antenna 12. The digital repeater 10 extends the coverage area of the originating base station antenna 6 and/or fills nulls in the coverage area of the originating base station antenna 6. The digital repeater 10 transmits and receives RF signals to and from the receiving apparatus 14, as shown in FIG. 2. The receiving apparatus 14 can comprise a pager, a TV or radio receiver, a cellular or PCS telephone, etc. The repeater 10 operates in both a transmit mode and a receive mode. For example, in one embodiment, the link antenna 8 is used to receive an incoming RF signal from the base station (BS) antenna 6 or from another repeater 10. The illustrated repeater 10 would therefore usually operate in the frequency band of the incoming RF signal or signals to be received. The broadcast antenna 12 is used in the broadcast/repeat mode to transmit (and receive) a signal(s) to the receiving apparatus 14, or to transmit a signal(s) to a further repeater 10 in a system using multiple repeaters 10 to broadcast or distribute an RF signal(s). Lovinggood at 3:13-39: Thus, the repeater 10 operates in full duplex mode (i.e., operates in two directions simultaneously) using two separate frequencies, one for each direction. As shown in FIG. 2, the digital repeater 10 includes a forward path 16 (downlink path) and a reverse path 18 (uplink path). Thus, the repeater 10 provides two-way communication with one or more receiving apparatus 14. The forward path 16 communicates an RF signal(s); from the BS antenna 6 to the receiving apparatus 14 while the reverse path communicates an RF signal(s) from the receiving apparatus 14 to the BS antenna 6. A diplexer 100 is connected

Asserted Claims	Lovinggood
	between the input of the forward path 16 and the output of the reverse path 18. Similarly, a second diplexer 200 is connected between the output of the forward path 16 and the input of the reverse path 18. The diplexers 100, 200 are used to separate the power for each path 16, 18 and to prevent noise wrap around from the forward path 16 to the reverse path 18, and vice-versa. RF signals 19 are received on the link antenna 8 and routed through the diplexer 100 and through the forward path 16. The second diplexer 200 then delivers filtered signals 43 to the broadcast antenna 12 which transmits the processed signals. In the reverse direction, the broadcast antenna 12 receives RF signals 52 which are fed through the diplexer 200 and through the reverse path 18. The first diplexer 100 then delivers filtered signals 82 to the link antenna 8 which transmits the processed signals. Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following: To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Lovinggood discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Lovinggood
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Lovinggood discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Lovinggood discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*. *See, e.g.*: To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Lovinggood discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 21, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with

Asserted Claims	Lovinggood
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Lovinggood discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Lovinggood at 1:42-2:11: Repeater systems are used in a variety of applications such as TV and radio transmission, cellular/PCS communications and pager services. Existing repeaters use analog technology and typically only provide one channel for the forward path and one channel for the reverse path. To obtain significant adjacent channel rejection, the RF signal must be converted to a fixed Intermediate Frequency (IF). Thus, each channel in a traditional repeater requires a dedicated down converter, a dedicated IF filter, a dedicated up converter and a dedicated synthesizer. A traditional analog repeater uses a Local Oscillator (LO) having a resolution of 12.5 kHz to 200 kHz. This sets the channel resolution of the entire repeater. The IF and bandwidth of an analog repeater are fixed based on the modulation format for which the repeater is designed. In addition, analog repeaters suffer from group delay and passband variations due to part-to-part variations in the IF surface acoustic wave (SAW) filter or crystal filter. Small impedance mismatches can create significant ripple in the passband response. In an analog repeater the shape factor of a SAW filter may have a 200 kHz to 400 kHz frequency difference between the 15 dB and 40 dB points. The passband response of an analog repeater is fixed by the IF SAW filter or crystal filter. Therefore, there is a need for a repeater capable of: transmitting and receiving multiple channels which uses only a single RF down converter/RF up converter pair for each path, greater local oscillator resolution, processing multiple modulation formats without changing the repeater hardware, virtually identical filter performance despite impedance

Asserted Claims	Lovinggood
	mismatches, allowing more channels to be placed closer together due to filters that have a shape factor with less than 1 kHz frequency difference between the 15 dB and 40 dB points, matching the modulation format used by the communications network, and automatically detecting the modulation format and changing the filter bandwidth based on the modulation format detected. The present invention is directed to addressing one or more of these needs. Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband

Asserted Claims	Lovinggood
	center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 8:42-54: A digital decimator 530 includes a digital low pass filter. The digital decimator 530 discards samples of the down converted digital signals 90, 91 that are not needed. This is possible because the signal of interest is centered around 0 Hz and occupies a narrow bandwidth. The decimation rate is a measure of the number of samples discarded. As the decimation rate increases, the bandwidth of the undiscarded samples decreases. The decimation rate is programmable via the user interface 310. The digital low pass filter is a Finite Impulse Response (FIR) type filter with programmable coefficients that define the shape of the filter. The filter coefficients are also programmable via the user interface 310. Lovinggood at 9:13-23: A digital interpolator 620 includes a digital low pass filter. The digital low pass filter is a FIR type filter with programmable coefficients. These coefficients define the shape of the filter. The filter coefficients are programmable via the user interface 310. The digital interpolator 620 generates data samples that are needed in order to increase the sample rate to the original fclk frequency. The interpolation rate is a measure of how many samples are generated. Generally, the interpolation rate is equal to the decimation rate used for the digital decimator 530. The interpolation rate is also programmable via the user interface 310. Lovinggood at Claim 2:

Asserted Claims	Lovinggood
	2. The method of claim 1, wherein the processing includes filtering and decimating the digital signal. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Lovinggood discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Lovinggood discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Lovinggood at Abstract: A method of using a digital repeater for receiving and retransmitting radio frequency (RF) signals. The method including down converting a first RF signal to an intermediate frequency (IF) signal, converting the IF signal into a digital signal, processing the digital signal with a the [sic] digital signal processor, amplifying the digital signal into an

Asserted Claims	Lovinggood
	amplified signal using the digital signal processor, and converting the amplified signal into an analog signal. The method further including up converting the analog signal to a second RF signal suitable for antenna transmission. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 9:58-10:9: A multichannel digital adder 690 is included. The digital adder 690 algebraically adds the digital output signals, e.g., 99 a-99 d, and applies a programmable scale factor (from 0 to 1) to the sum of the output signals 99 a-99 d. The scale factor prevents the summed channels from overflowing. For example, where there are four channels and each channel processes 16-bit words, the sum of the four 16-bit words could be greater than 16 bits. Therefore, the sum is scaled to prevent an overflow situation. The digital scale factor is programmable via the user interface 310.

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	The digital-to-analog converter 700 converts the sum of the output signals, e.g., 99 a-99 d, to a differential analog signal 37. A differential signal is a signal with a magnitude equal to the difference between the voltage potentials at two ports. A balanced to unbalanced signal transformer 710 is provided for converting the differential analog signal 37 to a single, low impedance analog output signal (the second IF signals 38 of FIG. 2). This single output signal uses ground (0 volts) as its reference. Lovinggood at 11:46-63: Furthermore, the digital repeater 10 is capable of transmitting and receiving multiple channels using only a single RF down converter/RF up converter pair for each path. The digital repeater 10 provides greater channel resolution which allows more channels to be placed closer together. This is accomplished by using precise digital filters that have less than a 1 kHz frequency difference between the 15 dB and 40 dB points. The digital repeater 10 can process multiple modulation formats without changing the repeater hardware; instead, the digital signal processors are programmable such that changing the modulation format is quick and easy. In fact, the digital repeater 10 is programmable to match the modulation format used by many communications networks. The digital repeater 10 can even automatically detect the modulation format used by a particular network and change the bandwidth of the filters based on the modulation format detected. Moreover, the digital repeater 10 provides virtually identical filter performance despite impedance mismatches. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating	Lovinggood discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.

Asserted Claims	Lovinggood
phasor to the data samples to translate their frequency.	*See* claim 17, *supra*. *See, e.g.*: Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated

Asserted Claims	Lovinggood
	embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 7:57-8:41: Referring to FIG. 3, a detailed schematic of the DSP module 130 is shown. Because the DSP module 230 operates in the same manner as the DSP module 130, only the module 130 is illustrated and described in detail. In one embodiment, the DSP module 130 is a four channel DSP capable of processing four channels simultaneously; however, one or more DSPs each capable of processing one or more channels could alternatively be used. An adjustable attenuator 400 is provided to accommodate a variety of IF signal levels. An impedance transformer 410 converts the low impedance output of the attenuator 400 to a high impedance output suitable for the input of the analog-to-digital converter 420. If, for example, the input IF signals 30 are too large for the analog-to-digital converter 420, then a feedback signal 84 causes the attenuation to increase, thereby reducing the signal level present at the input of the impedance transformer 410. The analog-to-digital converter 420 converts the incoming wideband IF signals 30 to the digital signals 32 which are sampled at a rate determined by f_{clk} In one embodiment, the approximate value of f_{clk} is 60 MHz depending on the application. A digital down converter 500 is provided. Because each of the channels operate in the same manner, only the digital down converter 500 is described and illustrated in detail. The digital down converter 500 includes a numerically controlled oscillator (NCO) 510. The frequency of the NCO 510 determines which channel of the digital signals 32 is processed, i.e., it determines the center frequency around which the digital down converter 500 is tuned. The NCO 510 can be tuned (through the user interface 310) to discrete frequencies with a separation of less than, e.g., 1 Hz. In one embodiment, the useable frequency range of the NCO 510 is 0 Hz to approximately $0.4*f_{clk}$. The NCO 510 produces two LO signals at the same output frequency, an in-phase version 86 and a quadrature version 88 which is shifted 90 degrees (to produce a ¼ cycle

Asserted Claims	Lovinggood
	delay) with respect to the in-phase version 86. The output frequency and the phase of the LO signals are programmable via the user interface 310. A pair of digital mixers 520 down convert the frequency of the specified channel of the digital signals 32 to a frequency determined by the NCO 510. When the frequency from the NCO 510 is equal to the frequency of the specified channel, the output of the mixers are centered around 0 Hz. One of the mixers uses the in-phase version 86 of the LO signal from the NCO 510. This mixer converts the specified channel into an in-phase, down converted digital signal 90 centered around 0 Hz. The second one of the mixers uses the quadrature version 88 of the LO signal from the NCO 510. This mixer converts the specified channel into a quadrature, down converted digital signal 91 centered around 0 Hz. At this point, the rate of samples produced by each mixer is equal to the original sample rate, f_{clk}. Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following: To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Lovinggood discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, 17, *supra*.

Asserted Claims	Lovinggood
	See, e.g.: Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each

Asserted Claims	Lovinggood
	channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 7:57-8:41: Referring to FIG. 3, a detailed schematic of the DSP module 130 is shown. Because the DSP module 230 operates in the same manner as the DSP module 130, only the module 130 is illustrated and described in detail. In one embodiment, the DSP module 130 is a four channel DSP capable of processing four channels simultaneously; however, one or more DSPs each capable of processing one or more channels could alternatively be used. An adjustable attenuator 400 is provided to accommodate a variety of IF signal levels. An impedance transformer 410 converts the low impedance output of the attenuator 400 to a high impedance output suitable for the input of the analog-to-digital converter 420. If, for example, the input IF signals 30 are too large for the analog-to-digital converter 420, then a feedback signal 84 causes the attenuation to increase, thereby reducing the signal level present at the input of the impedance transformer 410. The analog-to-digital converter 420 converts the incoming wideband IF signals 30 to the digital signals 32 which are sampled at a rate determined by f_{clk} In one embodiment, the approximate value of f_{clk} is 60 MHz depending on the application. A digital down converter 500 is provided. Because each of the channels operate in the same manner, only the digital down converter 500 is described and illustrated in detail. The digital down converter 500 includes a numerically controlled oscillator (NCO) 510. The frequency of the NCO 510 determines which channel of the digital signals 32 is processed, i.e., it determines the center frequency around which the digital down converter 500 is tuned. The NCO 510 can be tuned (through the user interface 310) to discrete frequencies with a separation of less than, e.g., 1 Hz. In one embodiment, the useable frequency range of the NCO 510 is 0 Hz to approximately $0.4*f_{clk}$. The NCO 510 produces two LO signals at the same output frequency, an in-phase version 86 and a quadrature version 88 which is shifted 90 degrees (to produce a ¼ cycle

Asserted Claims	Lovinggood
	delay) with respect to the in-phase version 86. The output frequency and the phase of the LO signals are programmable via the user interface 310. A pair of digital mixers 520 down convert the frequency of the specified channel of the digital signals 32 to a frequency determined by the NCO 510. When the frequency from the NCO 510 is equal to the frequency of the specified channel, the output of the mixers are centered around 0 Hz. One of the mixers uses the in-phase version 86 of the LO signal from the NCO 510. This mixer converts the specified channel into an in-phase, down converted digital signal 90 centered around 0 Hz. The second one of the mixers uses the quadrature version 88 of the LO signal from the NCO 510. This mixer converts the specified channel into a quadrature, down converted digital signal 91 centered around 0 Hz. At this point, the rate of samples produced by each mixer is equal to the original sample rate, f_{clk}. Lovinggood at 11:13-16: The digital repeater 10 described above operates independent of the frequency band being processed. That is, the repeater 10 may be used in any frequency band, including, but not limited to, the following: To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Lovinggood discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*:

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	Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each

Asserted Claims	Lovinggood
	channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 7:57-8:41: Referring to FIG. 3, a detailed schematic of the DSP module 130 is shown. Because the DSP module 230 operates in the same manner as the DSP module 130, only the module 130 is illustrated and described in detail. In one embodiment, the DSP module 130 is a four channel DSP capable of processing four channels simultaneously; however, one or more DSPs each capable of processing one or more channels could alternatively be used. An adjustable attenuator 400 is provided to accommodate a variety of IF signal levels. An impedance transformer 410 converts the low impedance output of the attenuator 400 to a high impedance output suitable for the input of the analog-to-digital converter 420. If, for example, the input IF signals 30 are too large for the analog-to-digital converter 420, then a feedback signal 84 causes the attenuation to increase, thereby reducing the signal level present at the input of the impedance transformer 410. The analog-to-digital converter 420 converts the incoming wideband IF signals 30 to the digital signals 32 which are sampled at a rate determined by f_{clk} In one embodiment, the approximate value of f_{clk} is 60 MHz depending on the application. A digital down converter 500 is provided. Because each of the channels operate in the same manner, only the digital down converter 500 is described and illustrated in detail. The digital down converter 500 includes a numerically controlled oscillator (NCO) 510. The frequency of the NCO 510 determines which channel of the digital signals 32 is processed, i.e., it determines the center frequency around which the digital down converter 500 is tuned. The NCO 510 can be tuned (through the user interface 310) to discrete frequencies with a separation of less than, e.g., 1 Hz. In one embodiment, the useable frequency range of the NCO 510 is 0 Hz to approximately $0.4*f_{clk}$. The NCO 510 produces two LO signals at the same output frequency, an in-phase version 86 and a quadrature version 88 which is shifted 90 degrees (to produce a ¼ cycle

Asserted Claims	Lovinggood
	delay) with respect to the in-phase version 86. The output frequency and the phase of the LO signals are programmable via the user interface 310. A pair of digital mixers 520 down convert the frequency of the specified channel of the digital signals 32 to a frequency determined by the NCO 510. When the frequency from the NCO 510 is equal to the frequency of the specified channel, the output of the mixers are centered around 0 Hz. One of the mixers uses the in-phase version 86 of the LO signal from the NCO 510. This mixer converts the specified channel into an in-phase, down converted digital signal 90 centered around 0 Hz. The second one of the mixers uses the quadrature version 88 of the LO signal from the NCO 510. This mixer converts the specified channel into a quadrature, down converted digital signal 91 centered around 0 Hz. At this point, the rate of samples produced by each mixer is equal to the original sample rate, f_{clk}. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Lovinggood discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Lovinggood at 10:10-53: A microprocessor 800 controls the digital down converter 500 and the digital up converter 600. The microprocessor 800 provides the multichannel DSP module 130 with programming data and reports the status of the module 130. The microprocessor 800

