

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
18 April 2002 (18.04.2002)

PCT

(10) International Publication Number
WO 02/32122 A1

(51) International Patent Classification⁷: **H04N 5/445**

(21) International Application Number: PCT/US01/42505

(22) International Filing Date: 4 October 2001 (04.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/687,844 13 October 2000 (13.10.2000) US

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

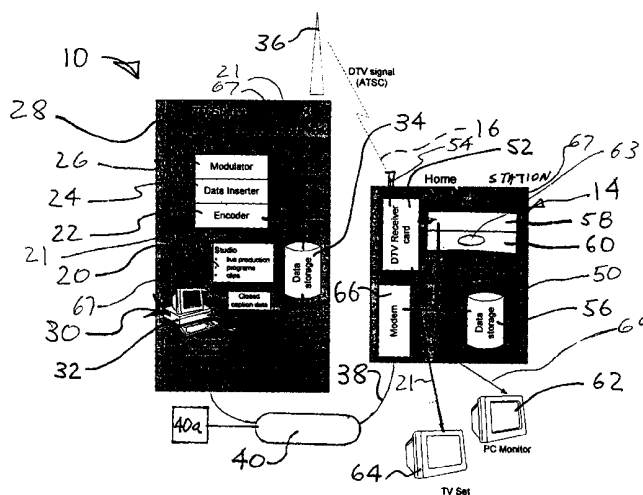
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: PERSONAL COMPUTER WITH SELECTED DIGITAL TV RECEPTION



(57) Abstract: A method for operating a television system (10) includes the steps of generating a television program (21) and an auxiliary signal descriptive of the content components (67) or clips of the television program (21). The television program content and auxiliary signal (67) are received via a receiver board in a PC (57), and are temporarily stored (56). A user profile (63) is applied to the auxiliary signal to determine if the television program content is of interest to the PC user (50). If the content is of interest, the PC is alerted and the material stored. The auxiliary signal (67) may be imbedded in the broadcast stream (30) based on information created at the station as the TV program is created. Each video clip (21) is described based on the station's information such as scripts, closed caption text, or it may be created by a computer (30) at the TV station (10) using interpretative software or manually at the source. A television system includes a television station (12) having a transmitter (28), a television program source (20) linked to the transmitter, and a descriptive data source (30) linked to the transmitter (28).



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DESCRIPTION

PERSONAL COMPUTER WITH SELECTED DIGITAL TV RECEPTION

5 BACKGROUND OF THE INVENTION

The field of the invention is personal computers with television reception.

Broadcast television has used analog transmission techniques for many years. However, currently, a changeover from analog television to digital television is taking place. Digital television offers the advantages of improved picture and sound quality as
10 well as being compatible with computer systems.

Television sets capable of receiving digital TV programming have only recently been introduced, and are currently relatively rare, in comparison to analog television sets, which can be found in almost every home. Digital television sets are also relatively costly, in comparison to analog television sets. Moreover, presently, most programming, whether
15 broadcast, cable or satellite, is still analog. Consequently, consumers (and to some extent the television industry) have been slow in moving from analog to digital television.

DTV signals are transmitted over roughly the same frequencies as used by analog television broadcasts. The DTV transmitted signal is a single, high-speed bit stream which includes encoded video, encoded audio, and system data. The digital video signal
20 is created by digitizing the image to be transmitted into a frame of pixels, then reducing the number of bits needed to represent the image, using a compression method. Similarly, digital audio is created by digitizing the sound to be transmitted, and then compressing the number of bits needed to represent the audio signal using a compression method. Industry standards contemplate a 19.4 megabits per second broadcast over each
25 channel. As a standard definition program can be made to use as few as 4 megabits per second, or less, there is sufficient bandwidth remaining to accommodate significant amounts of additional data such as descriptive information about the program segment or element.

While few consumers have yet purchased digital television sets, a much larger
30 number of consumers own home or personal computers ("PCs"). While most PCs as sold cannot receive and play analog or digital television, more versatile PCs having television

receiver expansion boards are available. See, for example, U.S. Patent No. 5,359,367, which describes a PC with an analog television receiver expansion board controlled by a computer microprocessor. Digital TV receiver boards are now also available. The digital TV ("DTV") receiver board decodes and formats the picture for the PC's display system.