Asserted Claims	Lovinggood
	interacts with the user interface 310 to allow a user to program and configure the DSP module 130 to set, e.g., the gain of the digital signal processors, the frequency and phase of the in-phase and the quadrature versions of the first digital signal, the rate at which the first digital signal is decimated, the amplification of the digital signal to control the coverage area of the digital repeater, the rate at which the separate signals are interpolated, and the digital scale factor. Referring to FIGS. 6a and 6 b, there is shown a flowchart depicting how the multichannel DSP module 130 is programmed. The microprocessor 800 begins executing the program in block 900. The microprocessor 800 then monitors the user interface 310 to determine whether a new channel setup is desired by a user (block 902). If a no is indicated, the microprocessor 800 returns to block 900. Otherwise, if a yes is indicated, the microprocessor 800 determines whether the new channel requested by the user is installed on the DSP module, i.e., is the channel available (block 904). The DSP module may have, for example, between 1 and 16 available channels. If the new channel is not available, the microprocessor 800 reports an allocation error in block 906 and the program ends (block 908). Otherwise, if the requested channel is installed and available, the microprocessor 800 determines whether the entered frequency is a valid frequency, i.e., whether the frequency is available (block 910). For example, the valid center frequencies may be multiples of 5 kHz. Therefore, if a frequency of 27 kHz were selected, this frequency would not be available. If the frequency is not available, the microprocessor 800 reports a frequency error in block 912 and the program ends (block 908). Otherwise, the microprocessor 800 determines in block 914 whether the modulation format corresponding to the new channel is available. If the modulation format is not available, the microprocessor 800 reports a format error in block 916 and the program ends (block 908). Otherwise, the microprocessor 800 programs the digital down converter NCO 510 (block 918) and the digital up converter NCO 630 (block 920) by using data from the NCO look-up table (block 922). To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with

Asserted Claims	Lovinggood
	one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Lovinggood discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Lovinggood discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Lovinggood at 1:42-2:11: Repeater systems are used in a variety of applications such as TV and radio transmission, cellular/PCS communications and pager services. Existing repeaters use analog technology and typically only provide one channel for the forward path and one channel for the reverse path. To obtain significant adjacent channel rejection, the RF signal must be converted to a fixed Intermediate Frequency (IF). Thus, each channel in a traditional repeater requires a dedicated down converter, a dedicated IF filter, a dedicated up converter and a dedicated synthesizer. A traditional analog repeater uses a Local Oscillator (LO) having a resolution of 12.5 kHz to 200 kHz. This sets the channel resolution of the

Asserted Claims	Lovinggood
	entire repeater. The IF and bandwidth of an analog repeater are fixed based on the modulation format for which the repeater is designed. In addition, analog repeaters suffer from group delay and passband variations due to part-to-part variations in the IF surface acoustic wave (SAW) filter or crystal filter. Small impedance mismatches can create significant ripple in the passband response. In an analog repeater the shape factor of a SAW filter may have a 200 kHz to 400 kHz frequency difference between the 15 dB and 40 dB points. The passband response of an analog repeater is fixed by the IF SAW filter or crystal filter. Therefore, there is a need for a repeater capable of: transmitting and receiving multiple channels which uses only a single RF down converter/RF up converter pair for each path, greater local oscillator resolution, processing multiple modulation formats without changing the repeater hardware, virtually identical filter performance despite impedance mismatches, allowing more channels to be placed closer together due to filters that have a shape factor with less than 1 kHz frequency difference between the 15 dB and 40 dB points, matching the modulation format used by the communications network, and automatically detecting the modulation format and changing the filter bandwidth based on the modulation format detected. The present invention is directed to addressing one or more of these needs. Lovinggood at 4:19-34: A first RF down converter 120 is included for down converting the amplified signals 22. As shown in FIG. 4a, the RF down converter 120 receives the amplified signals 22. The amplified signals 22 are combined by a mixer 24 with a local oscillator (LO) signal 34 to produce intermediate frequency (IF) signals 30. In one embodiment, the IF is between about 10 MHz to 30 MHz, depending on the application. Thus, where the LO signal 34 is 1860 MHz and the amplified signals 22 are 1850 MHz, then the IF signals would be 10 MHz. The IF signals 30 are amplified by an amplifier 33 and filtered by a band pass filter 35. The band pass filter 35 significantly reduces the complex components or images of the amplified signal 22 and the LO signal 34. The IF signals 30 each contain one or more

Asserted Claims	Lovinggood
	signals each at a different frequency (channel). All of the downlink channels pass through the first RF down converter 120. Lovinggood at 5:3-26: Returning to FIG. 2, the forward path 16 further includes a first multichannel Digital Signal Processor (DSP) module 130 which includes an analog-to-digital converter 420 which converts the incoming wideband IF signals 30 into digital signals 32, as shown in FIG. 3. In one embodiment, the DSP module is a four channel DSP; however, one or more DSPs each capable of processing one or more channels could alternatively be used. The digital signals 32 contain one or more channels. A first channel of the digital signals 32 is then digitally processed by the first digital down converter 500. Similarly, the other channels of the digital signals 32 are digitally processed by the respective digital down converters 560, 570 and 580. The first channel is digitally down converted to a baseband center frequency around 0 Hz and applied to a series of software configurable low pass filters and gain stages, as described in detail below in relation to FIG. 3. The processed channel is then digitally up converted back to the original IF frequency. In the illustrated embodiment, the four processed signals from the four channels are then digitally added together to form one digital signal 36 (having one or more channels of information, each channel having a different frequency). The digital signal 36 is then applied to a digital-to-analog converter 700. The DSP module 130 outputs second IF signals 38. Lovinggood at 8:42-54: A digital decimator 530 includes a digital low pass filter. The digital decimator 530 discards samples of the down converted digital signals 90, 91 that are not needed. This is possible because the signal of interest is centered around 0 Hz and occupies a narrow bandwidth. The decimation rate is a measure of the number of samples discarded. As the decimation rate increases, the bandwidth of the undiscarded samples decreases. The decimation rate is programmable via the user interface 310. The digital low pass filter is a

Asserted Claims	Lovinggood
	Finite Impulse Response (FIR) type filter with programmable coefficients that define the shape of the filter. The filter coefficients are also programmable via the user interface 310. Lovinggood at 9:13-23: A digital interpolator 620 includes a digital low pass filter. The digital low pass filter is a FIR type filter with programmable coefficients. These coefficients define the shape of the filter. The filter coefficients are programmable via the user interface 310. The digital interpolator 620 generates data samples that are needed in order to increase the sample rate to the original fclk frequency. The interpolation rate is a measure of how many samples are generated. Generally, the interpolation rate is equal to the decimation rate used for the digital decimator 530. The interpolation rate is also programmable via the user interface 310. Lovinggood at Claim 2: 2. The method of claim 1, wherein the processing includes filtering and decimating the digital signal. To the extent Lovinggood does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Lovinggood alone or it would have been obvious to combine Lovinggood with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

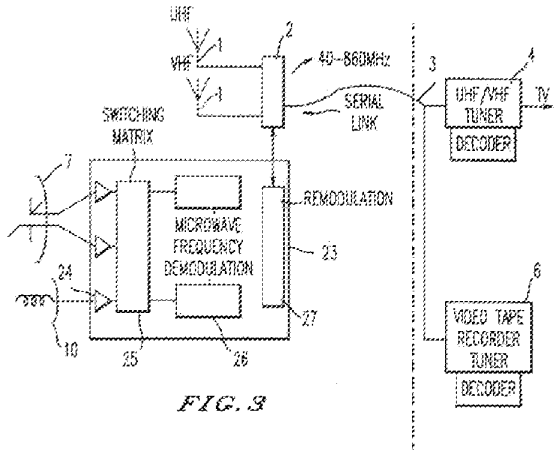
INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Mutzig

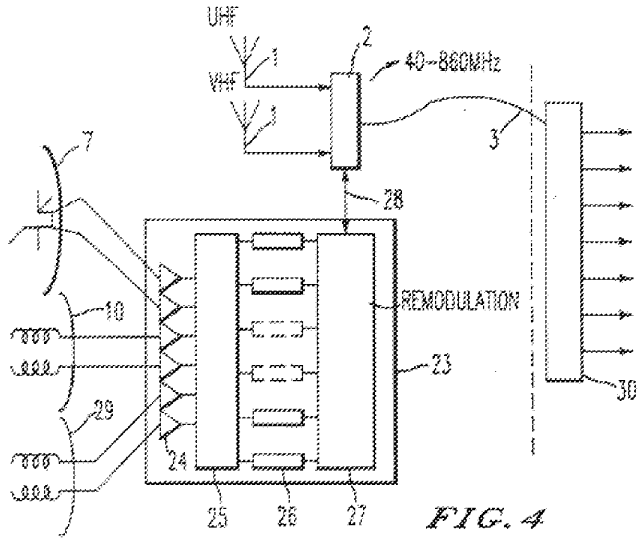
U.S. Patent No. 5,276,904 ("Mutzig") issued on January 4, 1994. Mutzig therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a), (b) and/or (e). For the reasons listed below, Mutzig invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

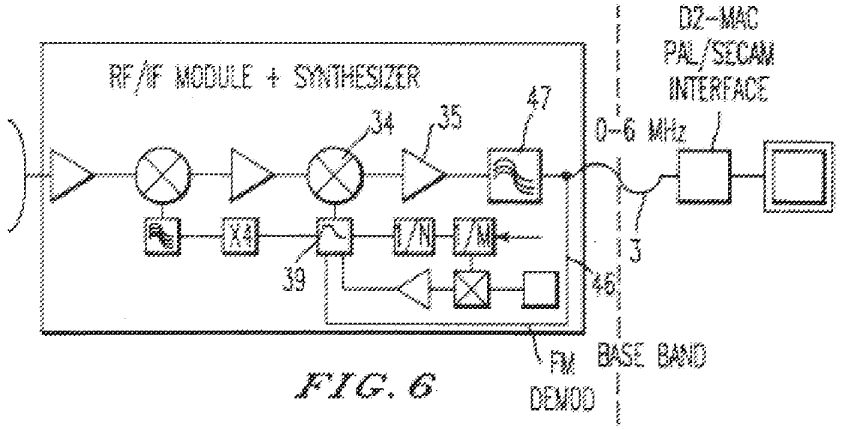
Asserted Claims	Mutzig
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Mutzig discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*: Mutzig at 3:58-4:4: The invention proposes a solution to the multiplication of converters in the external unit and of the link cables to the internal unit, by adapting a microwave frequency head, located

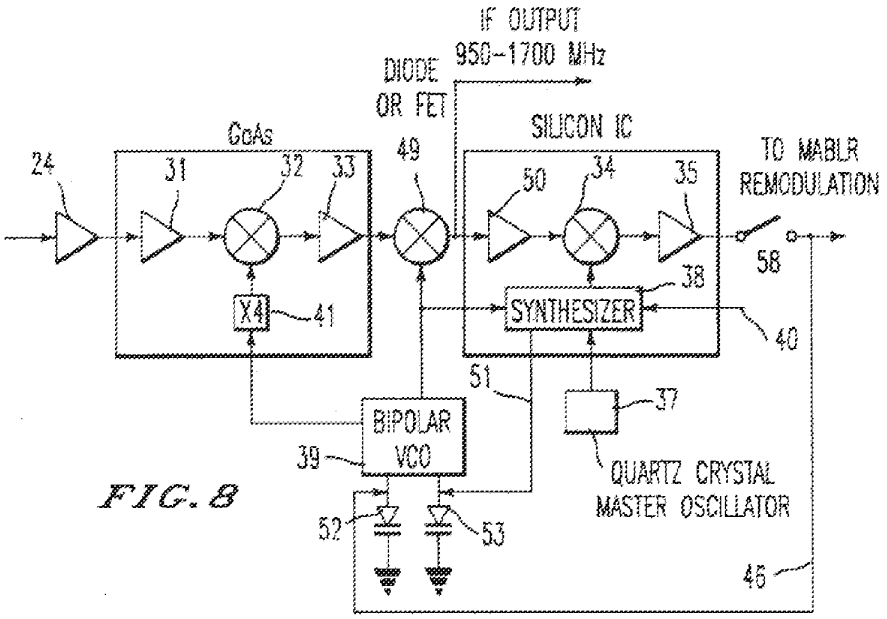
[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Mutzig
	in an external unit, integrated with the antenna for example. This receiving head comprises a multi-band converter, operating at a frequency which is programmed by control from the internal unit and a single receiving head can then process 20 to 40 channels. But furthermore, the received signals are demodulated and processed on the spot by the microwave head which supplies signals which are remodulated in amplitude modulation, which allows them to be applied to the multiplexer of VHF-UHF terrestrial microwave link receiving antennas, and the use of the existing single, 40-860 MHz link cable. Mutzig at 4:13-20: More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least: Mutzig at 4:57-5:7: FIG. 3 shows the system for receiving signals retransmitted by satellites according to the invention. The external unit for receiving terrestrial signals comprising the VHF/UHF antennas 1, the multiplexer 2 and the link cable 3 to the internal unit is assumed to already exist, because it is the most common case. If this is not the case, it suffices to install a conventional link cable 3, adapted to 40-860 MHz amplitude modulated signals. This system of receiving satellite signals is based on a microwave frequency head 23, interposed between the parabolic antenna or antennas 7 and 10, and the multiplexer 2 of the existing installation. The number and type of the parabolic antennas does not limit the extent of the invention and, if there is no multiplexer 2, the link cable 3 is connected directly to the microwave frequency head since one of its purposes is to process the satellite signals in order to make them compatible with the terrestrial signals and pass through the same cable. Mutzig at Fig. 3:

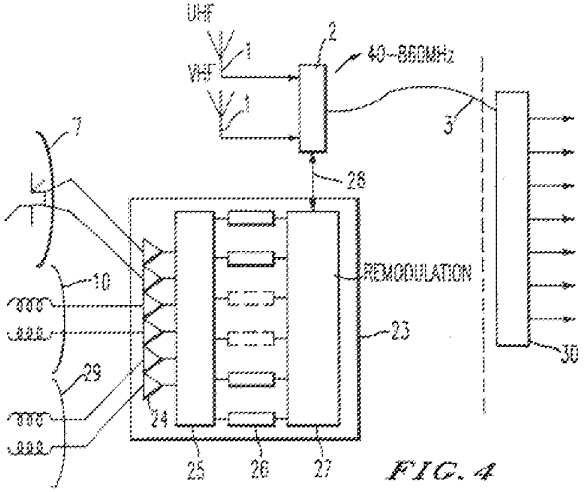
Asserted Claims	Mutzig
	 *FIG. 3* Mutzig at 5:8-32: The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally.

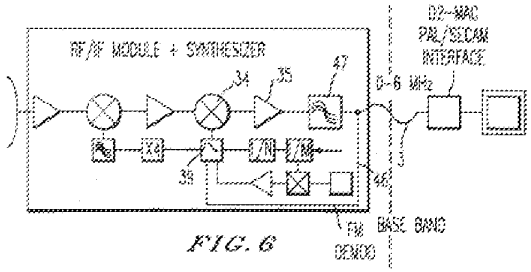
Asserted Claims	Mutzig
	Mutzig at 5:39-45: On the contrary, FIG. 4 shows the advantage of the microwave frequency head according to the invention for simultaneously using a large number of channels transmitted by satellites. The number of amplifiers 24 is adapted to the number and to the types of parabolic antennas 7, 10, 29 and to the number of corresponding channels. Mutzig at Fig. 4:  FIG. 4 Mutzig at 6:5-9: The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel.