5 They typically also provide an analog video out to an analog TV set for viewing in addition to the PC's monitor. The WIN TV-D board, Hauppauge Computer Works, Hauppauge, New York is a DTV receiver board now available, which receives terrestrial broadcast digital television. DTV receiver boards for use in satellite or cable reception are available from other manufacturers. A PC equipped with a DTV receiver board currently
10 costs far less than a digital television set.

DTV reception can come from a receiver in a DTV set or with the use of a set-top converter box for a satellite or cable service, but receiving digital television via a PC has the added advantage of being able to use additional data included in the digital television reception, and the ability to link to other devices PC compatible and communication links.

15 When equipped with a DTV receiver board, a PC can be used much like a digital television set. The DTV receiver card is tuned to a specific channel or station (using the PC input devices, such as a mouse and/or keyboard). This does not hinder the PC user who will want to use the PC primarily for other typical PC functions. As most PC users are interested in only a small fraction of available television programming received by
20 the DTV receiver card, there is a need for a method and system of filtering or screening out only the programming which the user may be interested in.

STATEMENT OF THE INVENTION

To this end, in a first aspect of the invention, in a computer based television
25 system, a receiver receives a transmitted signal including a television program including various audio and video clips, as well as an auxiliary signal or information set, indicative of the content of the television program. A user profile is applied or matched against the auxiliary signal, to identify any television program segment of interest. Upon reception of interesting television content, the user can be alerted or the material saved. Following an
30 input from the user, the saved content is then played on a video monitor and sound speakers.

In a second aspect of the invention, the auxiliary signal includes program descriptive information in the form of words or numbers in text which are compared against key words or other attributes in a user profile specifically prepared to identify programs of interest to the user. In another and separate aspect of the invention, a

5 television broadcast system includes a program source and a descriptive data source linked to a transmitter. The descriptive data source provides information descriptive of the program. The descriptive data may be generated using interpretative software, or it can be prepared by television station personnel via a PC in real time. Also, it is often available as part of the television production process in the form of a script, cue sheets, schedules,
10 news information systems or other records.

The transmitter transmits a signal including both the program and descriptive data, via terrestrial broadcasting, satellite, or cable transmission. A PC has a receiver for receiving the transmission, preferably a DTV receiver board. A user profile for the PC user is stored in memory. The receiver receives and decodes the program and descriptive
15 data transmission, which is then temporarily stored in data storage. A microprocessor applies the user profile to the descriptive data, and identifies any matches between user profile elements and descriptive data elements. Consequently, television programs of interest to the PC user, based on the user's user profile, are flagged for viewing by the user. The remaining programming received and determined to be not of interest is erased
20 or overwritten in the data storage, as additional transmissions are received.

The descriptive information about the program content may also be delivered over the Internet. To the extent this is used, there will be an Internet connected server which provides the metadata to the PC. Similar filtering and playing of the results will occur although the PC will have to retain video in a buffer to accommodate possible
25 delays in internet services.

Other and further objects and advantages will appear hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein the same reference number denotes the same element, throughout the several views:

Fig. 1 is a schematic diagram of television system according to one aspect of the invention;

Fig. 2 is a more detailed schematic illustration of the system shown in Fig. 1;

Fig. 3 is a schematic illustration of an alternative television system using satellite or cable transmission;

Fig. 4 is a flow diagram illustrating software operation in the PCs shown in Figs. 1-3; and

Fig. 5 is a flow chart showing a method of operation of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning now in detail to the drawings, as shown in Fig. 1, a TV system 10 includes a TV station 12 and a home station 14. A TV signal 16 is transmitted from the TV station 12 to the home station 14.

At the TV station 12, a program source 20 is connected to a transmitter 28. The program source 20 may be a television studio, a remote live camera, or other program content source, e.g., video, motion picture, etc. A descriptive data source 30 is also linked to the transmitter 28. The descriptive data source may be PC operated by TV station personnel, to provide descriptive information 67 which is synchronized in time with the video/audio program 21 generated by the program source 20. The program 21 and descriptive data 67 are transmitted to the home station 14 via an antenna 36. The transmission is received at a home PC 50 having an antenna 54. The home PC 50 may be linked to a television 64 and a decoder box 68. Additional devices, such as a home server 70 TiVio etc. may be linked to the decoder box 68.

As shown in greater detail in Fig. 2, the descriptive data source 30 in the TV station 12 may include an interpretative processor 32, which uses interpretative software to automatically generate descriptive data 67 about the program 21. The descriptive data source 30 may also retrieve descriptive data 67 from data storage 34, e.g., for regularly scheduled programs having previously prepared descriptive data.

The TV station of Figs. 1 and 2 is shown as a digital TV station. The transmitter 28 includes an encoder 22 to compress the digital video stream received from the program source 20. A data inserter 24 in the transmitter 28 inserts the descriptive data 67 from the descriptive data source 30. A modulator 26 in the transmitter 28 modulates the compressed program and descriptive data signals, which are then broadcast from the antenna 36.

Referring still to Figs. 1 and 2, the antenna 54 at the home station 14, in the preferred embodiment, is connected to a DTV receiver board or card 52. The home PC 50 includes a microprocessor 58 and memory 60 linked to the DTV receiver board 52, to data storage 56, and preferably also to a modem 66. The home PC 50 is connected to a monitor 62. The modem 66 may be connected to the Internet 40 via a telephone line 38 and to a server, 40a. An analog television set 64 may be connected directly to the DTV receiver card 52, for direct real time viewing.

Figs. 1 and 2 illustrate an embodiment using terrestrial broadcasting. Fig. 3 illustrates a similar embodiment using satellite or cable transmission. As shown in Fig. 3, in a satellite embodiment, a satellite transmitter 102 at the TV station 12 transmits to a satellite 104 in space, which in turn transmits to a receiver dish 106 linked to the home PC 50. In a cable transmission embodiment, a cable 110 connects the transmitter to the home PC 50. In both the satellite and cable embodiments, the design and operation is the same as described above in connection with Figs. 1 and 2, except for the mode of transmission.

Referring to Figs. 1 and 2, in use, programming 21 from the program source 20 is encoded in the encoder 22. Descriptive information 67, e.g., text describing the program, is created at the descriptive information source 30. A broadcast signal including the encoded program 21 and descriptive information 67 is transmitted from the antenna 36.

Referring now to Figs. 2, 4 and 5, at the home station 14, the transmitted signal (preferably DTV) is received by the PC antenna 54 and DTV receiver board 52. A direct analog output 65 from the DTV receiver card 52, to a separate analog TV set 64, allows the TV set to display digital television (with the home PC 50 then acting purely as a decoding box).

Referring to Figs. 2, 4 and 5, with PC operation, the DTV signal is received and decoded by the DTV receiver card 52. The descriptive or auxiliary data 67 (initially provided by the descriptive data source 30 at the TV station 12) is then read by the PC 50,

specifically via the microprocessor 58 and memory 60. The decompressed video is temporarily indexed and stored in the data storage 56. The microprocessor 58 retrieves a user profile 63 from the memory 60 and applies it or compares it to the descriptive data 67.

5 The descriptive data 67 can be text segments describing the program 21; a string of key words relating to the program 21, the closed caption text associated with the program 21, or in a non-text format consistent with use of a user profile in the PC 50. Similarly, the user profile can be created as a list of topics (e.g., world news; financial news; political news; local news; comedy; arts and entertainment; movies; etc.) so long as the output from
10 the descriptive information source 30 is consistent with such categories. Alternatively, the user profile 63 can be created using key words having a high probability of identifying programs of interest to the user.

 The microprocessor 58, using the user profile 63 stored in the memory 60 identifies programs, i.e., clips or television elements of interest by identifying matches
15 between parameters of the user profile 63 and the descriptive information 67. Program clips 21 identified as being of interest are then stored on a hard drive 56 or other long term storage, or optionally are displayed. The microprocessor 58 generates a play list of the stored programs of interest, and the play list is displayed on the monitor 62. The user then selects the program of interest which the user desires to view (the selection made via a
20 mouse, keyboard, or other input device). The selected program is then read from the hard drive 56 and displayed on the monitor 62, with the accompanying sound played on the PC sound speakers 71. The programming or clips determined to not be of interest is not stored long term, and is purged or overwritten by subsequently received programming. A clip or television element is a segment of audio and video typically on a single topic, and
25 typically relatively short, e.g., from a few seconds to a few minutes long.