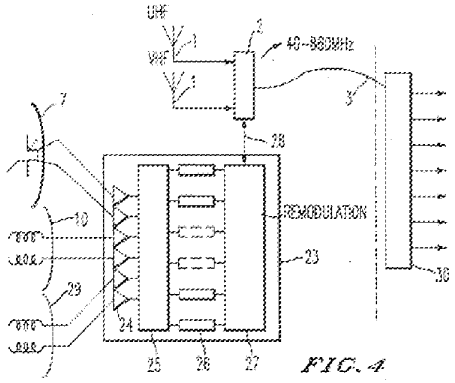
Asserted Claims	Mutzig
	Mutzig at 8:6-16: A link 46, which connects the output of the RF/IF module to one of the varactor diodes 52, forms the FM demodulator which has been described previously. From this same output of the RF/IF module, the signals are also applied to the MABLR remodulation circuit 48. This circuit is neither shown nor described in detail as it is known per se; it supplies a residual side band amplitude modulated signal, in the 40-860 MHz band. The MABLR remodulation allows the simultaneous reception of several satellite channels on a single external-internal link. Mutzig at Fig. 6:  FIG. 6 Mutzig at Fig. 8:

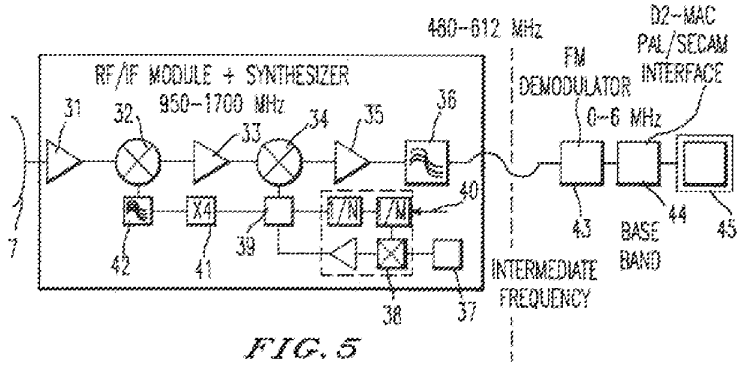
Asserted Claims	Mutzig
	 *FIG. 8* To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Mutzig discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Mutzig at 5:25-31:

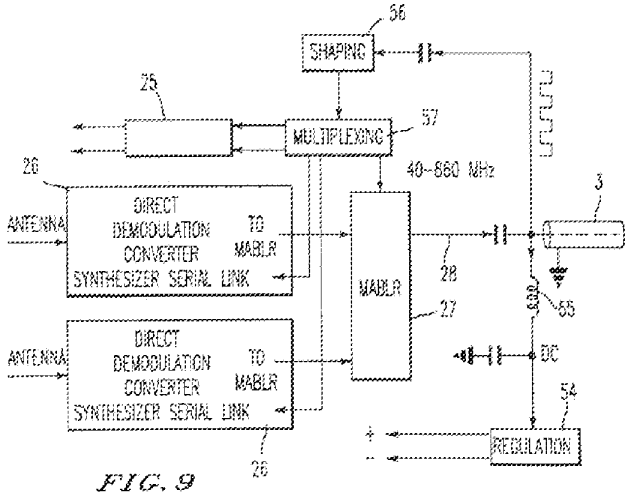
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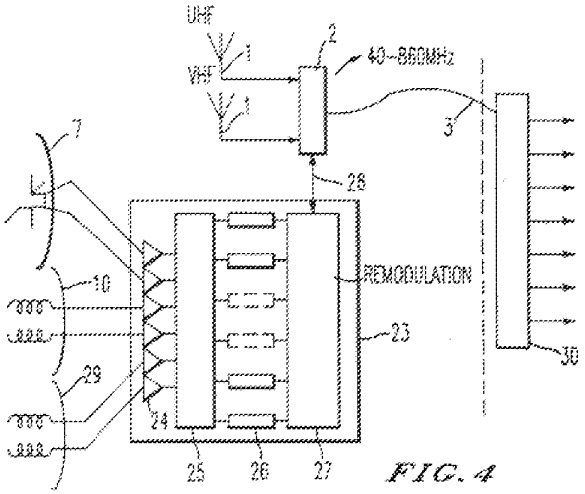
Asserted Claims	Mutzig
	an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 4:  FIG. 4 Mutzig at 8:6-16: A link 46, which connects the output of the RF/IF module to one of the varactor diodes 52, forms the FM demodulator which has been described previously. From this same output of the RF/IF module, the signals are also applied to the MABLR remodulation circuit 48. This circuit is neither shown nor described in detail as it is known per se; it supplies a residual side band amplitude modulated signal, in the 40-860 MHz band. The MABLR

Asserted Claims	Mutzig
	remodulation allows the simultaneous reception of several satellite channels on a single external-internal link. Mutzig at Fig. 6:  FIG. 6 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Mutzig discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Mutzig at 4:13-20: More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal

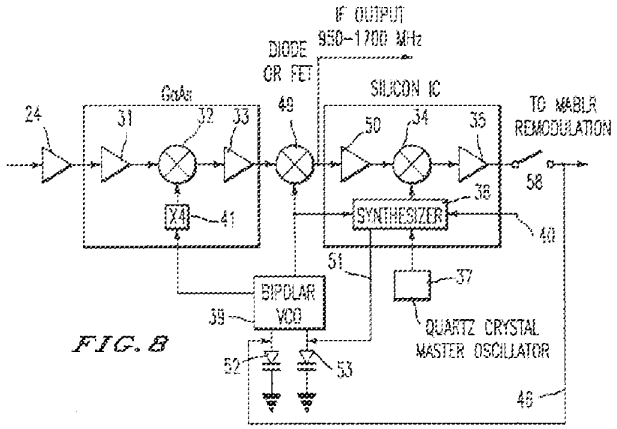
Asserted Claims	Mutzig
	unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least: Mutzig at 5:25-31: an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 4:  FIG. 4 Mutzig at 6:14-19: The heart of the system is in the microwave frequency demodulator, the function of which is to select a channel and to demodulate the frequency modulated microwave frequency signal, complying with the characteristics required by the standards, that is, rejection of adjacent channels, linearity . . . etc.

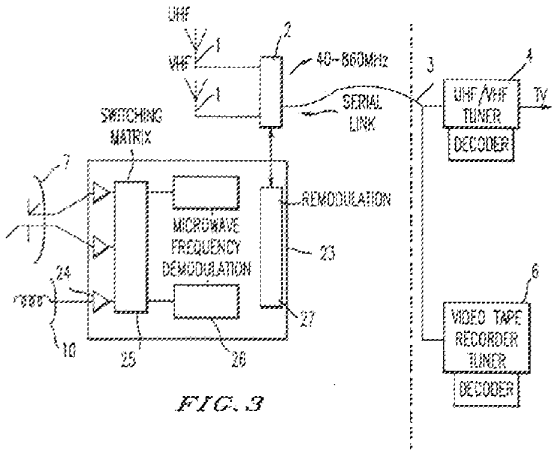
Asserted Claims	Mutzig
	Mutzig at 6:43-52: The converter and the RF/IF module are both controlled from a quartz crystal 37 which, via a synthesizer 38, controls an oscillator 39. The synthesizer 38 is an assembly which is known and available on the market 50 55 65 and is controlled on its input 40 by digital data transmit ted by the link cable 3, and it allows the selection of a channel, or of N channels from among M channels, by choosing an appropriate frequency. The oscillator 39 directly controls the mixer 34, of the RF/IF module, for example at 2.3 GHz. Mutzig at Fig. 5:  FIG. 5 Mutzig at 8:28-36: But a regulated power supply 54 injects a DC current, Smoothed by the LC element 55, onto this same cable 3; the digital data necessary for programming the microwave frequency head according to the invention, coming from the internal unit, are applied to a shaping circuit 56 and then to a multiplexing circuit 57, which distributes them to the switching matrix 25, to the direct demodulation converters 26 and to the MABLR remodulator 27.

Asserted Claims	Mutzig
	Mutzig at Fig. 9:  *FIG. 9* To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Mutzig discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Mutzig at 5:25-31:

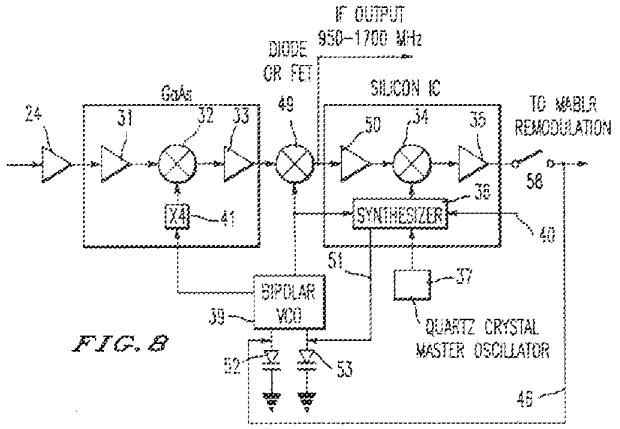
Asserted Claims	Mutzig
	an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 4:  FIG. 4 Mutzig at 6:14-52: The heart of the system is in the microwave frequency demodulator, the function of which is to select a channel and to demodulate the frequency modulated microwave frequency signal, complying with the characteristics required by the standards, that is, rejection of adjacent channels, linearity . . . etc.

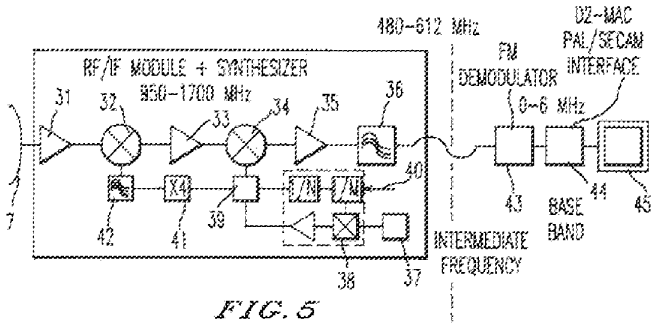
Asserted Claims	Mutzig
	In order to facilitate the understanding of the proposed solution, this microwave frequency demodulator is shown in various stages of integration in FIGS. 5, 6, and 7. In FIG. 5, the external unit comprises a low noise, multi-band converter and an RF/IF module as well as a synthesizer, all shown in the form of a block diagram. The switching matrix has not been shown, in order to simplify the diagram. The converter comprises a low noise input amplifier 31 which receives the signals from the antenna 7, a mixer 32 and an output amplifier 33. The converter is controlled by a multi-band oscillator which will be described later. This converter allows the conversion of the entire frequency band of a satellite into a frequency range of 0.95 to 1.70 GHz. It is followed by an RF/IF module, allowing the transposition of the selected channel to a fixed intermediate frequency (IF), 480 or 612 MHz depending on the manufacturers. This RF/IF module comprises a mixer 34, an amplifier 35 and an output filter 36, which therefore functions at intermediate frequency. The converter and the RF/IF module are both controlled from a quartz crystal 37 which, via a synthesizer 38, controls an oscillator 39. The synthesizer 38 is an assembly which is known and available on the market and is controlled on its input 40 by digital data transmitted by the link cable 3, and it allows the selection of a channel, or of N channels from among M channels, by choosing an appropriate frequency. The oscillator 39 directly controls the mixer 34, of the RF/IF module, for example at 2.3 GHz. Mutzig at 8:6-16: A link 46, which connects the output of the RF/IF module to one of the varactor diodes 52, forms the FM demodulator which has been described previously. From this same output of the RF/IF module, the signals are also applied to the MABLR remodulation circuit 48. This circuit is neither shown nor described in detail as it is known per se; it supplies a residual side band amplitude modulated signal, in the 40-860 MHz band. The MABLR

Asserted Claims	Mutzig
	remodulation allows the simultaneous reception of several satellite channels on a single external-internal link. Mutzig at Fig. 8:  FIG. 8 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Mutzig discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Mutzig at 4:13-20:

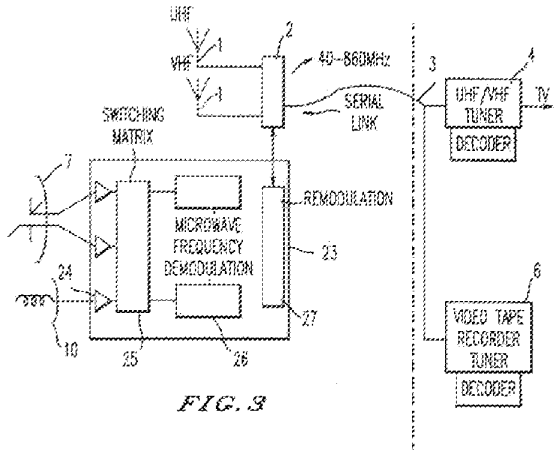
Asserted Claims	Mutzig
	More precisely, the invention comprises a system for receiving TV signals retransmitted by satellites, intended for the transmission of at least one channel from among a plurality of channels from at least one antenna, in an external unit, to at least one receiver in an internal unit, this system being characterized in that it comprises, in an external unit, a microwave frequency head which comprises at least: Mutzig at 6:5-9: The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel. Mutzig at Fig. 3:  FIG. 3 Mutzig at 8:6-16:

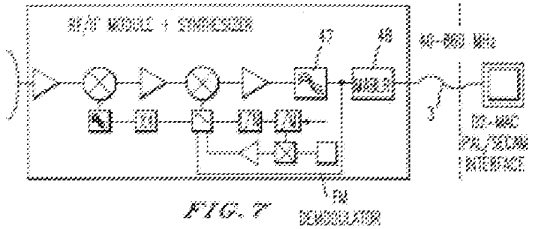
Asserted Claims	Mutzig
	A link 46, which connects the output of the RF/IF module to one of the varactor diodes 52, forms the FM demodulator which has been described previously. From this same output of the RF/IF module, the signals are also applied to the MABLR remodulation circuit 48. This circuit is neither shown nor described in detail as it is known per se; it supplies a residual side band amplitude modulated signal, in the 40-860 MHz band. The MABLR remodulation allows the simultaneous reception of several satellite channels on a single external-internal link. Mutzig 8:38-55: An advantage of the microwave frequency head according to the invention is that it processes the signals retransmitted by different satellites and routes them through a 40-860 MHz downward link which is none other than the existing VHF/UHF antenna cable. This is due to the remodulation in MABLR amplitude modulation. However, the microwave frequency head can also be used with receivers fitted with a "satellite" input which receives the signals in the satellite intermediate band 950-1700 MHz. In this case, it suffices to eliminate the FM demodulation, which is carried out by means of a switch in the link 46, and to output before the MABLR remodulation. But in this case the downward link must pass the 40-1700 MHz band. The programming of the microwave frequency head is of course adapted to allow the remote control either of the demodulation of a channel, or of the conversion into satellite intermediate band. Mutzig at Fig. 8:

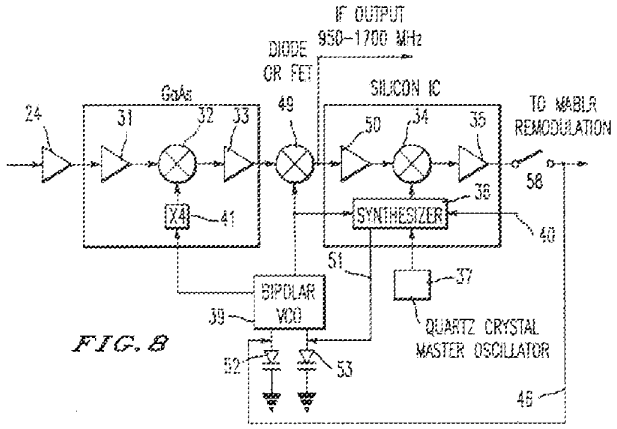
Asserted Claims	Mutzig
	 FIG. 8 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Mutzig discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Mutzig at 1:51-55:

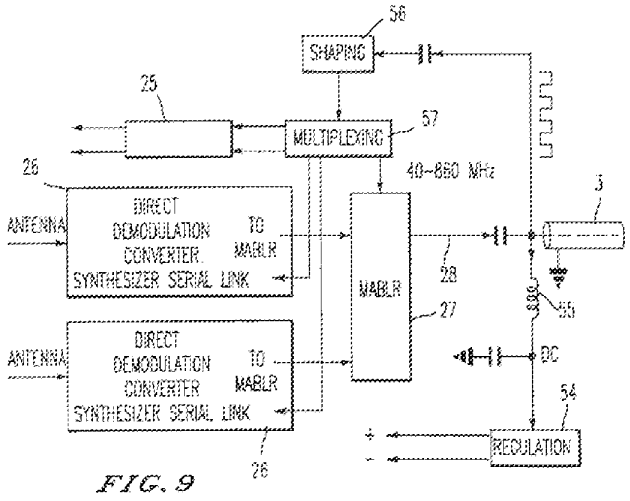
Asserted Claims	Mutzig
	The function of the internal unit is: to select the channel to be received by means of a synthesizer and a frequency converter. A surface wave filter, normally a 480 or 612 MHz filter, allows the elimination of the adjacent channels. Mutzig at 6:40-42: This RF/IF module comprises a mixer 34, an amplifier 35 and an output filter 36, which therefore functions at intermediate frequency. Mutzig at Fig. 5:  FIG. 5 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and	Mutzig discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.