 The user profile 63 allows the users to personalize their preferences for content, and then filters the relevant televised clips within a program 21. As shown in Figs. 1 and 2, no cable, satellite, or internet connection is needed. However, these media may be used in place of the broadcast signal.

30 The home PC 50 filters and stores received DTV programming on a clip by clip basis, not necessarily entire programs. The PC presents the programming of interest as a

custom video magazine, i.e., with a back to back series of items, played on demand with VCR-like video controls.

5 The PC 50 has a graphical user interface 73 which includes screens and commands to create and revise the user profile, select videos, play video, or delete video. The screens may be interactive and integrated with an internet back channel 38, 40 for e-commerce purposes. A server 40a may be used to provide descriptive data over the Internet.

10 The descriptive information 67 is incorporated after the program signal 21 is compressed or encoded, but before modulation. Additional content, such as web pages, or any windows documents, could also be added into the transmitted signal using known techniques.

Since each TV station segment may be of interest, all segments must be stored temporarily until the filtering software decides whether to save it.

15 The graphical user interface 73 displays the status of received material and provides the user with controls to play the stored material. Full or partial screen live display of incoming video, or picture in picture display, may also be used.

CLAIMS

1. A method for operating a television system, comprising the steps of:
generating a television signal;
generating an auxiliary signal descriptive of the content of the television
5 signal.
transmitting the television signal with the auxiliary signal;
receiving the television signal and auxiliary signal at a computer;
temporarily storing the television signal;
applying a user profile to the auxiliary signal to determine whether the
10 television signal contains a television element of interest; and
displaying a video image or audio track of the television element of
interest, upon an instruction by a computer user.
2. The method of claim 1 further comprising the step of dividing the received
15 television program into discrete audio/video clips, and then applying the user profile
sequentially to the clips.
3. The method of claim 1 wherein the television program element of interest
is displayed as still photos and text.
20
4. The method of claim 1 further comprising the step of having the computer
user create the user profile.
5. The method of claim 1 wherein a television program signal of interest is
25 identified by matching key text words in the user profile with text words in the auxiliary
signal.
6. The method of claim 1 wherein the television program and auxiliary signals
are transmitted via over-the-air terrestrial transmission, via cable, or via satellite.
30
7. The method of claim 1 wherein the auxiliary signal is generated at a
television station using a computer.

8. The method of claim 1 further comprising the step of automatically generating the auxiliary signal via interpretative software.