Asserted Claims	Mutzig
extracted transponder channels to a variable frequency before combining.	*See* claim 14, *supra*. *See, e.g.*: Mutzig at 5:8-32: The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 3:

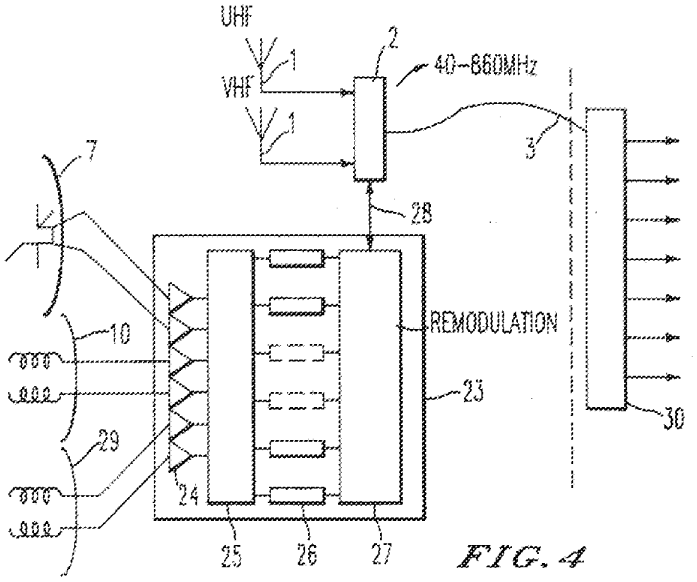
Asserted Claims	Mutzig
	 *FIG. 3* Mutzig at 7:28-41: It is therefore an advantage of the invention that the signal is remodulated, as shown in FIG. 7. The modulator 48 receives the signal in base band, 0-6 MHz, coming from the filter 47, and applies residual side band amplitude modulation (MABLR) to it and it sends, through the link cable 3, signals at 40-860 MHz which are insensitive to interference. This allows the system to be compatible with the existing standard links since the microwave frequency head according to the invention supplies amplitude modulated signals in the 40-860 MHz band, like the conventional VHF-UHF antennas. Furthermore, in the case of a simultaneous reception a single link suffices for transmitting several programs, in 8 MHz steps for example. Mutzig at Fig. 7:

Asserted Claims	Mutzig
	 FIG. 7 Mutzig at 8:6-16: A link 46, which connects the output of the RF/IF module to one of the varactor diodes 52, forms the FM demodulator which has been described previously. From this same output of the RF/IF module, the signals are also applied to the MABLR remodulation circuit 48. This circuit is neither shown nor described in detail as it is known per se; it supplies a residual side band amplitude modulated signal, in the 40-860 MHz band. The MABLR remodulation allows the simultaneous reception of several satellite channels on a single external-internal link. Mutzig at Fig. 8:

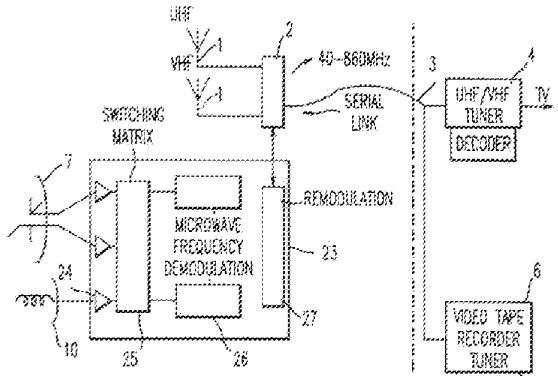
Asserted Claims	Mutzig
	 FIG. 8 Mutzig at 8:38-55: An advantage of the microwave frequency head according to the invention is that it processes the signals retransmitted by different satellites and routes them through a 40-860 MHz downward link which is none other than the existing VHF/UHF antenna cable. This is due to the remodulation in MABLR amplitude modulation. However, the microwave frequency head can also be used with receivers fitted with a "satellite" input which receives the signals in the satellite intermediate band 950-1700 MHz. In this case, it suffices to eliminate the FM demodulation, which is carried out by means of a switch in the link 46, and to output before the MABLR remodulation. But in this case the downward link must pass the 40-1700 MHz band. The programming of the microwave frequency head is of course adapted to allow the remote control either of the demodulation of a channel, or of the conversion into satellite intermediate band. Mutzig at Fig. 9:

Asserted Claims	Mutzig
	 *FIG. 9* To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Mutzig discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Mutzig at 6:36-39:

Asserted Claims	Mutzig
	It is followed by an RF/IF module, allowing the transposition of the selected channel to a fixed intermediate frequency (IF), 480 or 612 MHz depending on the manufacturers. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Mutzig discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. See claim 14, *supra*. *See, e.g.*: Mutzig at 6:5-13: The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel. By way of example, the microwave frequency head according to the invention allows the simultaneous use of up to 20 to 40 channels, in collective reception for a building or a telecommunications center. Mutzig at Fig. 4:

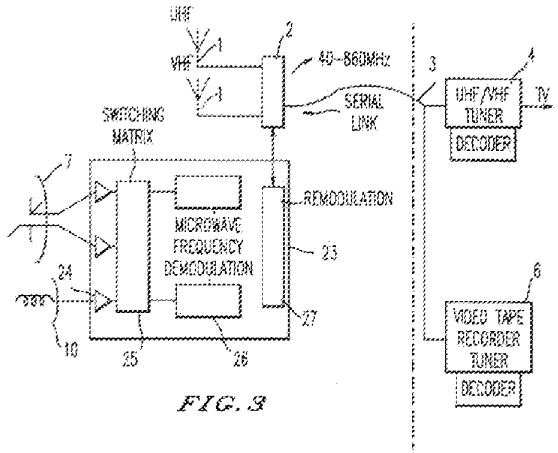
Asserted Claims	Mutzig
	 FIG. 4 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Mutzig discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*: Mutzig at 5:8-32:

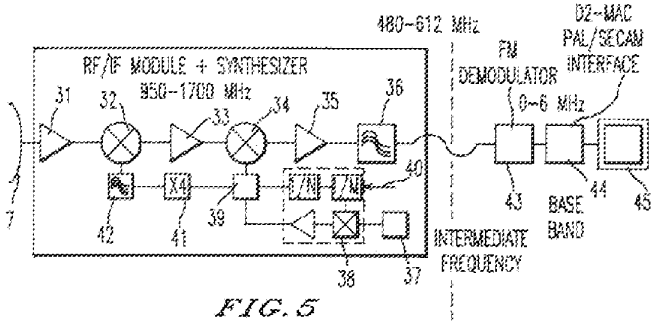
Asserted Claims	Mutzig
	The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 3:

Asserted Claims	Mutzig
	 *FIG. 3* Mutzig at 6:5-13: The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel. By way of example, the microwave frequency head according to the invention allows the simultaneous use of up to 20 to 40 channels, in collective reception for a building or a telecommunications center. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is	Mutzig discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU.

Asserted Claims	Mutzig
transmitted over a wireless link to the ODU.	*See* claim 14, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Mutzig discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Mutzig discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is	Mutzig discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD.

Asserted Claims	Mutzig
transmitted over the cable from an IRD.	*See* claims 19, 21, *supra*. *See, e.g.*: Mutzig at 5:8-32: The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 3:

Asserted Claims	Mutzig
	 *FIG. 5* Mutzig at 6:5-13: The output signals from the head all use the single link cable 3, and are applied by the distributor 30, in the internal unit, to the various receiving devices, either television or telecommunications, each of which decodes the information corresponding to a channel. By way of example, the microwave frequency head according to the invention allows the simultaneous use of up to 20 to 40 channels, in collective reception for a building or a telecommunications center. Mutzig at 6:45-50: The synthesizer 38 is an assembly which is known and available on the market and is controlled on its input 40 by digital data transmitted by the link cable 3, and it allows the selection of a channel, or of N channels from among M channels, by choosing an appropriate frequency. Mutzig at Fig. 5:

Asserted Claims	Mutzig
	 FIG. 5 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Mutzig discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Mutzig discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. See claims 14, 15, *supra*.

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Asserted Claims	Mutzig
	See, e.g.: Mutzig at 1:51-55: The function of the internal unit is: to select the channel to be received by means of a synthesizer and a frequency converter. A surface wave filter, normally a 480 or 612 MHz filter, allows the elimination of the adjacent channels. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Mutzig discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Mutzig discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*.

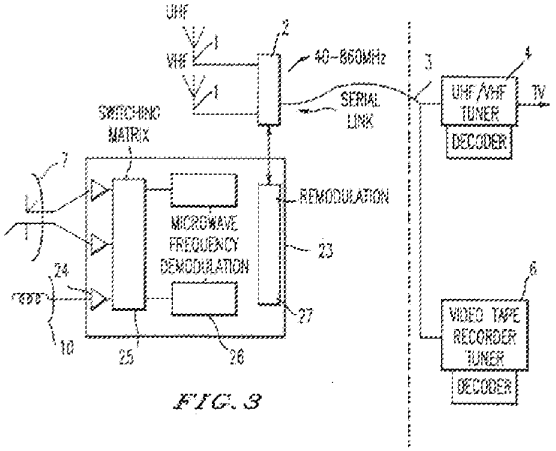
Asserted Claims	Mutzig
	To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Mutzig discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Mutzig discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claim 14, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized	Mutzig discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.

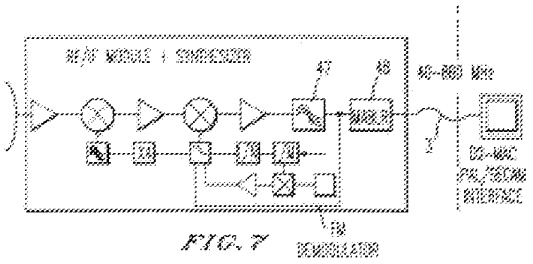
Asserted Claims	Mutzig
broadband signal to locate a selected transponder channel at baseband.	*See* claim 38, *supra*. *See, e.g.*: Mutzig at 5:8-32: The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the polarization of the signal, a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3+28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally." Mutzig at 7:10-41:

Asserted Claims	Mutzig
	Among the various possible types of FM demodulators, it is known that a looped oscillator-mixer-amplifier system provides a phase locked loop demodulator with excellent specifications. Now the RF/IF module of FIG. 5 comprises an oscillator 39, a mixer 34 and an amplifier 35 and it suffices to loop them back by a link 46, as shown in FIG. 6, in order to integrate the FM demodulator 43 of FIG. 5 in the microwave frequency head. This configuration is more advantageous because it is simpler and more integrated (the entire system is in the external unit). However, the output filter 47 operates in base band 0-6 MHz; it is therefore different from the filter 36 in FIG. 5 which operates at an intermediate frequency, but, above all, the signals transmitted at 0-6 MHz are sensitive to interference due to the environment of the link cable 3. And several links between external and internal units are still necessary in the case of simultaneous reception. It is therefore an advantage of the invention that the signal is remodulated, as shown in FIG. 7. The modulator 48 receives the signal in base band, 0-6 MHz, coming from the filter 47, and applies residual side band amplitude modulation (MABLR) to it and it sends, through the link cable 3, signals at 40-860 MHz which are insensitive to interference. This allows the system to be compatible with the existing standard links since the microwave frequency head according to the invention supplies amplitude modulated signals in the 40-860 MHz band, like the conventional VHF-UHF antennas. Furthermore, in the case of a simultaneous reception a single link suffices for transmitting several programs, in 8 MHz steps for example. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table	Mutzig discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.

Asserted Claims	Mutzig
specifying assigned frequency slots for transponder channels in the composite signal.	*See* claim 14, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Mutzig discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels.	Mutzig discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*. *See, e.g.*: Mutzig at 5:8-32: The structure of the microwave frequency head 23, which will be described in detail below comprises: a series of low noise amplifiers 24 each of which receives on its input the signal coming from a parabolic antenna, or from an antenna element, according to the

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Asserted Claims	Mutzig
	polarization of the signal, **a switching matrix allowing the selection of the channel or channels chosen from among those transmitted by the satellite or satellites; this matrix allows the choice of the program from several simultaneously transmitted channels**, at least two microwave frequency demodulators 26, a remodulation circuit 27, which converts the FM modulated signals in baseband, 0-6 MHz for example coming from demodulators 26, into amplitude modulated signals in the 40-860 MHz band a 40-860 MHz downward link to the internal unit, an upward link using the same physical medium 3-28, allowing the transmission of the digital data necessary for the selection of the satellite or satellites and of the channels to be demodulated. It also allows a decision to be made on the re-modulation frequency plan, which depends on the microwave channels already received locally. Mutzig at Fig. 3:  FIG. 3 Mutzig at 7:28-41:

Asserted Claims	Mutzig
	It is therefore an advantage of the invention that the signal is remodulated, as shown in FIG. 7. The modulator 48 receives the signal in base band, 0-6 MHz, coming from the filter 47, and applies residual side band amplitude modulation (MABLR) to it and it sends, through the link cable 3, signals at 40-860 MHz which are insensitive to interference. This allows the system to be compatible with the existing standard links since the microwave frequency head according to the invention supplies amplitude modulated signals in the 40-860 MHz band, like the conventional VHF-UHF antennas. Furthermore, in the case of a simultaneous reception a single link suffices for transmitting several programs, in 8 MHz steps for example. Mutzig at Fig. 7:  FIG. 7 To the extent Mutzig does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Mutzig alone or it would have been obvious to combine Mutzig with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Petruzzelli

U.S. Patent No. 5,959,592 ("Petruzzelli")[2] was filed on March 14, 1997 and issued on September 29, 1999. Petruzzelli therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102(a), (b), and/or (e). For the reasons listed below, Petruzzelli invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, in Appendix A, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Petruzzelli
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Petruzzelli discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

[2] Petruzzelli was incorporated by reference in the '576 patent. *See* '576 patent at 2:34–47.