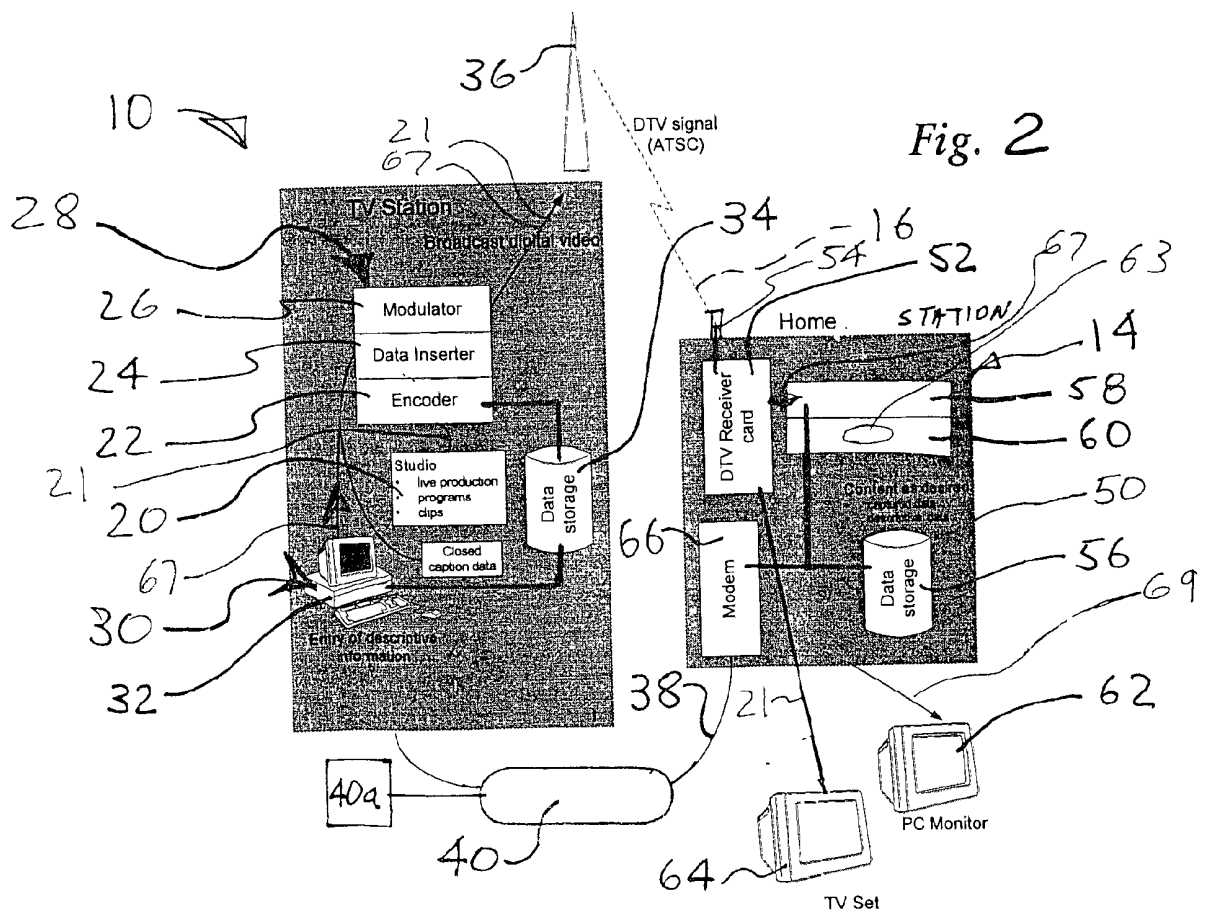
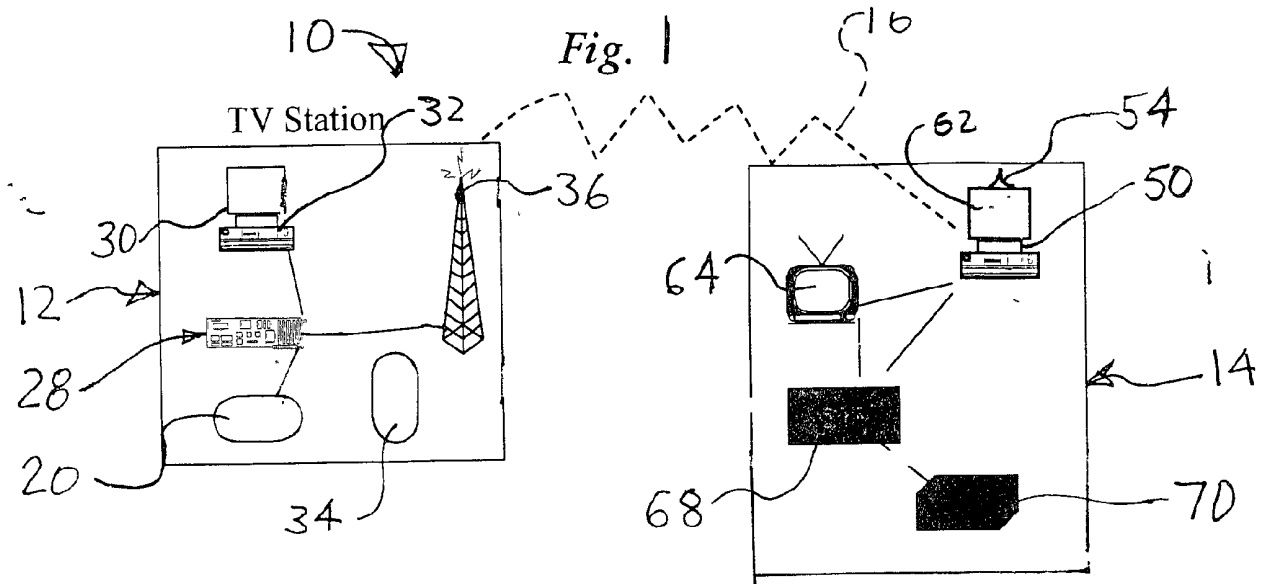
5 9. The method of claim 1 wherein the auxiliary signal comprises closed captioning.

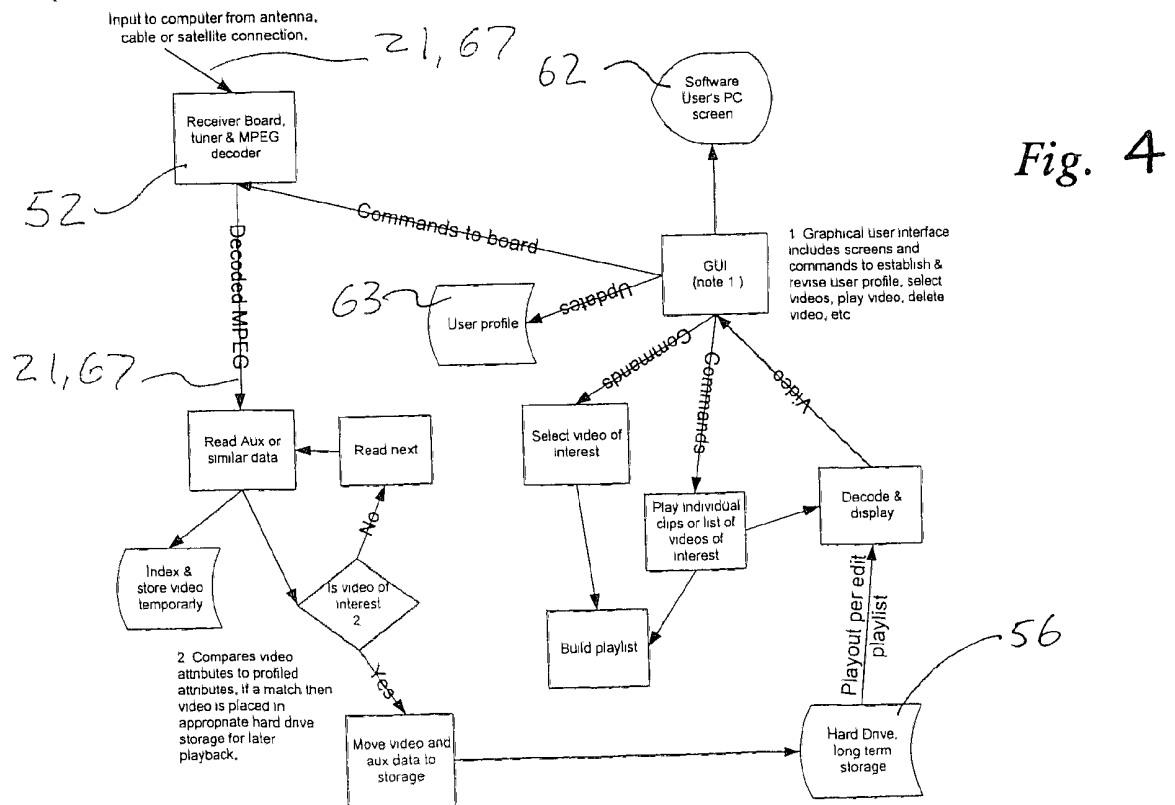
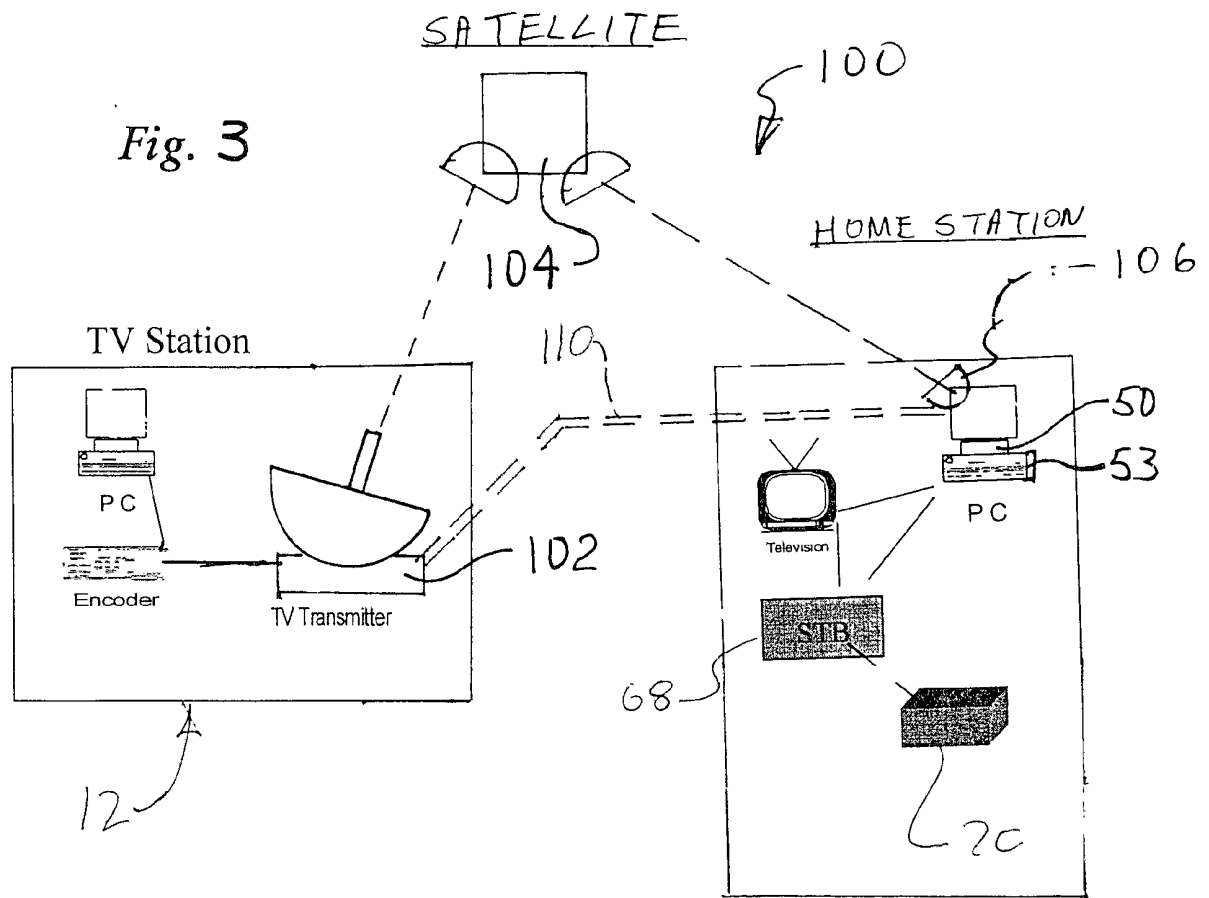
10 10. The method of claim 1 further comprising the step of storing the television element of interest in a memory and creating an audio or video alert that the television element has been stored.