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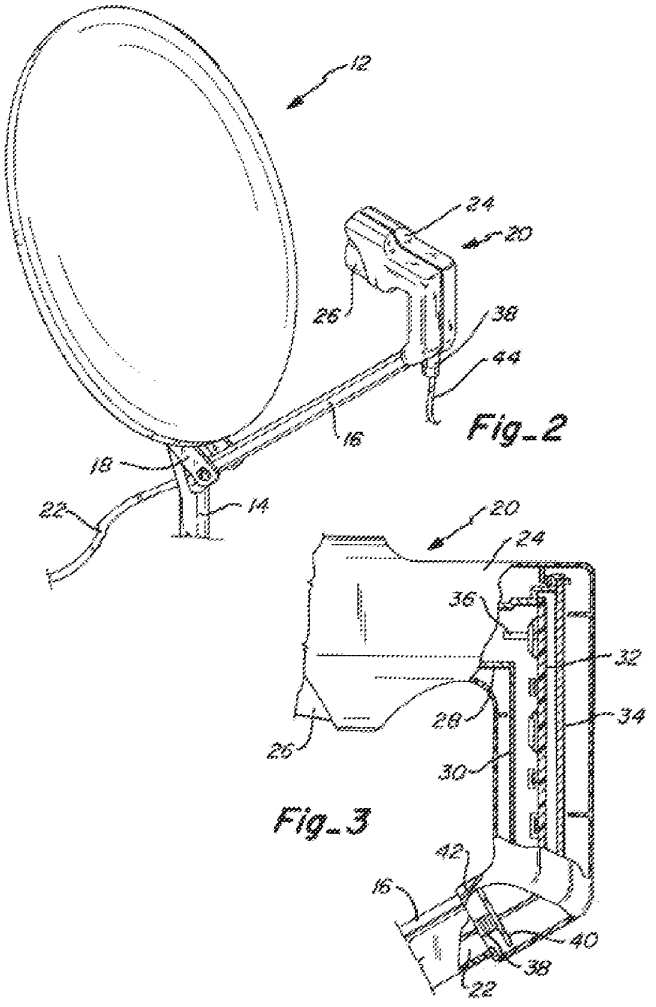
Asserted Claims	Petruzzelli
	Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 4:4–23:

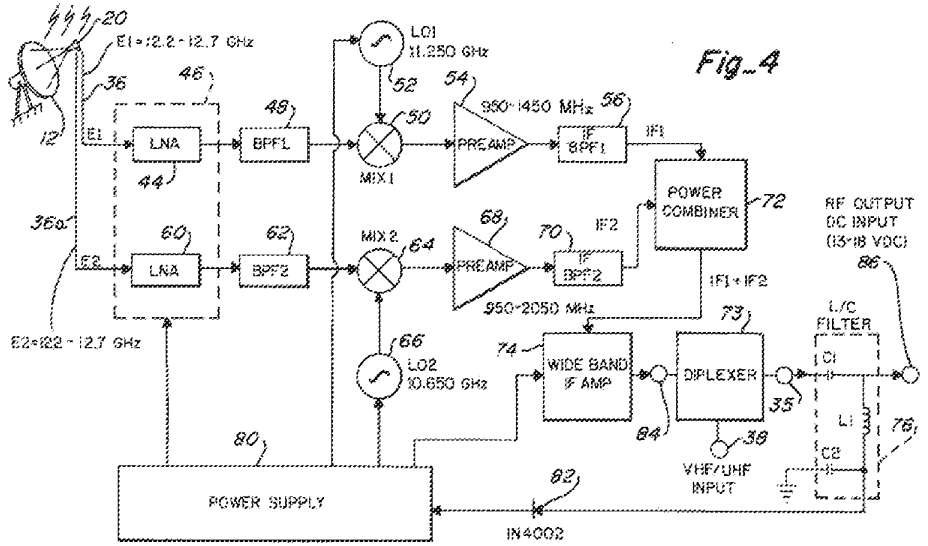
Asserted Claims	Petruzzelli
	The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:24–46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite

Asserted Claims	Petruzzelli
	signals for producing a stacked band of frequencies for transmission through the single lead-in cable. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 4:59–68: The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the

Asserted Claims	Petruzzelli
	frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:38–45: The present invention is directed primarily to a satellite parabolic antenna which has an LNB mounted within a housing and located at the focal point of the antenna. A wave guide collects the incoming RF radio frequency energy and directs the signal to a plurality of individual antenna probes. For the sake of illustration, the probes as disclosed and discussed herein are arranged for reception of right and left hand polarized incoming RF signals.

Asserted Claims	Petruzzelli
	Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at Fig. 2–3:

Asserted Claims	Petruzzelli
	

Asserted Claims	Petruzzelli
	Petruzzelli at Fig. 4:  '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.

Asserted Claims	Petruzzelli
	To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Petruzzelli discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering

Asserted Claims	Petruzzelli
	and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the

Asserted Claims	Petruzzelli
	other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Petruzzelli discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17:

Asserted Claims	Petruzzelli
	This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 4:24–46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable. Petruzzelli at 4:59–68: The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals

Asserted Claims	Petruzzelli
	in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:38–45: The present invention is directed primarily to a satellite parabolic antenna which has an LNB mounted within a housing and located at the focal point of the antenna. A wave guide collects the incoming RF radio frequency energy and directs the signal to a plurality of individual antenna probes. For the sake of illustration, the probes as disclosed and discussed herein are arranged for reception of right and left hand polarized incoming RF signals. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down

Asserted Claims	Petruzzelli
	converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as

Asserted Claims	Petruzzelli
	any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of

Asserted Claims	Petruzzelli
	approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Petruzzelli discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a

Asserted Claims	Petruzzelli
	home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise

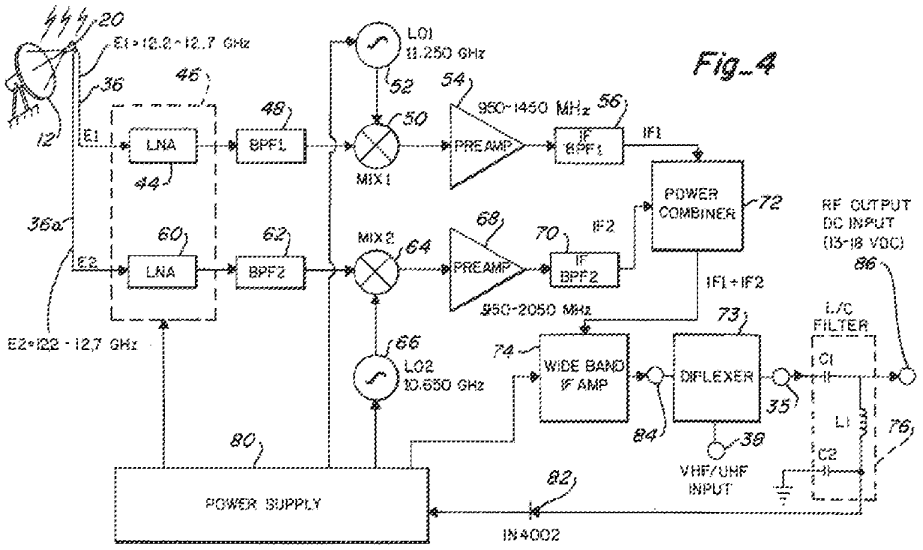
Asserted Claims	Petruzzelli
	amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While

Asserted Claims	Petruzzelli
	this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the

Asserted Claims	Petruzzelli
	components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known

Asserted Claims	Petruzzelli
	in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78.

Asserted Claims	Petruzzelli
	Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a

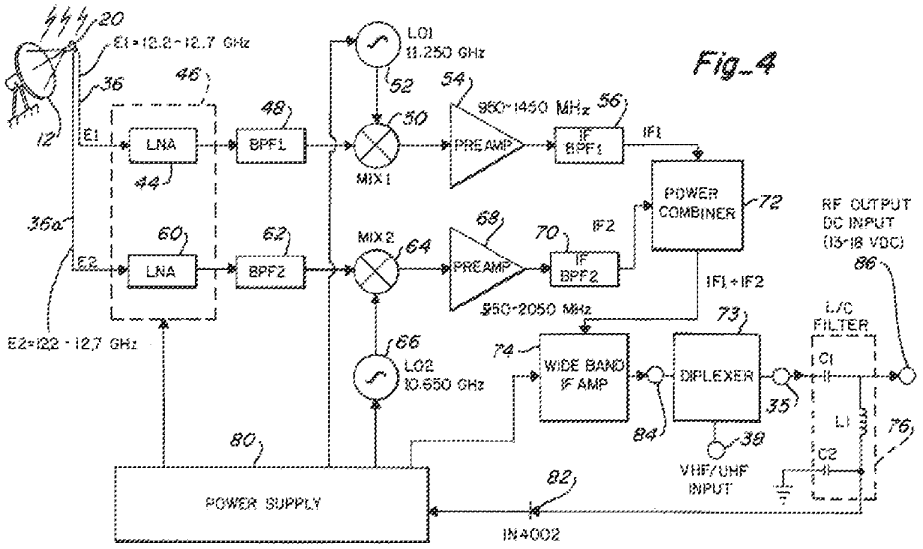
Asserted Claims	Petruzzelli
	relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at Fig. 4:  '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized

Asserted Claims	Petruzzelli
	(RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Petruzzelli discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the

Asserted Claims	Petruzzelli
	satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal

Asserted Claims	Petruzzelli
	sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:24–46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna.

Asserted Claims	Petruzzelli
	Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at 9:47–57: A common L/C filter 76 at the output of the diplexer 78 allows the IF signal to pass to the housing output connector 86. The coaxial cable 22 connected between the connector 86 and the satellite receiver provided within the protection of the home or structure provides a source of unregulated DC voltage of approximately 13-18 volts DC. This voltage is applied through the RF output connector 86. This voltage passes directly to the L/C filter

Asserted Claims	Petruzzelli
	76 where the DC voltage is blocked by capacitor C1 and passes through the L1/C2 portion of the filter 76 and through the diode 82 to the power supply 80. Petruzzelli at Fig. 4:  To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step	Petruzzelli discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a

Asserted Claims	Petruzzelli
of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This

Asserted Claims	Petruzzelli
	patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in

Asserted Claims	Petruzzelli
	the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 7:25–45: The LNB housing includes an outer plastic or non-metallic protective sleeve 24 and wave guide cover 26. The covers 24, 26 enclose and encapsulate a metallic tubular wave guide 28 as well as component housing 30. The component housing 30 contains a printed circuit board 32 including the components necessary for a plurality of low noise amplifiers, band pass filters, oscillators, mixers and IF amplifiers. In addition, antenna probes 36 are provided on the circuit board 32 for coupling the RF energy received through the wave guide 28. A regulated power supply is also provided on the printed circuit board 32 for powering the electronic components. Two or more Type F coaxial connectors 38 are mounted on a mounting board 40 which is positioned in the neck 42 of the housing 20. A second Type F connector 38 is arranged to be connected to a secondary or auxiliary input cable 44 which may be connected to a terrestrial VHF/UHF TV antenna or to other TV signal sources. The printed circuit board 32 also includes a diplexer (not shown) which is positioned between the output from the printed circuit board and the outlet Type F coaxial connector 38 attached to the transmission cable 22.

Asserted Claims	Petruzzelli
	Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement.

Asserted Claims	Petruzzelli
	Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Petruzzelli
16. The method of claim 14 wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining.	Petruzzelli discloses, explicitly and/or inherently, wherein the step of combining comprises frequency translating the selected and extracted transponder channels to a variable frequency before combining. *See* claim 14, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low

Asserted Claims	Petruzzelli
	input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42–52: The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56:

Asserted Claims	Petruzzelli
	As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit

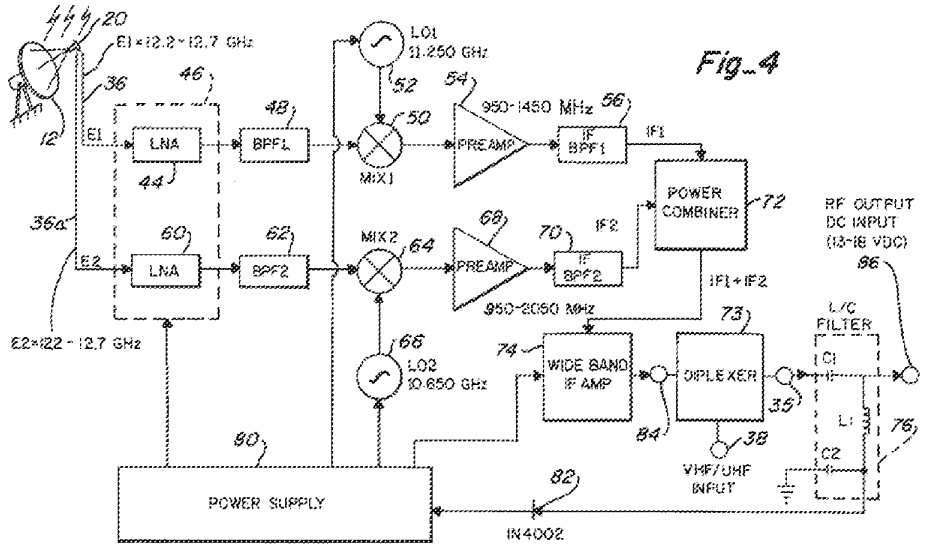
Asserted Claims	Petruzzelli
	for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate

Asserted Claims	Petruzzelli
	satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known

Asserted Claims	Petruzzelli
	in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78.

Asserted Claims	Petruzzelli
	Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a

Asserted Claims	Petruzzelli
	relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. Petruzzelli at Fig. 4:

Asserted Claims	Petruzzelli
	 '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.

Asserted Claims	Petruzzelli
	To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
17. The method of claim 15 further comprising frequency translating the selected transponder channels to a predetermined frequency before combining.	Petruzzelli discloses, explicitly and/or inherently, further comprising frequency translating the selected transponder channels to a predetermined frequency before combining. *See* claim 15, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13

Asserted Claims	Petruzzelli
	Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42--52: The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which

Asserted Claims	Petruzzelli
	can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56: As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing.

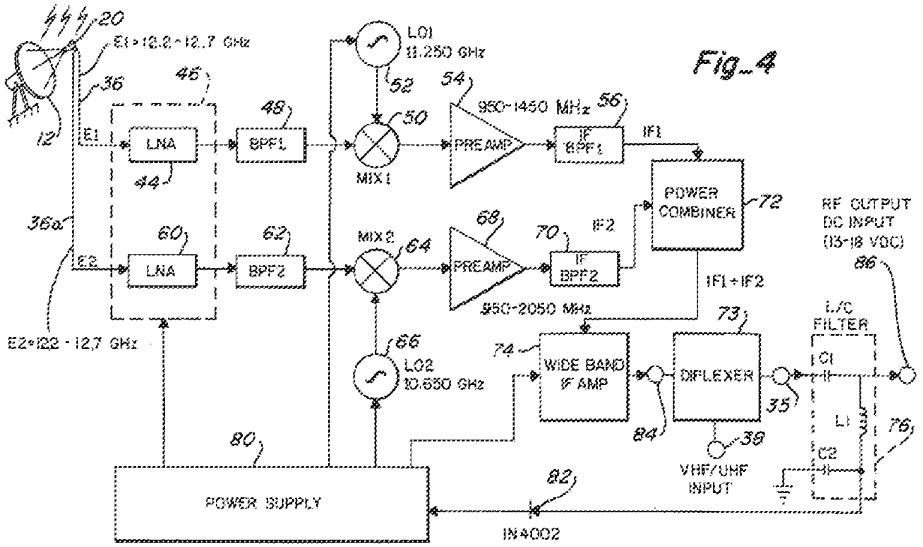
Asserted Claims	Petruzzelli
	Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band

Asserted Claims	Petruzzelli
	between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the

Asserted Claims	Petruzzelli
	low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to

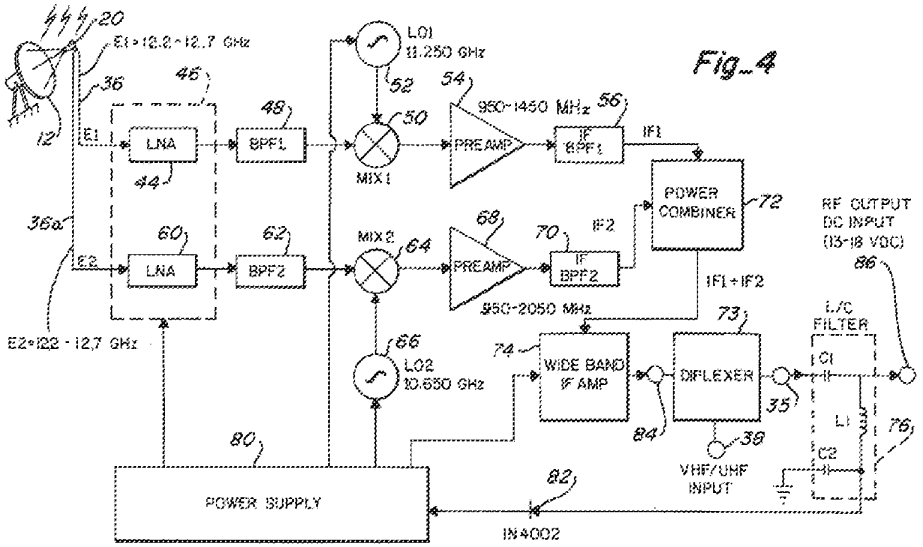
Asserted Claims	Petruzzelli
	provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor

Asserted Claims	Petruzzelli
	C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. Petruzzelli at Fig. 4:

Asserted Claims	Petruzzelli
	 '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art

Asserted Claims	Petruzzelli
	in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
18. The method of claim 14 further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs.	Petruzzelli discloses, explicitly and/or inherently, further comprising the step of splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claim 14, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 3:28–41: A common terrestrial television antenna 24 is usually mounted on the exterior portion of the structure and is tuned to receive local television and FM channels for both video and audio reception. These signals are, in turn fed through either a coaxial cable connected through an impedance matching transformer from the antenna or a twin lead TV cable through the interface 21 to the interior of the home or structure where the TV is located.