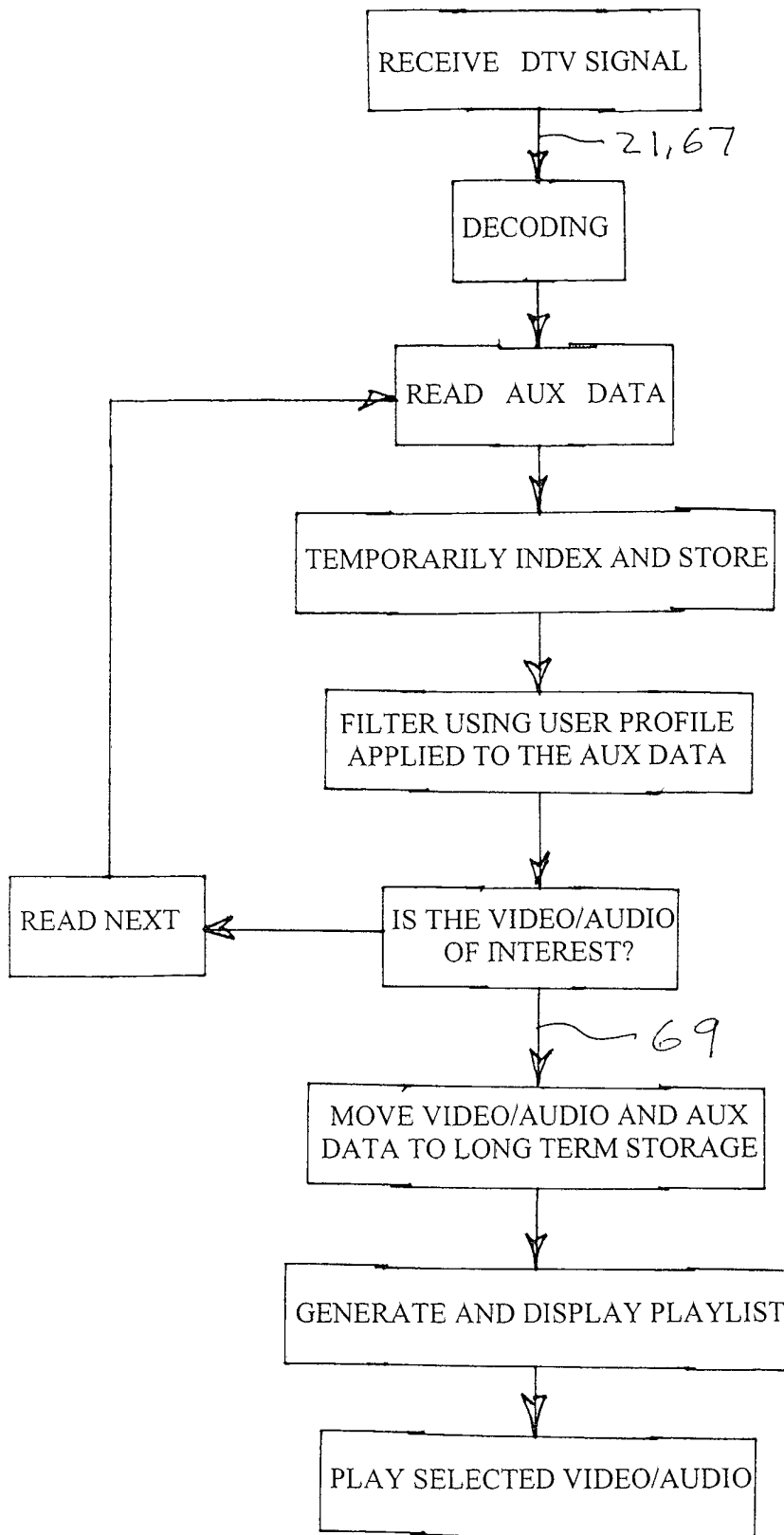
11. A television system, comprising:
a transmitter;
a television program source linked to the transmitter;
15 a descriptive data source linked to the transmitter;
a computer having:
a memory having a user profile; and
a processor for applying the user profile to the descriptive data source and for identifying descriptive data matching the user profile.

20

12. A home computer comprising:
a digital TV receiver;
a memory linked to the digital TV receiver, the memory storing a preselected profile user;
25 a processor linked to the digital TV receiver and to the memory; and
means for using the user profile to find TV programming received via the digital TV receiver, that is of interest to a user.





*Fig. 5*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/12505

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04N 5/445

US CL : 725/32, 40, 41, 46, 51, 133; 348/563

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 725/32, 40, 41, 46, 51, 133; 348/563.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
None

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,028,644 A (MAEDA et al) 22 February 2000, col. 2, line 65 to col. 5, line 20.	1-12
X	US 6,031,578 A (MAEDA et al.) 29 February 2000, see col. 2, line 64 to col. 5, line 20.	1-12
X	US 6,018,371 A (MAEDA et al.) 25 January 2000, see col. 2, line 61 to col. 5, line 18.	1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Z" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

26 NOVEMBER 2001

Date of mailing of the international search report

25 FEB 2002

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INTERNATIONAL SEARCH REPORT

Internat application No.
PCT/US01/12505

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

EAST.

Search terms: digital TV/television, PC or computer, auxiliary signal, and program content.