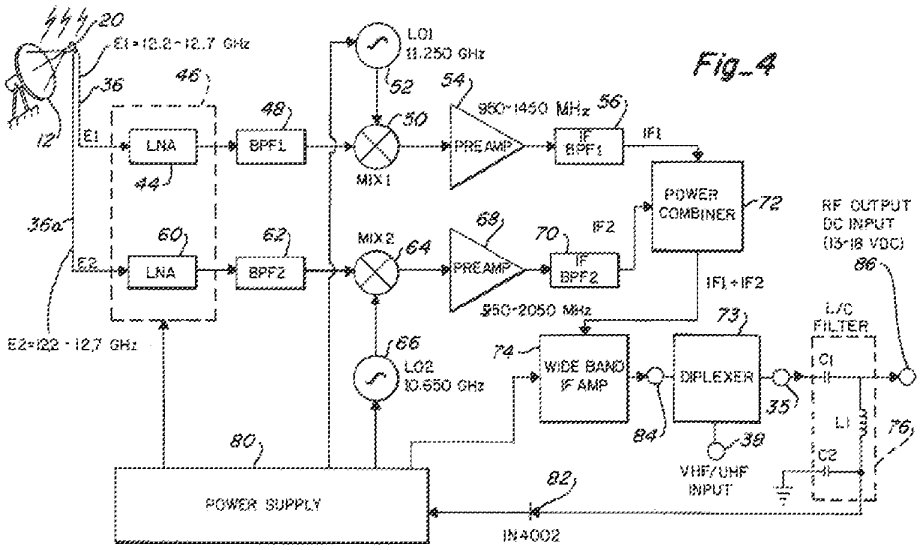
Asserted Claims	Petruzzelli
	By the same token, a commercial television cable input feed 28 can be connected through a coaxial cable 30. All of these input signals are connected to a combiner/distribution circuit 22 so that the RF signals are then distributed through appropriate cables to a plurality of IRD's 32-36 which, in turn, are connected to a TV receiver or monitor 38-42. Petruzzelli at 4:59–68: The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at Fig. 4:

Asserted Claims	Petruzzelli
	 To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
19. The method of claim 14 wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal.	Petruzzelli discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD and all IRDs receive the same composite signal. *See* claim 14, *supra*. *See, e.g.*:

Asserted Claims	Petruzzelli
	Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals

Asserted Claims	Petruzzelli
	are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:24--46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable.

Asserted Claims	Petruzzelli
	Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22 carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22

Asserted Claims	Petruzzelli
	carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at 9:47–57: A common L/C filter 76 at the output of the diplexer 78 allows the IF signal to pass to the housing output connector 86. The coaxial cable 22 connected between the connector 86 and the satellite receiver provided within the protection of the home or structure provides a source of unregulated DC voltage of approximately 13-18 volts DC. This voltage is applied through the RF output connector 86. This voltage passes directly to the L/C filter 76 where the DC voltage is blocked by capacitor C1 and passes through the L1/C2 portion of the filter 76 and through the diode 82 to the power supply 80. Petruzzelli at Fig. 4: 

Asserted Claims	Petruzzelli
	To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
20. The method of claim 14 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Petruzzelli discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claim 14, *supra*. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[a] 21. The method of claim 14 further comprising the steps of: frequency translating the selected transponder channels to a variable frequency before combining; and	Petruzzelli discloses, explicitly and/or inherently, frequency translating the selected transponder channels to a variable frequency before combining. *See* claims 14, 16, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and

Asserted Claims	Petruzzelli
	separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate

Asserted Claims	Petruzzelli
	frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42–52: The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56: As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system.

Asserted Claims	Petruzzelli
	Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier

Asserted Claims	Petruzzelli
	(LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver

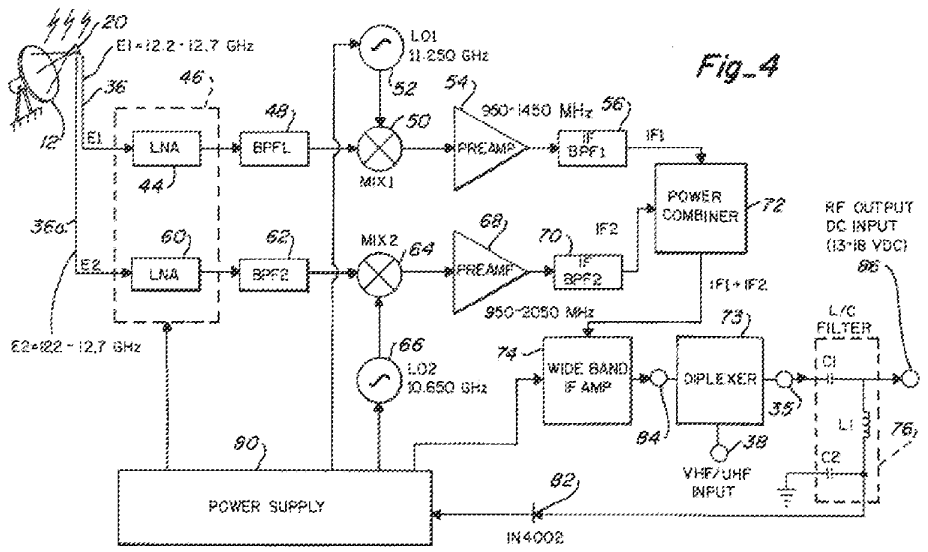
Asserted Claims	Petruzzelli
	found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450

Asserted Claims	Petruzzelli
	MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal

Asserted Claims	Petruzzelli
	95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a

Asserted Claims	Petruzzelli
	weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
21[b] splitting the composite signal inside a home and distributing to a plurality of IRDs.	Petruzzelli discloses, explicitly and/or inherently, splitting the composite signal inside a home and distributing to a plurality of IRDs. *See* claims 14, 18, *supra*. *See, e.g.*: Petruzzelli at Abstract:

Asserted Claims	Petruzzelli
	An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 3:28–41: A common terrestrial television antenna 24 is usually mounted on the exterior portion of the structure and is tuned to receive local television and FM channels for both video and audio reception. These signals are, in turn fed through either a coaxial cable connected through an impedance matching transformer from the antenna or a twin lead TV cable through the interface 21 to the interior of the home or structure where the TV is located. By the same token, a commercial television cable input feed 28 can be connected through a coaxial cable 30. All of these input signals are connected to a combiner/distribution circuit 22 so that the RF signals are then distributed through appropriate cables to a plurality of IRD's 32-36 which, in turn, are connected to a TV receiver or monitor 38-42. Petruzzelli at 4:59–68: The Oleson patent (U.S. Pat. No. 4,675,732) discloses the processing of an incoming satellite antenna signal in a low noise block down converter mounted at the antenna. The output of the LNB is delivered to a splitter where it is divided into various individual signals. The satellite incoming signals can be combined with local UHF/VHF TV signals in a matrix and selectively distributed to attached TV sets. There is no teaching in this patent of any combining of the satellite signals and the terrestrial antenna signals at the antenna receiving head.

Asserted Claims	Petruzzelli
	Petruzzelli at Fig. 4:  To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
22. The method of claim 21 wherein the transponder request signal is transmitted over the cable from an IRD.	Petruzzelli discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over the cable from an IRD. *See* claims 19, 21, *supra*.

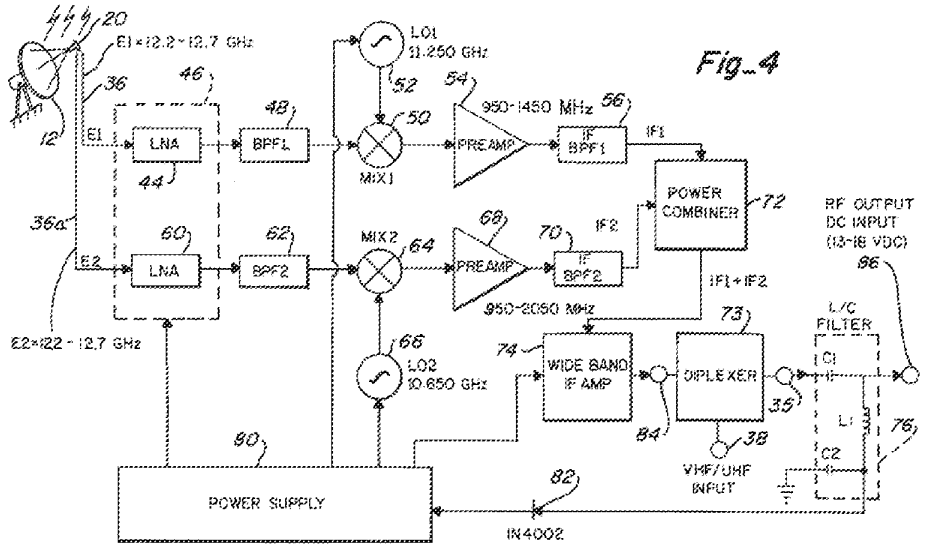
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Asserted Claims	Petruzzelli
	See, e.g.: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install.

Asserted Claims	Petruzzelli
	Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:24–46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite

Asserted Claims	Petruzzelli
	signals for producing a stacked band of frequencies for transmission through the single lead-in cable. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli 7:12–7:24: Turning now more specifically to the drawings, FIG. 2 shows a satellite type parabolic antenna 12 mounted on a support structure 14 and having an upwardly extending arm 16 mounted to bracket 18 and supporting an LNBF feed housing 20. A single output coaxial cable 22 is connected through the support arm 16 and LNBF feed housing for passage to the interior of the home or structure upon which the antenna is mounted. The cable 22

Asserted Claims	Petruzzelli
	carries the output signals from the LNB housing and contains the satellite signals as well as any additionally attached auxiliary input signals. In this way, a single coaxial cable 22 carries all of the applicable RF signals for connection and operation to the satellite receiver and television set or monitor (not shown). Petruzzelli at 9:47–57: A common L/C filter 76 at the output of the diplexer 78 allows the IF signal to pass to the housing output connector 86. The coaxial cable 22 connected between the connector 86 and the satellite receiver provided within the protection of the home or structure provides a source of unregulated DC voltage of approximately 13-18 volts DC. This voltage is applied through the RF output connector 86. This voltage passes directly to the L/C filter 76 where the DC voltage is blocked by capacitor C1 and passes through the L1/C2 portion of the filter 76 and through the diode 82 to the power supply 80. Petruzzelli at Fig. 4:

Asserted Claims	Petruzzelli
	 To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
23. The method of claim 21 wherein the transponder request signal is transmitted over a wireless link to the ODU.	Petruzzelli discloses, explicitly and/or inherently, wherein the transponder request signal is transmitted over a wireless link to the ODU. *See* claims 20, 21, *supra*. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art

Asserted Claims	Petruzzelli
	in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
34. The method of claim 14, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal.	Petruzzelli discloses, explicitly and/or inherently, wherein selecting and extracting comprises applying a pass band filter transfer function to the digitized broadband signal. *See* claims 14, 15, *supra*. *See, e.g.*: Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the

Asserted Claims	Petruzzelli
	950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter.

Asserted Claims	Petruzzelli
	Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 7:25–45: The LNB housing includes an outer plastic or non-metallic protective sleeve 24 and wave guide cover 26. The covers 24, 26 enclose and encapsulate a metallic tubular wave guide 28 as well as component housing 30. The component housing 30 contains a printed circuit board 32 including the components necessary for a plurality of low noise amplifiers, band pass filters, oscillators, mixers and IF amplifiers. In addition, antenna probes 36 are provided on the circuit board 32 for coupling the RF energy received through the wave guide 28. A regulated power supply is also provided on the printed circuit board 32 for powering the electronic components. Two or more Type F coaxial connectors 38 are mounted on a mounting board 40 which is positioned in the neck 42 of the housing 20. A second Type F connector 38 is arranged to be connected to a secondary or auxiliary input

Asserted Claims	Petruzzelli
	cable 44 which may be connected to a terrestrial VHF/UHF TV antenna or to other TV signal sources. The printed circuit board 32 also includes a diplexer (not shown) which is positioned between the output from the printed circuit board and the outlet Type F coaxial connector 38 attached to the transmission cable 22. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450

Asserted Claims	Petruzzelli
	MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40--53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
35. The method of claim 14, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining.	Petruzzelli discloses, explicitly and/or inherently, further comprising converting the selected signal to an analog signal using a digital to analog converter prior to combining. *See* claim 14, *supra*. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one

Asserted Claims	Petruzzelli
	or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
36. The method of claim 14, wherein the combining is performed in the digital domain.	Petruzzelli discloses, explicitly and/or inherently, wherein the combining is performed in the digital domain. *See* claim 14, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 1:1–17: This invention is directed to a combined LNB and diplexer mounted within a single microwave antenna feed housing. It is more specifically directed to the packaging of the electronic circuits of an LNB and a diplexer in the feed housing of a satellite receiving antenna so that the combined incoming RF signals from the satellite system and a

Asserted Claims	Petruzzelli
	terrestrial antenna can be fed simultaneously through an inexpensive coaxial cable to an appropriate TV receiver. Petruzzelli at 3:57–62: The present invention eliminates the duplicity that is provided in the prior art and allows the conveyance of all input sources through one cable from the exterior of the structure to the interior. Thus, a much more inexpensive and efficient arrangement is provided which is easier and cheaper to install. Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and

Asserted Claims	Petruzzelli
	low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down

Asserted Claims	Petruzzelli
	converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission

Asserted Claims	Petruzzelli
	through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450

Asserted Claims	Petruzzelli
	MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal

Asserted Claims	Petruzzelli
	95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

Asserted Claims	Petruzzelli
37. The method of claim 17, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency.	Petruzzelli discloses, explicitly and/or inherently, wherein frequency translating comprises using a digital mixer to apply a rotating phasor to the data samples to translate their frequency. *See* claim 17, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low

Asserted Claims	Petruzzelli
	input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42–52: The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56:

Asserted Claims	Petruzzelli
	As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit

Asserted Claims	Petruzzelli
	for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate

Asserted Claims	Petruzzelli
	satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known

Asserted Claims	Petruzzelli
	in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78.

Asserted Claims	Petruzzelli
	Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a

Asserted Claims	Petruzzelli
	relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable.

Asserted Claims	Petruzzelli
	To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
38. The method of claim 14, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal.	Petruzzelli discloses, explicitly and/or inherently, further comprising frequency translating the digitized broadband signal prior to selecting and extracting transponder signal. *See* claims 14, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement. Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13

Asserted Claims	Petruzzelli
	Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42--52: The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which

Asserted Claims	Petruzzelli
	can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56: As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing.

Asserted Claims	Petruzzelli
	Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band

Asserted Claims	Petruzzelli
	between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the

Asserted Claims	Petruzzelli
	low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to

Asserted Claims	Petruzzelli
	provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor

Asserted Claims	Petruzzelli
	C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the

Asserted Claims	Petruzzelli
	resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
39. The method of claim 38, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband.	Petruzzelli discloses, explicitly and/or inherently, wherein frequency translating comprises translating the original digitized broadband signal to locate a selected transponder channel at baseband. *See* claim 38, *supra*. *See, e.g.*: Petruzzelli at Abstract: An arrangement is provided for combining the video and audio signals from a satellite antenna with other auxiliary input signals producing a frequency stacked band arrangement for transmission by a single cable to a satellite receiver or TV monitor located within a home or structure. Multiple TV input signals from the satellite antenna are processed and separated into intermediate frequency bands which are then combined in a diplexer with one or more auxiliary input frequency bands. The output of the diplexer is connected directly to the signal output terminal at the antenna. All components for performing this combining process are included within the sealed housing of the LNB provided at the satellite antenna. Improved band isolation and reduced noise and interference are produced by the novel arrangement.

Asserted Claims	Petruzzelli
	Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 3:42–52:

Asserted Claims	Petruzzelli
	The diagram at the lower portion of FIG. 1, illustrates the frequency bands of the RF signals which are transmitted through the interface 21 from the exterior of the structure to the appropriate location where the equipment is located within the structure. The VHF band is relatively narrow in comparison with the UHF bands being broader in bandwidth. The signals received from the satellite include the direct broadcast satellite signals which can have left hand and right hand circular polarization. As shown, the bandwidth of these signals are considerably broader than those of the VHF and UHF signals. Petruzzelli at 3:53–56: As illustrated herein, the prior art commonly provides a plurality of cables for conveying the signals from various RF sources to the appropriate converters or receivers within the structure where they can be satisfactorily used. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This

Asserted Claims	Petruzzelli
	patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 5:46–61: For the purpose of this invention, it is also possible to include horizontal and vertical polarized or elliptical signals. As will be discussed later, these inputs can be replaced by other types of inputs, such as terrestrial microwave signals as well as other incoming signals for transfer to a suitable receiver or TV monitor. For the present, the discussion will be directed to the use of antenna probes to receive separate bandwidths of right and left hand polarized incoming video and audio signals. Each of the incoming signals follows a separate processing path whereby the signals are introduced into a low noise amplifier (LNA) and a band pass filter where they are then processed through separate block down converters. Each of the block down converters includes a mixer for combining a local oscillator frequency for producing an intermediate frequency signal band which is, in turn, again amplified and passed through a band pass filter. Petruzzelli at 5:62–6:21: In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each

Asserted Claims	Petruzzelli
	other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this

Asserted Claims	Petruzzelli
	band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass

Asserted Claims	Petruzzelli
	filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter

Asserted Claims	Petruzzelli
	88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. '576 patent at 2:34–47:

Asserted Claims	Petruzzelli
	U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
40. The method of claim 14, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal.	Petruzzelli discloses, explicitly and/or inherently, further comprising maintaining a channel translation table at the outdoor unit, the channel translation table specifying assigned frequency slots for transponder channels in the composite signal. *See* claim 14, *supra*. *See, e.g.*: Petruzzelli at 2:53–3:27: Along the left side of the figure is illustrated an antenna which, in essence, is a parabolic satellite antenna receiving downlinked microwave signals usually from a geostationary satellite. The frequencies of the received microwave signals are in the range of 12-13 Gigahertz. Because of the ability to receive polarized signals, the diagram illustrates the reception of signals in two separate frequency bands from the antenna 12. These are

Asserted Claims	Petruzzelli
	separate input signals and utilize the capability of the feedhorn or feed to separate the two polarized RF signals. Each signal is directly fed into a separate low noise amplifier and a separate block down converter 14, 16. The low noise amplifier amplifies the extremely low input signal received from the antenna and boosts it to a reasonable signal for processing. The block down converters include a mixer wherein the incoming RF signals are mixed with a local oscillator frequency signal whereby the incoming signals are combined and differentiated. The oscillator feeding the mixer contained within LNB 14 usually has a frequency of about 11.250 GHz. The oscillator feeding the mixer of the second LNB 16 is at a different frequency, such as about 10.650 GHz. The differential between the primary frequencies of the incoming signal and the oscillator signal provides the difference which is a considerably lower intermediate frequency. With the original incoming bandwidth approximately 500 MHz the output intermediate frequency from the first LNB 14 usually is in the range of 950-1450 MHz. The signal emitting from the second LNB 16 also has a bandwidth of approximately 500 MHz and lies in the frequency range of 1550-2050 MHz. In this way, there is two distinct band frequencies of 500 MHz each which are now at different base frequencies than the original incoming signals. These signals are then combined in a combiner included in the circuitry found within the feedhorn or feed 17 provided at the focal point of the parabolic satellite antenna. These incoming intermediate frequency bands contain all of the video and audio programming as well as the data provided in the TV satellite transmission. A coaxial cable 20 is fed from the combiner carrying the so called "stacked" intermediate frequency bands through the interface 21 of the support structure to the interior of the structure. Petruzzelli at 4:24–46: The Mutzig et al. patent (U.S. Pat. No. 5,276,904) provides a system for simultaneous reception of satellites and UHF/VHF frequencies. A microwave frequency head or LNBF includes a microwave frequency demodulation circuit which selects a chosen channel and demodulates it. The circuit is controlled by the satellite receiver. The unit further includes an amplitude remodulation circuit which converts the signal to signals in the 40-860 MHz band which is the same as the VHF/UHF channels received by the terrestrial TV receiving antennas. This satellite signal is combined through a multiplexer with the terrestrial

Asserted Claims	Petruzzelli
	received signals and the combined signal is then transmitted through a single cable to a converter and/or satellite receiver. The multiplexer is disclosed as being used in conjunction with a UHF/VHF antenna. There are several circuits which are also disclosed in this patent which allow the demodulation of the satellite signal and the direct transmission of this signal to the associated receiver positioned within the home or structure. None of these disclosures teach the inclusion of a diplexer within the LNBF housing for combining the UHF/VHF TV antenna signals with the incoming satellite signals for producing a stacked band of frequencies for transmission through the single lead-in cable. Petruzzelli at 5:1–15: The Green et al. patent (U.S. Pat. No. 5,073,930) discloses a television distribution system which includes a frequency agile satellite transponder down converter operating in the 950-1450 MHz frequency band along with an IF stage incorporating band pass filtering and a frequency agile up converter. This allows an antenna configuration with optimum selection of transponders from one or more satellites and with opposite polarization. The frequency block can then be distributed to multiple subscribers in various locations. This patent discloses multiple satellite signal inputs, but does not disclose the processing of the frequency bands into a frequency stacked band configuration nor the combining of the terrestrial television antenna output with the satellite signal output through the use of a diplexer mounted within the LNBF housing. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite

Asserted Claims	Petruzzelli
	receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream. Petruzzelli at 6:37–50: By the unique combination of components within the LNB housing, fewer exposed connections and couplings are provided with all of the existing components protected from weather and contamination. In this way, lower cost, better efficiency and more reliable transmission of signals is possible. In addition, all of the intermediate frequency signals are transmitted through one relatively inexpensive cable or lead-in wire to the satellite receiver found within the home or structure. In addition, the intermediate frequency signals are stacked so that the individual frequency bands are separated and positioned one above the other so that they do not overlap. In this way, the bands do not interfere with each other and provide an extremely wide range of incoming frequency video and audio reception. Petruzzelli at 7:63–8:39: Antenna probe 36 receives the incoming radio frequency (RF) video and audio signals encompassing a wide frequency band. In the preferred embodiment of this invention, this band is in the range of 12.2 to 12.7 GHz. E1 designates the data signal stream received through the antenna probe 36 which is connected to a low noise amplifier (LNA) contained within a special isolation housing 46 to minimize the introduction of noise and interference. It is understood that the incoming RF signal at this point is quite low and the low noise amplifier 44 is designed to amplify the signal to a much higher lever without the introduction of noise and interference to the signal. The signal is fed from the low noise amplifier through a first band pass filter 48 to a first mixer 50. The incoming RF data signal having a frequency in the band of 12.2 to 12.7 GHz is mixed with the frequency from a local oscillator having a predetermined frequency of 11.250 GHz. As is well known in frequency mixers of this type, a summation and difference of the combined frequencies are produced. As a result, a high frequency RF band and a lower frequency RF band are produced and amplified in the preamplifier 54. The increased signal is then passed through

Asserted Claims	Petruzzelli
	an intermediate frequency band pass filter designed to allow the passage of the lower intermediate frequencies in the band of 950-1450 MHz to pass through. All other frequencies, including the high intermediate frequency band, are blocked. In the same way, the second input frequency signal stream 36a having the same input frequency band is fed through a second separate low noise amplifier 60 and second band pass filter 62 to the second mixer 64. A second local oscillator 66 having a lower frequency than the frequency found in the first local oscillator is fed directly to the second mixer 64. The oscillator frequency in the second local oscillator 66 can be predetermined at 10.650 GHz in order to provide an intermediate frequency downstream of the second mixer in the bandwidth of 1550-2050 MHz. As can be seen, this second intermediate frequency band encompasses a bandwidth of 500 MHz and is above the intermediate frequency bandwidth of 950-1450 MHz provided in the first signal source. In this way, there is a guard band of approximately 100 MHz provided between the intermediate frequency bands of the first and second signal sources. This is what is called a "stacked band" arrangement. Petruzzelli at 8:40–53: The combined resulting frequencies of the summation and difference of the frequencies introduced to the second mixer are passed directly through preamp 68 and the second intermediate frequency band pass filter 70. The second intermediate frequency band pass filer 70 filters out all of the extraneous frequencies except the desired intermediate frequencies in the 1550-2050 MHz frequency range. This band of frequencies is then introduced into the power combiner 72 along with the first source of incoming IF band frequencies. The first and second IF signal bands are combined in the combiner 72 to provide the "stacked band" arrangement mentioned above. The resulting signals are then fed through a wide band intermediate frequency amplifier 74. The output from the wide band amplifier 74 is then fed to a diplexer 78. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor

Asserted Claims	Petruzzelli
	C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:65–10:10: It is important to understand that the novel results obtained in the present invention are produced by the inclusion of the diplexer within the LNB housing to minimize lead length between the LNB components and the diplexer for producing the combined stacked band frequency signals at the output 86 of the LNB. This is possible with the inclusion of the auxiliary inputs to the LNB housing for the combining of all of the desired frequency signals at the one output terminal. Thus, the components and connections are provided in a weather insulated environment to minimize contamination and prevent the introduction of noise and interference to the system. '576 patent at 2:34–47: U.S. Pat. No. 5,959,592 incorporated herein by reference, by Petruzzelli addresses combining both the left hand circular polarized (LHCP) and right hand circular polarized (RHCP) signals into one signal that is transmitted from the ODU. In the disclosed band stacking approach, the output of two low noise amplifiers (LNAs), each 500 MHz wide, are frequency translated to different IF frequencies and summed into a signal with a bandwidth of more than 1000 MHz. In one example disclosed, the different IF bands are 950 to 1450 MHz and 1550 to 2050 MHz. The problem with this approach is that the

Asserted Claims	Petruzzelli
	resulting bandwidth is very wide and becomes impractical when the number of LNB signals increases because each LNB output requires 500 MHz of bandwidth on the cable. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
41. The method of claim 38, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel.	Petruzzelli discloses, explicitly and/or inherently, further comprising providing the channel translation table to the IRD to allow the IRD to tune to a desired selected translated transponder channel. *See* claim 38, *supra*. *See, e.g.*: Petruzzelli at 5:16–24: The Japanese patent to Yoshida (patent No. 5-129977) discloses a circuit which allows plural satellite broadcast receivers. A plurality of input antennas covering both satellite transmissions as well as UHF/VHF TV antenna signals are connected through various band pass filters to a mixer for connection to a tuner or a receiver. This patent does not in any way disclose the combination of a diplexer for combining UHF/VHF TV antenna signals with the output signals from a satellite antenna. Petruzzelli at 5:25–34: The Shingematsu et al. patent (European patent application No. 576012-A2) discloses a digital broadcast receiver comprising a satellite frequency converter and a cable frequency converter which are combined within a television receiver which includes a tuning circuit

Asserted Claims	Petruzzelli
	for selecting the input signal, whether analog or digital in the associated receiver. While this patent discloses the combining of various input signals, it does not teach or disclose the use of a diplexer or the location of the diplexer in the LNBF of a satellite receiving antenna. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
42. The method of claim 14, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal	Petruzzelli discloses, explicitly and/or inherently, wherein selecting and extracting comprises low-pass filtering the translated digitized broadband signal thereby substantially removing signal information from non-selected transponder channels. *See* claim 14, *supra*.

Asserted Claims	Petruzzelli
information from non-selected transponder channels.	*See, e.g.*: Petruzzelli at 4:4–23: The Kang patent (U.S. Pat. No. 5,119,509) discloses a satellite receiving system having the capability of receiving both the C band as well as the Ku band, simultaneously. The signals are separately amplified through low noise amplifiers and are passed through a band pass filter to a single mixer. Dual switchable oscillators are provided in the mixing stage to establish an intermediate frequency, having a frequency band of 950-1450 MHz. The intermediate frequency signals are processed through a low pass filter and an intermediate frequency (IF) amplifier and a biasing stage for supplying DC bias voltage to the low noise amplifiers, local oscillators and the IF amplifiers. Low voltage operating power is received from the outlet cable source, such as a satellite receiver. A suitable filtering stage is provided for separating the DC voltage from the RF signal. The DC voltage is used in powering the LNBF components. Although this patent teaches two separate input signal sources, it does not disclose the use of a diplexer for combining exterior signal sources for combining and transmission through a single cable to the satellite receiver. Petruzzelli at 4:47–58: The Theriault patent (U.S. Pat. No. 4,397,037) discloses the use of a diplexer for combining UHF input sources along with high frequency as well as low frequency TV frequency sources. Through use of a number of filters, these input signals are combined and delivered to a mixer section for processing the signals in a subsequent section of a broadcast TV signal processor. This patent merely teaches the use of various high pass and low pass filters for impedance matching and blending of signals into a common mixer for producing an intermediate frequency for later processing. It does not disclose the use of a diplexer or filters in the LNBF of a direct broadcast satellite antenna system. Petruzzelli at 5:62–6:21:

Asserted Claims	Petruzzelli
	In this way, the incoming RF signals are converted and separated into individual signal streams or bands having defined bandwidths which are independent and spaced from each other. It has been found that the first incoming band can have an intermediate frequency in the range of 950-1450 MHz while the second RF signal band is converted to a different frequency range, such as 1550-2050 MHz. The local oscillator frequencies are selected so that approximately one hundred MHz is provided as an isolation or separation band between these two intermediate frequency ranges. These signal bands are then combined and passed through a wide band intermediate frequency (IF) amplifier to boost the signal strength to an acceptable level. The signal then is passed through a high pass/low pass filter for separating out a DC operating voltage of approximately 13-18 volts which is fed to the LNB by the coaxial or other lead-in cable connecting the LNB with the appropriate satellite receiver. The receiver is adapted to provide the voltage for operation of the components within the LNB. This DC voltage is then processed through a regulated power supply which, in turn, is connected with the individual components and sections of the LNB. A diplexer which is essentially a high pass/low pass filter is provided between the output from the wide band amplifier to the output connector on the LNB for transferring the received RF video and audio signals to the connected satellite receiver. Petruzzelli at 6:22–36: This invention provides the unique feature of permitting the additional connection and introduction of other RF signal sources, such as the signals received by a VHF/UHF terrestrial TV antenna or external cable TV input directly into the antenna housing for the LNB. In this way, all of the signals converging at the exterior of the support structure for the antenna systems can be combined through the diplexer provided in the housing for combining all of these incoming signals into a stacked band arrangement for transmission through the attached coaxial cable or lead-in wire for transfer to the appropriate satellite receiver or TV monitor. The auxiliary incoming signals are connected through the high and low pass filters of the diplexer for matching the incoming impedance of the signal sources and combining these signals into a single signal stream.

Asserted Claims	Petruzzelli
	Petruzzelli at 8:54–61: The diplexer 78 as shown in FIG. 5 provides the function of a high pass/low pass filter for the combining of the external auxiliary VHF/UHF input to the intermediate frequency band signals for passage through the RF output connector 86 to the connected satellite receiver. The diplexer provides a high pass filter through the output 84 from the wide band IF amplifier 74 containing the higher first and second intermediate frequency signal bands IF1, IF2. Petruzzelli at 8:62–9:13: The diplexer 78 is utilized in this arrangement since it provides the desired impedance matching at its respective inputs and output terminals. In addition, it permits signals from separate sources to be combined in a common circuit path without possible noise and distortion. In high pass filter 88, coupling capacitor C3 routes the combined UHF intermediate frequency signals through blocking capacitor C4 to internal circuit terminal 95. While, inductor L2 conducts relatively lower frequency signals to ground. Capacitors C3 and C4 are of relatively high capacitance to exhibit a relatively small impedance to signals at UHF frequencies. However, filter 88 shows a relatively high impedance at circuit terminal point 95 to lower frequency signals applied thereto from low pass filter 90. In high pass filter 88, capacitors C3 and C4 and inductor L2 serve as a simple 3 section filter and have values selected to cut-off at 950 MHz or slightly less. Thus, the high pass filter 88 has high impedance to the auxiliary lower frequency band which is being imported at the input terminal 38. Petruzzelli at 9:14–31: The low pass filter 90 of the diplexer 78 includes inductors L3, L4 in the line between the lower frequency band input terminal 38 and the circuit terminal point 95. A shunt capacitor C5 connected between the two inductors L3, L4 is connected directly to ground. Inductor L4 and shunt capacitors C5 and C6 serve as a simple 3 section filter and have a selective cut off value at or slightly above 812 MHz. In this way, low pass filter 90 presents a

Asserted Claims	Petruzzelli
	relatively high impedance to the higher frequency intermediate frequency bands so that these bands are directed through the internal terminal point 95 to the output 85 from the LNB. By the same token, the high pass filter 88 presents a relatively high impedance to the auxiliary lower input frequency band for VHF and UHF video and audio signals. The combined signals at output terminal 85 include essentially the three frequency bands shown in FIG. 5. These bands are stacked one above the other in series fashion and provide unique signal transmission to the applicable satellite receiver, tuner or TV monitor. Petruzzelli at 9:32–46: FIG. 6 shows a diagram of the output frequencies from the diplexer 78 at internal circuit point 95 and output connector 85. The upper line 102 at the left portion of the graph shows low impedance in the auxiliary VHF/UHF input frequencies with considerable frequency drop off past the cut off frequency of approximately 812 MHz in the low pass filter. The high pass filter 88 also has the same characteristics with respect to the satellite received intermediate frequency bands wherein a substantial drop off or insertion loss occurs at frequencies below 950 MHz. A node 106 occurs at approximately the mid-point in the cross-over in the bands between 812 and 950 MHz. The selection of the proper values for the components in the high pass and low pass filters produce high signal isolation between the satellite signal input 84 and the auxiliary signal input 38. To the extent Petruzzelli does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Petruzzelli alone or it would have been obvious to combine Petruzzelli with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.

INVALIDITY CLAIM CHART[1]
Invalidity of U.S. Patent No. 7,130,576 in view of Pugel '200

U.S. Patent Publication No. 2003/0165200 ("Pugel '200") was filed on August 30, 2001 and was published on September 4, 2003. Pugel '200 therefore qualifies as prior art to the '576 patent under, at least, (pre-AIA) 35 U.S.C. § 102 (e). For the reasons listed below, Pugel '200 invalidates the asserted claims of the '576 patent under 35 U.S.C. §§ 102 or 103 alone, in view of the knowledge of one of skill in the art, or in combination with various prior art references identified in the chart, as discussed below, or with one or more references identified in Defendants' Invalidity Contentions. References to figures, drawings, and the like refer to the cited items as well as any accompanying or related text.

Asserted Claims	Pugel '200
14[pre] 14. A method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU, the method comprising the steps of:	Defendants take no position in these Invalidity Contentions on whether the entirety of the preamble of this claim is a limitation. To the extent it is a limitation, Pugel '200 discloses, explicitly and/or inherently, a method of communicating a plurality of transponder signals from a satellite outdoor unit (ODU) that receives a plurality of satellite broadband signals to an integrated receiver decoder (IRD) over a single cable connected to the ODU. *See, e.g.*:

[1] Defendants apply the prior art in light of Plaintiff's improper assertions of infringement and improper application of the claims. Defendants do not agree with Plaintiff's application of the claims, or that the claims satisfy 35 U.S.C. § 112. In the invalidity contentions cover pleading, Defendants identified terms in the '576 patent that it contends are governed by 35 U.S.C. § 112(6). While the charts below identify where certain elements are found in the prior art, including the identity of structures, acts or materials in each item of prior art that perform the function for terms governed by 35 U.S.C. § 112(6), Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. Defendants object to any attempt to imply claim construction from this chart. Defendants' prior art invalidity contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

Asserted Claims	Pugel '200
	Pugel '200 at Abstract: An apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted. Pugel '200 at [0003]: Communications systems having higher data throughput and greater efficiency in the use of available bandwidth are increasingly in demand. In a typical communications system, such as a satellite communications system, a satellite provides a plurality of communications channels to terrestrial receivers. Each communications channel has associated with it, for example, a particular transponder, a particular polarization and the like. Normally, each defined channel broadcasts at its maximum data rate. Pugel '200 at [0015]-[0016]: FIG. 1 depicts a high-level block diagram of an exemplary receiver usable in accordance with the principles of the invention. Specifically, the receiver 100 comprises a direct broadcast satellite (DBS) receiver comprising an analog processing section 110, an analog-to-digital (A/D) converter 120, a plurality of channel processors 130 1 through 130 n (collectively channel processors 130), a back end processor 140 and, optionally, a mass storage device 150. The analog processor 110 receives an analog input signal S1 comprising, illustratively, a 950-1,450 MHz signal having modulated thereon a plurality of analog carrier signals having, illustratively, bandwidths of 24 MHz and center frequencies separated by 29.16 MHz from the center frequencies of adjacent analog carrier signals. The analog processor

Asserted Claims	Pugel '200
	110 performs a signal conditioning function to produce an output signal S2 suitable for processing by the A/D converter 120. Pugel '200 at [0052]: The invention provides the capability to not only down convert or receive one channel, but to receive N channels simultaneously. All of the N down-converted channels are included within a digital bit stream, which is processed digitally to recover in parallel any of the N original transponder channels. In an analog system, such capability requires the use of N analog tuners to select the N analog signals for subsequent processing. Since the N analog tuners at subsequent processing operate on RF signals that cannot be split due to the power domain processing of such signals, the N analog tuners would be ganged together. Within the context of the present invention, the direct conversion processing of multiple channels simultaneously avoids this high cost tuning and processing arrangement. To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[a] communicating a transponder request signal to the ODU from the IRD;	Pugel '200 discloses, explicitly and/or inherently, communicating a transponder request signal to the ODU from the IRD. *See, e.g.*: Pugel '200 at [0022]-[0023]: Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates

Asserted Claims	Pugel '200
	to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120. The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136. Pugel '200 at [0037]: In a "channel hopping" embodiment of the invention, the stream identifier data 312 and sequence code 314 associated with one or more packets or groups of packets within a payload portion of the data structure 300 of FIG. 3 are augmented by other data 316 comprising a channel identifier field and a time of transmission field. The channel identifier data is used to identify which transmission or transport channel(s) will be used to transport the stream identified in field 312. The time of transmission data is used to indicate the actual time of such transmission(s). In this manner, where a receiver is capable

Asserted Claims	Pugel '200
	of processing a smaller number of transport channels, a "channel hopping" mechanism is implemented whereby one or more of the channel processors at the receiver select the identified channel(s) at the identified time(s) to retrieve therefrom the stream identified in field 312. To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[b] in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals;	Pugel '200 discloses, explicitly and/or inherently, in the ODU, digitizing the plurality of satellite broadband signals, selecting and extracting a plurality of transponder signals from the received satellite broadband signals, wherein the selecting is responsive to the transponder request signals. *See, e.g.*: Pugel '200 at [0005]-[0006]: The invention comprises an apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted. An apparatus, in accordance with an embodiment of the present invention, comprises an analog to digital converter, for directly converting a plurality of carrier signals into a digital data stream; a plurality of channel processors, for simultaneously extracting from the digital data stream data carried by respective carrier signals; and a processor, for

Asserted Claims	Pugel '200
	combining at least portions of the data extracted from at least two carrier signals to produce a complete bitstream, the extracted data having associated with it stream identifier and sequence code information for determining, respectively, the complete bitstream corresponding to the extracted data and the sequence within the complete bitstream of the extracted data. Pugel '200 at [0018]: The A/D converter 120 receives all (illustratively) 16 channels simultaneously and produces at its output a digital bit stream S3 that is representative of the 16 channels in a digital format. In the exemplary satellite receiver embodiment, the A/D converter 120 comprises an 8 bit A/D converter approximately 1.5 GHz. Thus, given the relevant input frequencies of signal S2 of 950 to 1,450 MHz, the output signal S3 comprises a digital signal having an inverted spectrum from 50 to 550 MHz. The output signal S3 of the A/D converter 120 is coupled to an input of each mixer 132 within the channel processors 130_1 through 130_N. Pugel '200 at [0021]-[0023]: Each of the channel processors 130 comprises a mixer 132, a decimator/filter 134, a digital demodulator 136 and a transport processor 138. It will be appreciated by those skilled in the art that the digital demodulator 136 and transport processor 138 may be combined into a single integrated circuit known as a link IC. Each of the mixers 132 mixes the digital signal S3 with a respective numerically controlled oscillator (NCO) signal to produce respective in-phase I and quadrature Q signal components, which are coupled to the respective decimator/filters 134. The respective NCO frequency is selected to derotate a desired signal or channel. Each mixer 132 operates to perform a frequency rotation function, whereby the selected channel is rotated to baseband from the undersampled digital signal S3. This may be accomplished using a numerical table to extract (or rotate) the desired channel frequency from the digital signal comprising all available frequencies processed by the A/D converter 120.

Asserted Claims	Pugel '200
	The decimator/filter 134 receives the respective in-phase I and quadrature Q components of the derotated and selected channel. The decimator/filter 134 processes these orthogonal components to extract the desired signal. Briefly, after the mixer 132 derotates the selected signal to baseband (i.e., by multiplying the signal by sine and cosine functions), non-desired channel energy is removed from the derotated signal. Specifically, given the exemplary embodiment whereby 16 channels are simultaneously processed, it is desired to retain only the channel energy associated with a specific desired channel. After filtering the derotated baseband signal to remove undesired channel energy, the remaining signal is decimated to remove excess energy associated with the desired channel. For example, since the sampling frequency of the A/D converter is 1.5 gigasamples per second, frequency components from zero to 750 MHz may be present. Those samples not associated with the (approximately) 24 MHz associated with a selected channel are unnecessary. The decimation process removes the unwanted samples. As will be appreciated by those skilled in the art, the 24 MHz associated with a selected channel is actually two 12 MHz channels due to the sine/cosine processing of the derotator or mixer 132. The resulting derotated, filtered, and decimated signal is then provided to the respective demodulator 136. Pugel '200 at [0046]: In one embodiment of the invention, only a subset of the received channels is processed. That is, to reduce costs and complexity within the receiver 100 of FIG. 1, two or more channel processors 130 are utilized. However, the number of channel processors 130 actually utilized is less than the number of channels present within output signal S3 of the A/D converter 120. In this embodiment, channel identifier and channel transmit time information is utilized to cause at least one of the channel processors 130 to selectively process different channels at different times. In this manner, the selected at least one channel processor is caused to "hop" between different channels such that all of the data necessary to reconstruct an initial bitstream may be retrieved utilizing less than a full complement of channel processors.

Asserted Claims	Pugel '200
	Pugel '200 at Claim 1: 1. A method, comprising: converting a plurality of carrier signals into a digital data stream; extracting from said digital data stream, data carried by at least two carrier signals; and combining at least portions of data extracted from said at least two carrier signals to form a complete bitstream, said extracted data having associated with it stream identifier and sequence code information for, respectively, identifying the complete bitstream corresponding to the extracted data and determining the position of the extracted data within the complete bitstream. To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[c] combining extracted selected transponder signals into a composite signal;	Pugel '200 discloses, explicitly and/or inherently, combining extracted selected transponder signals into a composite signal. *See, e.g.*: Pugel '200 at Abstract: An apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and

Asserted Claims	Pugel '200
	the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted. Pugel '200 at [0005]-[0006]: The invention comprises an apparatus and method for simultaneously processing each of a plurality of carrier signals having data modulated thereon, wherein a complete data stream is formed by extracting at least portions of at least two of the modulated signals and combining the extracted portions. Each of the portions of the complete data stream comprises a plurality of packets having associated with them respective stream identification and sequence codes, where the stream identification identifies the complete bit stream to be formed, and the sequence codes identify the order or position within the complete bitstream that the associated data packets should be inserted. An apparatus, in accordance with an embodiment of the present invention, comprises an analog to digital converter, for directly converting a plurality of carrier signals into a digital data stream; a plurality of channel processors, for simultaneously extracting from the digital data stream data carried by respective carrier signals; and a processor, for combining at least portions of the data extracted from at least two carrier signals to produce a complete bitstream, the extracted data having associated with it stream identifier and sequence code information for determining, respectively, the complete bitstream corresponding to the extracted data and the sequence within the complete bitstream of the extracted data. Pugel '200 at [0046]: In one embodiment of the invention, only a subset of the received channels is processed. That is, to reduce costs and complexity within the receiver 100 of FIG. 1, two or more channel processors 130 are utilized. However, the number of channel processors 130 actually utilized is less than the number of channels present within output signal S3 of the A/D converter 120. In this embodiment, channel identifier and channel transmit time information is utilized to cause at least one of the channel processors 130 to selectively

Asserted Claims	Pugel '200
	process different channels at different times. In this manner, the selected at least one channel processor is caused to "hop" between different channels such that all of the data necessary to reconstruct an initial bitstream may be retrieved utilizing less than a full complement of channel processors. Pugel '200 at Claim 1: 1. A method, comprising: converting a plurality of carrier signals into a digital data stream; extracting from said digital data stream, data carried by at least two carrier signals; and combining at least portions of data extracted from said at least two carrier signals to form a complete bitstream, said extracted data having associated with it stream identifier and sequence code information for, respectively, identifying the complete bitstream corresponding to the extracted data and determining the position of the extracted data within the complete bitstream. To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
14[d] transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting.	Pugel '200 discloses, explicitly and/or inherently, transmitting the composite signal over the single cable from the ODU to the IRDs, wherein the modulation of the transponder signal is not altered by the steps of selecting, combining, and transmitting. *See, e.g.*: Pugel '200 at [0024]:

Asserted Claims	Pugel '200
	The demodulator 136 operates to demodulate the provided signal and retrieve therefrom the original data stream modulated thereon. Since each of the channel processors 130 operates simultaneously, the respective demodulators 136 are operating upon substantially simultaneous transmitted streams. The digital demodulators 136 provide respective demodulated data streams to the respective transport processors 138. Pugel '200 at [0052]: The invention provides the capability to not only down convert or receive one channel, but to receive N channels simultaneously. All of the N down-converted channels are included within a digital bit stream, which is processed digitally to recover in parallel any of the N original transponder channels. In an analog system, such capability requires the use of N analog tuners to select the N analog signals for subsequent processing. Since the N analog tuners at subsequent processing operate on RF signals that cannot be split due to the power domain processing of such signals, the N analog tuners would be ganged together. Within the context of the present invention, the direct conversion processing of multiple channels simultaneously avoids this high cost tuning and processing arrangement. To the extent Pugel '200 does not explicitly and/or inherently disclose this element, it would have been obvious in view of the knowledge of a person of ordinary skill in the art in light of Pugel '200 alone or it would have been obvious to combine Pugel '200 with one or more prior art references identified in the cover document to which this chart is attached and/or in Appendix A thereto.
15. The method of claim 14 wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal.	Pugel '200 discloses, explicitly and/or inherently, wherein the step of selecting and extracting a transponder signal comprises the step of: filtering a transponder signal with a band pass filter having a bandwidth ranging from 5% to 100% wider than the bandwidth of the transponder signal. *See* claim 14, *supra*. *See, e.g.*: