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IPR2026-000213 - Samsung
Ex. 1039 - Page 1

Correction by the EPO of errors in debit instructions filed by eOLF
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

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Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number	05703078.5
Applicant's or representative's reference	01110EP HG

	Description of document	Original file name	Assigned file name
1	Reply to examination report	01110EP HG response 24-05-2012.pdf	EXRE3-1.pdf
2	Amended description with annotations	01110EP amended description 24-05-2012 marked up.pdf	DESC-HWA-1.pdf
3	Amended description (clean copy)	01110EP Amended description 24-05-2012 clear.pdf	DESC-1.pdf
4	Amended claims (clean copy)	01110EP Amended Claims 24-05-2012 clear.pdf	CLMS-1.pdf

Signatures

Place:	**Budapest**
Date:	**24 May 2012**
Signed by:	**/HARANGOZÓ Gábor/**
Capacity:	**(Representative)**

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Date:	Budapest, May 24, 2012
Our ref.:	01110EP-1786X HG/NZ
Re.:	European Patent Application No. 05703078.5 corr. to PCT/IL2005/000035
Applicant:	TVNGO LTD.
Title:	Method and apparatus for facilitating toggling between Internet and TV Broadcasts

Dear Sirs,

This is in response to the Communication pursuant to Article 94(3) EPC dated November 15, 2011. The content of the examination report has been carefully studied and responded to herewith as follows.

I. Amendments to the claims

The claim amendments are based on the set of claim currently on file (as amended under Art 34 PCT).

Claim 1 has been amended as follows:

1. A method for generating at a user's premises an overlay using video output (24) consisting of a TV broadcast signal constituting a first data and overlay display information constituting a second data (*Feature 1*), the method comprising:

(a) providing a combiner unit (23) at the user's premises (*Feature 2*), wherein:

the combiner unit (23) is connected to said video output (24) at the user's premises (*Feature 3*), and

the combiner unit (23) is also connected to an Internet data source providing said overlay display information over the Internet (15), (*Feature 4*)

characterized in that:

said TV broadcast signal and overlay display information originate from unrelated sources (*Feature 5*) and are transmitted to the user's premises by different resources as mutually distinct and independent first and second inputs (21, 22), (*Feature 6*), and wherein

said overlay display information includes at least:

a Web link indicating a website where an internet content that is associated with said overlay display information is stored (*Feature 7*),

an icon and/or textual data indicative of the content associated with said display information (*Feature 8*), and

an overlay trigger criterion (*Feature 9*); and

(b) processing at the user's premises said overlay display information and generating at the user's premises a corresponding overlay only if said criterion related to overlay trigger is met (*Feature 10*), wherein generating an overlay includes:

generating at the user's premises a first display screen including at least a first portion corresponding to said TV broadcast signals and a second portion overlaid over said first portion and corresponding at least to said icon and/or textual data (*Feature 11*), and

associating the Web link with said second portion of the first display screen thereby allowing a user to cause the combiner unit (23) to retrieve said content, generate a second video display screen including at least a portion which corresponds to said content, and providing the second display screen as output. (*Feature 12*).

References are now made to the application as originally filed (published as WO 2006/075313 A1), where the above identified features of amended Claim 1 can be found.

Features 1 and 3 is described with reference to Figure 5 in the paragraph from starting on page 9, line 27 and ending up at page 10, line 8.
Feature 2 is disclosed on page 6, lines 18 to 20, where it is said that „the subscriber is able to program the TV-Internet Integration Box 16 in much the same way that a video cassette recorder is programmed", meaning that the combiner unit, which is comprised in the TV-Internet Integration Box 16 (see Figure 5), is placed at the user's premises.

Features 3 and 4 can be found on page 5, in lines 13 to 16.

Feature 5 is clearly shown in Figure 1, which presents that the TV broadcast signal is received by the TV-Internet Integration Box 16 comprising the combiner unit 23 from a cable TV box 11, while the internet content is received from the Internet 15 through independent connections from unrelated sources.

Feature 6 is based on Feature 5 and further supported by Figure 5, wherein the combiner unit 23 has independent first and second inputs 21 and 23 for the TV broadcast signal and the IP data, respectively.

Feature 7 is disclosed with reference to Figure 4 (page 7, line 32 to page 8, line 2), saying that „the advertiser designs an advertisement and sends it together with a request to a web site link via the Internet or off-line as required". This feature is also supported in lines 20-21 on page 11, mentioning that „The second data also specifies the web site where the IP content is located."

Feature 8 is disclosed in the description of Figure 3 from line 30 of page 6 to line 2 of page 7, saying that „the matched information may be an icon that indicates to the subscriber that an Internet movie is currently being broadcast; or it may be an advertisement or information related to the TV program being broadcast".

Feature 9 is disclosed in the description of Figure 3, in lines 27 to 30 on page 6, saying that „Upon detecting a matching event, corresponding to received IP content that is of interest to the subscriber, the TV-Internet Integration Box 16 overlays the matched IP content with the current broadcast and displays the new integrated video on the subscriber's TV set 17".

Feature 10 can be read from the text of lines 8 to 10 on page 6, that is „the web server 14 monitors events, which are triggered in known manner causing the web server 14 to extract from the database 19 pre-stored IP content for streaming over the Internet 15 to the TV-Internet Integration Box 16".

Feature 11 is disclosed in lines 21 to 22 on page 7 („The video content of the TV broadcast is displayed in one window and the IP content in another window.") and lines 15 to 16 on page 6 („such as icons and/or textual data, are to be displayed together with the TV broadcast data").

Feature 12 is disclosed in connection with Figure 7b, in which a small window 45 (referred to as the secondary window) is contained within the primary window 41 for displaying IP content (see also lines 8 to 10 on page 11).

Claim 2 is amended by replacing the term „second data" with the term „overlay display information". This amendment is in line with the wording of currently amended claim 1 and made for clarity purpose.

Claim 3 is amended by replacing the second method step with the step of „responsive to said command, resizing said first portion and/or said second portion of said first display screen"

The new feature in claim 3 is disclosed in lines 7 to 8 on page 8, saying that „it may be necessary to reduce and resize any textual information".

Claim 4 is amended by changing the term „digital data communications network" to „Internet" in line with the description and the figures.

Claim 5 is amended as follows:

> 5. The method according to any one of the preceding claims, wherein the overlay display information comprises data representative of one or more second images and for each of said one or more second images said overlay display information comprises respective web site addresses where IP content associated with the respective second image is stored, and wherein said generating an overlay further includes within said first display said one or more second images.

The above features of claim 5 are disclosed in lines 20-10 on page 11 („The second data also specifies the web site where the IP content is located") and in Figure 7a and 7b, in which icons 42, 43, 44 pointing to different IP contents are displayed.

Claim 6 is amended as follows:

> 6. The method according to claim 5, further including: periodically accessing a web server (14) for downloading said second data; extracting from the second data the second images and the respective web site corresponding to each of said second images; retrieving and storing digital content from said internet content; and
> if the overlay trigger criterion is met and a user command that is associated with an image from amongst said one or more second images is identified, displaying the respective image from amongst the second images, accessing the respective web site associated with the displayed image and extracting and buffering content from the internet (15).

The basis of the above amendment can be found in the description of Figure 8 in lines 15 to 25 on page 12.

Claim 7 is amended in line with claim 2.

Claim 8 is amended by replacing the term „program details image" with „overlay display information", the term „TV subscriber" with „user" in line with the description. The term „broadcast" is replaced with „displayed" since the icon is a visual component displayed on the TV screen and not a signal to be broadcast.

Claim 9 is amended to change the term „remote control" to „remote control unit (30)", made again for clarity purpose.

Claim 10 is amended by replacing the term „image" with „overlay display information" in line with amended claim 1, and the reference number 30 is added to the control unit.

Claim 11 is amended according to claim 1. The support for the amendments of claim 11 is the same as referred above with respect to claim 1.

Claim 12 is amended in the same way as claim 7.

Claim 13 is amended to bring it into conformity with amended claim 3.

Claim 14 is amended as follows:

> 14. The TV-Internet Integration Box according to any one of claims 11 to 13, wherein the overlay display information comprises data representative of one or more second images, and for each of said one or more second images said overlay display information comprises respective web site addresses where IP content associated with the respective second image is stored, and wherein the combiner unit (23) is configured to:
>
> periodically access a web server (14) for downloading said overlay display information;
>
> extract from the overlay display information said one or more second images and the respective web sites corresponding to each of said second images;
>
> retrieve and store internet content from said web sites; and
>
> if the overlay trigger criterion is met, and a user command that is associated with an image from amongst said one or more second images is identified, display the respective image from amongst the second images, access the respective web site associated with the displayed image and extract and buffer content from the website.

Amended claim 14 includes the features of amended claims 5 and 6.

Amended claim 15 includes the features of current claim 16, and further amended by replacing the term „program details image" with „overlay display information", the term „TV subscriber" with „user" and the term „broadcast" with „displayed" (see comments on claim 8 above).

Amended claim 16 recites claims 11 to 15 and includes the feature of current claim 17.
The basis of the amendments to claim 16 can be found in lines 8 to 10 on page 7 („buttons on the remote control unit may be color-coded and the icon may be colored so as to indicate to the subscriber which color-coded button to press for selection of the corresponding IP content"),

meaning that color-coded icons and buttons may be used in any embodiment of the TV-Internet Integration Box.

Claim 17 is amended as follows:

> 17. The TV-Internet Integration Box according to any one of claims 11 to 15, wherein said overlay trigger criterion includes at least one of the following: a timing information, data specifying one or more TV subscriber channels, a user command information.

The above features can be found in lines 5 to 7 on page 6 („an IP content provider interfaces with the web server for creating IP content and associating therewith calendar and program data indicating dates, times and channels in respect of which the IP content is to be streamed to the customer premises") and in lines 23 to 26 on page 10 („The user interface 32 is coupled to an encoder 33 which is responsive to a pressed key or key combination for producing a corresponding IR signal that is transmitted by an IR transmitter 34 to the TV-Internet Integration Box 16 for receipt by the IR receiver 28 thereof.").

Claim 18 is amended in line with amended claim 17 as follows:

> 18. The method according to claim 1, wherein said overlay trigger criterion includes at least one of the following: a timing information, data specifying one or more TV subscriber channels, a user command information.

We note that the amended independent claims substantially correspond to the independent claims of the US Patent No. 8,132,220 based on the same international patent application No. PCT/IL2005/000035.

II. Novelty and inventive step

According to the Examination Report, document US 2001/003212 A1 (referred to as D2) has been considered to be the closest prior art with respect to the invention as defined in claims 1 and 11. Concerning the inventions defined by Claims 1 and 11, lack of novelty has been objected in view of D2, whereas lack of inventive step has been objected in view of document US 2002/056129 A1 (referred to as D3).

The technology described in documents D2 and D3 (referred to as the closet prior art documents in the Examination report) is based on a mixture of data, i.e. A/V Data and Ancillary information that are related to the broadcaster in various ways.

The technological differences between the present invention and the solutions of D2 and D3 can be summarized as follows:

1. Transmission paths

In the present invention, each content source reach the user in an entirely unrelated manner. There is no connection or relation between the two data sources and they technically operate independently. The overlay data is not part of the broadcaster content, neither it is generated through or in connection with its facilities.

In D2 and D3, the two content sources are related and dependent on the broadcaster (or content creator) (See par. 0013).

2. Related sources

In D2, the second source shows connections of transport operator 14 (or content creator) and server 18 via link 20 and medium 22 to the user (see par. 0016).
In FIG. 1 of D3, the trigger signal (109) and the video signal (105) are broadcast from the broadcaster source. That is the reason why the second stream of data (overlay) can be synchronized with the first data (TV broadcasting) thus consisting one controlled system with two related and dependant sources for data transmission.

3. Different standards

D2 is based on ATVEF standard (see par. 0019 to 0021) or VBI, and both have been drafted by broadcasters union. ATVEF standard also transmits data over IP using IP multicast. The present invention is not based on ATVEF standard, but uses Internet protocols TCP/IP.

4. Synchronization

In the ATVEF standard applied in D2, one of the three components is the trigger which synchronizes the enhancement data with the TV transmission (see par. 0021). However, the present invention does not have synchronization factor with TV content transmission.

5. Announcement component

In D2, it is described how the announcement component being transmitted with TV content (see par. 0022).
In the present invention, the second data (i.e. Internet content) is not at all related or transmitted through broadcast.

6. Alternative to broadcast

The present invention, the second data is an alternative viewing source to the TV broadcasting on TV screen. In D2, enhancement data is associated with TV broadcasting by adding and/or completing.

7. Bandwidth

D2 concerns about bandwidth of transport medium 22 and suggests extra flexibility by using also link 20 to share A/V workload (see par. 0023).
In contrast, the present invention is not concerned at TV broadcast bandwidth, it does not interfere with that at all, but receives the TV broadcast content passively at the user premises as it is being transmitted by the broadcaster, and only then overlay the second data.

With regard to independent claims 1 and 11, D2 fails to disclose or reasonably suggest the invention taken as a whole with respect to a combiner unit at the user premises separate from TV broadcast signal (first data) that receives video and overlay display information (second data, referred to as Ancillary information n D2) from mutually distinct, unrelated sources and inputs, wherein the unrelated sources are a video source and the internet, and wherein the overlay display information comprise a web link indicating a website where content that is associated with the overlay display information is stored, an image indicative of the content associated with the overlay display information, and overlay trigger criterion.

Document D2 discloses receiving both video and overlay display information from the **same source** (see D2, paragraph 0013, "*The content creator 12 originates enhancement data (or other type of ancillary information) and television content (or other type of content including audio and/or video data) to be transmitted by the transport operator system 14*.") and by using **different technology** (see D2, paragraph 0019, "*One standard for describing transmission of enhancement data with television content is the ATVEF specification, with one version described in ATVEF Specification, Draft Version 1.1r26, dated Feb. 2, 1999. Enhancement data may be transmitted in a number of different ways from the transport operator system 14 to the receivers 16, depending on the type of transport medium 22. For example, with an analog transport medium such as the National Television System Committee (NTSC) Standard of the Electronics Industries Association, portions of the enhancement data may be sent in the vertical blanking interval (VBI) of the NTSC transmission. A description of NTSC may be found in the book, "Video Demystified: A Handbook For the Digital Engineer" by Keith Jack, published by HighText Publications (2d Ed. 1996). Other types of transport media (analog or digital) may provide different mechanisms of communicating the enhancement data*.").

Consequently, both documents D2 and D3 fail to disclose that the source of the video content and the overlay display information are unrelated and are received via mutually distinct and independent inputs, therefore the present invention according to claims 1 and 11 is novel and inventive in view of D2 and D3.

Accordingly, the embodiments of the present invention specified by the dependent claims are also novel and inventive in view of the cited prior art documents D1 to D4.

III. Amendments to the description

The description has been amended by adding a short introduction of the prior art documents cited in the Examination report as D1 to D4. A brief discussion of these documents has also been added to the section “Background of the invention”.
Some additional minor clerical errors have also been corrected in the description currently on file, including:

- correction of the figure number of “7d” to “7a” in line 10 on page 11 of the original description, and
- correction of the reference number of the memory from 25 to 26 in lines 20 and 27 on original page 6.

The above amendments and corrections do not contain subject-matter which extends beyond the content of the application as originally filed.

* * *

In view of the above amendments to the claims and the description, as well as our foregoing comments and arguments, we respectfully request your favourable reconsideration of this matter and the allowance of patent for the present invention.

Should there be still unsettled objections in relation to the present application, the Examining Division is respectfully requested to issue a written communication or to contact the undersigned

representative by phone. In case the Examining Division intends to reject the present patent application, as a precautionary measure, oral proceedings are respectfully requested.

Very truly yours,

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Patent & Law Office LLC



Gábor HARANGOZÓ
Patent Attorney

Encl.:
amended description – marked-up version
amended description – clear version
amended claims – clear version

Method and apparatus for facilitating toggling between Internet and TV broadcasts

FIELD OF THE INVENTION

This invention relates to the broadcast of audio/video content over the TV infrastructure and Internet.

BACKGROUND OF THE INVENTION

With the proliferation of cable TV and the high bandwidth currently available for the Internet, which promises to increase even more in the near future, Internet TV is fast becoming a viable alternative to regular and cable TV broadcast channels. Moreover, Internet TV is not subject to the government licensing laws required by cable and broadcast TV channels and thus offers programs that may not be obtainable using regular and cable TV broadcast channels.

It is not uncommon for Internet broadcasters to offer near DVD-quality movies that can be viewed either using video streaming or downloaded to the hard disk of a subscriber's computer for viewing "off-line". The video quality of such movies is vastly superior to that obtainable on a regular TV set, owing to the high resolution associated with computer displays that cannot presently be matched by TV screens. However, this is not particularly troublesome where only pictures are displayed; but it becomes a problem when textual information is displayed that is formatted for high resolution computer monitors since the text is then barely legible when displayed on lower resolution TV screens. Thus, if a regular TV set is used to display Internet content that is rich in text, the resulting display quality is poor.

It would therefore be a significant benefit to users of low resolution displays such as TV screens, to be able to watch regular and cable TV broadcasts and to integrate with Internet content on demand. In particular, it would be desirable to provide such a user with a visual and legible indication when viewing a regular or TV broadcast of available Internet movies or other programs and allow him to use the displayed indication to integrate with a desired Internet broadcast.

These requirements have been only partially addressed in the art. WO 00/08855 to United Video Properties, Inc. and entitled *"A system and method for synchronizing television-related product content and internet-delivered information"* describes a screen generator that merges program guide data with a TV image and superimposes an Interactive TV Guide on the regular TV image.

US 2002/0093594 (Kikinis) entitled *"Method and system for identifying addressing data within a television presentation"* illustrates in Fig. 5 the common connection of TV and Internet to a set-top box.

US 6,606,746 to OpenTV, Inc. entitled *"Interactive television system and method for displaying a graphical user interface using insert pictures"* discloses interactive television having a compressed background picture and one or more compressed insert pictures commonly connected to a TV-Internet Integration box. The compressed insert pictures represent items of a GUI. The local system i.e. computer "pastes" the insert pictures into the background image.

US 6,130,898 to Bell Atlantic Network Services, Inc., entitled *"Simulcasting digital video programs for broadcast and interactive services"* teaches an interactive TV system where TV broadcast data is merged with Internet data. To this end, public wireless packet data network is combined with a broadband digital broadcast network at a plurality of transmitter sites. Customer premises receiving systems include a receiving antenna and one or more digital entertainment terminals. The terminal includes a channel selector and digital receiver for capturing a digital transport stream from a selected channel. A processor converts selected program information from the transport stream for presentation, e.g. via a television set. The terminal also includes a CPU controlling the operation of the channel selector and the processor in response to user inputs.

US 2002/0088004 (corresponding to WO0219689 published Mar. 7, 2002) to Sony Electronics Inc. describes a system and method for interactive television (ITV) includes presenting both TV channels and "virtual channels" on an ITV. A virtual channel can be a Web page stored in memory of the ITV (or remote therefrom) and accessed by a microprocessor in the ITV when a user selects the virtual channel number using a conventional TV remote control. The particular Web page can be established based on consumer data, such as demographic data supplied by the consumer or consumer responses to prompts displayed along with a channel. The Web page associated with the virtual channel can be updated or changed by sending data to the ITV through the VBI of a TV signal or via the Internet, through a modem on the ITV. Video TV broadcast data and content conveyed via the Internet are fed to separate inputs of a subscriber's TV set, thus requiring the TV set to have a digital data input, as well as the facility to combine both signals to form a composite signal.

US 2004/0107437 (Herrington *et al.)* published June 3, 2004 discloses systems and methods for providing enhanced advertising and merchandising opportunities. Advertisements may be provided for passive programming such as television programs, commercials, pay-per-view programs, passive video products, or other suitable passive programming. Interactive advertisements may be provided in interactive applications such as interactive television program guides, web browsers, home shopping applications, operating systems, or other suitable interactive applications. It appears that composite video data is prepared off-line by what is referred to as a main facility and then conveyed to a subscriber's TV set.

None of these references appears to disclose the ability to merge broadcast TV signals with IP packet data at a customer site, specifically in such a manner that a conventional TV set is able to display Internet program selection data while viewing a TV broadcast program and to use the selected data to select an Internet channel, such as a movie, for display on the TV set instead of the TV broadcast program.

WO 02/19689 A (Sony Electronics Inc.) discloses a system and method for interactive television (ITV) for presenting both TV channels and "virtual channels" on an ITV. A virtual channel can be a Web page stored in memory of the ITV (or remote therefrom) and accessed by a microprocessor in the ITV when a user selects the virtual channel number using a conventional TV remote control. The particular Web page can be established based on consumer data or consumer responses to prompts displayed along with a channel. The Web page associated with the virtual channel can be updated or changed by sending data to the ITV through the VBI of a TV signal or via the Internet, through a modem on the ITV.

US 2001/0003212 discloses a system that communicates video information including television content associated with a plurality of channels and ancillary information. Information may be transmitted with the ancillary information that is indicative of the type of content included in the ancillary information.

US 2002/0056129 discloses an interactive television trigger having a time attribute value that indicates a future time when the trigger is to be executed. In situations where the trigger cannot be sent to the receiver unit at the desired time of trigger execution (for example, due to limited available bandwidth of a communication channel to the receiver unit), the trigger is sent prior to the future time. The receiver unit then executes the trigger on the receiver unit at the future time as indicated by the time attribute.

The public standard ATVEF (Advanced Television Enhancement Forum) Specification describes delivery mechanisms for interactive television experiences using existing Internet technologies.

None of the above ducuments discloses that the source of the TV broadcast content and the overlay display information are unrelated and received via mutually distinct and independent inputs of a merging device at a customer site.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a TV-Internet Integration Box having the ability to merge broadcast TV signals with IP packet data at a customer site.

It is a further object that such a TV-Internet Integration Box permits a TV set connected thereto to display Internet program selection data while viewing a TV broadcast program and to use the selected data to select an Internet movie for display instead of the TV broadcast program.

These objectives are realized in accordance with the attached independent claims. Various embodiments of the present invention are specified by the dependent claims. ~~a first aspect of the invention by a method for facilitating first data broadcast over a TV subscriber channel to be displayed simultaneously together with second data conveyed via a digital data communications network from a web server to a combiner unit coupled to the TV subscriber channel, the method comprising:~~

~~receiving said first data and said second data; and~~

~~combining said first data and said second data to form a combined video signal for displaying a first image corresponding to the first data together with a second image corresponding to the second data; **characterized** by:~~

~~receiving the second data including data that is representative of:~~

~~▪ a web link indicating a website where an IP content relating to the second data is stored;~~

~~▪ a program details image to be displayed indicative of the IP content;~~

~~▪ timing information indicating when the program details image is to be displayed; and~~

~~▪ one or more TV subscriber channels on which said program details image is to be displayed;~~

~~storing the second data for off-line processing;~~

~~combining said first data and with data representative of said program details image only if the TV set is tuned to one of said TV subscriber channels during a time that conforms to the timing information embedded in the second data, and conveying said combined video signal to a video input of a TV set in a user premises for displaying a first image corresponding to the first data and having the program details image overlaid thereon within an area occupied by the first image, said program details image being configured to allow a user at said user premises to interact therewith for redirecting to the digital data communications network and displaying a program said IP content broadcast thereby in at least a portion of the TV set.~~

~~-4a-~~

~~In accordance with a second aspect of the invention there is provided a method for facilitating first data broadcast over a TV subscriber channel to be displayed simultaneously together with second data broadcast over a digital data communications network, the method comprising:~~

~~receiving said first data at a user premises for displaying a first image;~~

~~receiving said second data at the user premises according to a user profile associated with the second data, the second data including data representative of:~~

~~▪ a web link indicating a website where an IP content relating to the second data is stored;~~

~~▪ a program details image to be displayed indicative of the IP content;~~

~~▪ timing information indicating when the program details image is to be displayed; and~~

~~▪ one or more TV subscriber channels on which said program details image is to be displayed;~~

~~combining said first data with a portion of said second data to form a combined video signal only if the TV set is tuned to one of said TV subscriber channels during a time that conforms to the timing information embedded in the second data; and~~

~~conveying said combined video signal to a TV set in a user premises for displaying said first image and having the program details image overlaid thereon, said the program details image being configured to allow a user at said user premises to interact therewith for redirecting to the digital data communications network and displaying the IP content in at least a portion of the TV set.~~

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Fig. 1 is pictorial representation showing a TV-Internet Integration Box according to the invention connected to a mixed broadcast network for combining Internet and broadcast TV signals;

Fig. 2 is a flow diagram showing the principal actions carried out by the web server shown in Fig. 1;

Fig. 3 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box shown in Fig. 1;

Fig. 4 is a flow diagram showing the principal actions carried out by an IP content provider such as an advertiser for creating IP content for overlaying by the TV-Internet Integration Box with a broadcast TV signal;

Fig. 5 is a block diagram showing the functionality of the TV-Internet Integration Box shown in Fig. 1;

Fig. 6 is a block diagram showing the functionality of a remote control unit for interfacing with the TV-Internet Integration Box shown in Fig. 5;

Figs. 7a, 7b and 7c are pictorial representations showing a TV set during different stages of receiving and displaying combined Internet and broadcast TV signals; and

Fig. 8 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box when pre-fetching a digital broadcast signal.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Fig. 1 is pictorial representation showing a mixed broadcast network 10 having a Cable TV Box 11 coupled to a satellite 12 and a Cable TV transmitter 13 for receiving a cable TV broadcast signal (constituting first data). An Internet broadcast signal comprising IP packet data (constituting second data) is streamed from a web server 14 via the Internet 15 (constituting a digital data communications network) to a TV-Internet Integration Box 16 for display on a TV set 17 coupled thereto. The TV set 17 may be constituted by a computer having a video card and a high resolution display monitor. However, the principal benefit of the invention is obtained when a regular TV set having low resolution is used, since such a configuration has not so far been used to integrate Internet programs with conventional TV broadcasts in the manner proposed by the invention. The TV-Internet Integration Box 16 is connected to the Cable TV Box 11 for combining the broadcast TV signals received by the Cable TV Box 11 with the IP packet data broadcast via the Internet 15. Also shown is an advertiser 18 having a computer coupled to the Internet 15 for downloading advertising content to the web server 14 for storage in a database 19 and a telephone 20 coupled to the TV-Internet Integration Box 16 for feeding telephony signals to the TV-Internet Integration Box 16, which combines the received telephony signals with video data received from the Cable TV Box 11 and/or the Internet 15.

The advertiser 18 typically pays for specific time slots and for one or more specific channels during which his advertisement will be broadcast. Thus, in addition to the advertising content which is prepared and then stored on the web server 14 in known manner, the advertiser 18 also specifies when the advertisement is to be broadcast and on which TV channel or channels. By such means, a sports advertiser can request time during the interval of a football match to broadcast a commercial, while a toy advertiser would obviously prefer to broadcast a commercial during a children's TV program. Different time slots may be charged out at different rates depending on the ratings associated with the associated TV program. After selecting one or more time slots, the

advertisement content as well as the selected time slots and program data are stored in the database 19 accessed by the web server 14.

Fig. 2 is a flow diagram showing the principal actions carried out by the web server 14, which is responsive to an event timetable stored and updated in the database 19. To this end, an IP content provider interfaces with the web server for creating IP content and associating therewith calendar and program data indicating dates, times and channels in respect of which the IP content is to be streamed to the customer premises. Once this is done, the web server 14 monitors events, which are triggered in known manner causing the web server 14 to extract from the database 19 pre-stored IP content for streaming over the Internet 15 to the TV-Internet Integration Box 16, where it is processed as described below with reference to Fig. 3 of the drawings.

Fig. 3 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box 16. In accordance with one embodiment of the invention, the subscriber selects what kind of IP content he wishes to receive and in respect of which program details, such as icons and/or textual data, are to be displayed together with the TV broadcast data. For example, a subscriber may wish to block certain types of program material or may wish to receive details thereof only during limited hours, for example when the children are asleep. To this end, the subscriber is able to program the TV-Internet Integration Box 16 in much the same way that a video cassette recorder is programmed so as to store in the memory 265 a timetable indicating what type of IP data is to be displayed and when. The timetable is updated as and when required by the subscriber. The TV-Internet Integration Box 16 is adapted to check the timetable periodically and to filter out incoming IP content that is either of a type that is not required or that is broadcast during an unauthorized time window. By such means, an additional layer of authorization may be provided to that stored in the database 19 for access by the web server 14, thus allowing pre-fetching of IP content and storage in the memory 256 of the TV-Internet Integration Box 16. Upon detecting a matching event, corresponding to received IP content that is of interest to the subscriber, the TV-Internet Integration Box 16 overlays the matched IP content with the current broadcast and displays the new integrated video on the subscriber's TV set 17. For example, the matched information may be an icon that indicates to the subscriber that an Internet

movie is currently being broadcast; or it may be an advertisement or information related to the TV program being broadcast.

The subscriber can respond to the overlaid data using a remote control unit, described below with reference to Fig. 6 of the drawings, which is programmed to interact with the displayed icon or other data that is overlaid on the TV broadcast. To this end, the displayed IP content may optionally contain textual information advising the subscriber to press a particular button on the remote control unit. Alternatively, buttons on the remote control unit may be color-coded and the icon may be colored so as to indicate to the subscriber which color-coded button to press for selection of the corresponding IP content. If the subscriber responds to the overlaid data by pressing a button on the remote control unit, the TV-Internet Integration Box 16 receives the signal from the remote control unit and changes the priorities for use with the Picture-in-Picture (PIP) technique to display the TV broadcast in a reduced window and to show the other media, i.e. the IP content, in an enlarged window. The IP content can be a custom designed web page for TV, or a game or advertisement movie or any other information placed on the matched record. PIP techniques are known *per se* and allow a video or graphics image to be inserted on top of a movie clip and to be positioned and sized. An Effect In and Effect Out may be used to fade or move the inserted video to the screen. In accordance with one such technique, the bulk of the IP content e.g. corresponding to a movie may be rendered transparent so as to provide a transparent window through which an icon e.g. relating to the movie is visible. The video content of the TV broadcast is displayed in one window and the IP content in another window. Since the bulk of the IP content is transparent it will remain invisible to the subscriber, while the icon (or text) will be visible since it is opaque. On selecting the displayed icon, the attributes may simply be reversed so as to hide the icon while displaying the movie or other content. At the same time, the TV broadcast may be re-sized either to display it in a minimized window it the case that it is to be suppressed altogether, or to display it superimposed on the IP content so that both are visible at the same time in different, possibly overlapping, windows.

Fig. 4 is a flow diagram showing the principal actions carried out by an IP content provider such as an advertiser for creating IP content for overlaying by the TV-Internet Integration Box with a broadcast TV signal. Thus, the advertiser designs an

advertisement and sends it together with a request to a web site link via the Internet or off-line as required. Since the IP content is intended for display on a low resolution TV screen, any textual information that forms part of the IP content is formatted so as to be legible when displayed on lower resolution TV screens. Generally, this requires reducing the quantity of textual information to a minimum and sizing any text so that it is legible. Often, a web advertiser will wish to create an on-line advertisement based on an existing web page. In such case, it may be necessary to reduce and resize any textual information so as to comply with these requirements.

The request specifies calendar and program data as explained above, which the web site operator checks for availability and type, defining to which group of users it belongs. If the required time slots are available for the requested channels, the site operator confirms the request and forwards the request to the web control room for final confirmation. On confirming the request, a status flag of the advertisement is changed so as to indicate that the advertisement is awaiting final confirmation from the web control room. At the web control room the advertisement is checked for content by human evaluators who either approve or reject the advertisement content and, in the case of rejection, may provide reasons therefor. If the advertisement (or other IP content) is approved by the web control center, its status is set to "approved" and the web control center bills the customer and the web site operator adds the advertisement and the scheduling information to the database 19. The customer who is billed is typically the advertiser but may be any entity that is identified by a digital signature associated with the advertisement. If either of the requests for approval is rejected the status of the advertisement is set to "rejected" and the web control room informs the advertiser of the grounds for rejection, allowing the advertiser to change the request and re-send to the web site operator. Optionally, in such case the web server may be adapted to display to the advertiser the occupied timetable and suggest new timetable. Only those advertisements whose status flag indicates that they are approved by the web control room are actually available for transmission. The time slot and channel information associated with any advertisement that is not so approved remain available for other advertisements and will be shown as available to another advertiser who attempts to schedule an advertisement. Only when the advertisement is actually

approved by the web site operator and its status is updated accordingly, are the transmission time and channel locked for use by other users.

The IP packet data may optionally be associated with predefined user-profiles that are also stored in the database 19 so that the advertisement or other IP data is sent only to specific TV-Internet Integration Boxes. Such user-profiles may be configured by the advertiser or by the user. Thus, for example, the invention allows supplementary or complementary program content to be associated with a TV broadcast, while providing the facility to view the supplementary program content only to specific subscribers, according to their user-profiles.

Thus, by way of non-limiting example, the invention allows sign language to be associated with a TV broadcast for the hard of hearing. It is known to display sign language in a corner of the screen, but since this is usually done indiscriminately it also apt to disturb the majority of viewers who do not need the sign language. The invention may be used to avoid this by conveying the sign language as IP content separate from main TV broadcast and allowing subscribers to register for a "sign language" service so that only registered subscribers receive the IP content. IP content files corresponding to sign language to be associated with different TV broadcasts are created as explained above, and stored in the database 19 together with user-profile data indicating which subscribers are registered to obtain the service. The user-profile data may contain data that further refines the target audience, such as categories of TV program alongside which the sign language is to be displayed. The user-profile data may further contain geographical data or language data that allows sign language corresponding to a target language to be conveyed to specific audiences. By such means, a TV program can be accompanied by a sign language overlay that is customized to a target language depending on the location of the IP target address or the language requested by the subscriber on registering for the service.

Fig. 5 is a block diagram showing the functionality of the TV-Internet Integration Box 16 shown in Fig. 1. Thus, the TV-Internet Integration Box 16 comprises a first input 21 for receiving first data corresponding to a TV broadcast signal, typically being a cable TV signal and a second input 22 for receiving respective second data corresponding to IP packet data. The IP packet data may optionally be downloaded to specific TV-Internet Integration Boxes in accordance with predefined user-profiles

associated with IP packet data and stored in the database 19. A combiner unit 23 is coupled to the first and second inputs for combining the first data and the second data to form a combined video signal. A video output 24 is coupled to the combiner unit 23 for conveying the combined video signal to a TV set in a user premises. The TV set may be a conventional TV having a relatively low resolution screen for displaying a first image corresponding to the first data and having superimposed thereon a second image corresponding to the second data. Alternatively, it can be a computer having a video card for displaying a combined video image on a high resolution display monitor.

The combiner unit 23 is shown coupled to a processing unit 25 although in practice it may be implemented in software by the processing unit 25. A memory 26 is coupled to the processing unit 25 for storing program data, such as profiles and program timetables etc. so as to allow the processing unit 25 to filter incoming IP content according to pre-defined profiles and other selection data. The processing unit 25 is also coupled to a user interface 27 that allows the subscriber to program the TV-Internet Integration Box 16 and store the program data in the memory 26. An IR receiver 28 is adapted to receive IR commands from a remote control unit described below with reference to Fig. 6 and is coupled to a decoder 29, which decodes a received IR signal and feeds it to the processing unit 25 for further processing.

Fig. 6 is a block diagram showing the functionality of a remote control unit 30 for interfacing with the TV-Internet Integration Box 16 shown in Fig. 5. The remote control unit 30 includes a processing unit 31 coupled to a user interface 32, typically having a keypad or pushbuttons for program selection and setting as well as other functions. The user interface 32 is coupled to an encoder 33 which is responsive to a pressed key or key combination for producing a corresponding IR signal that is transmitted by an IR transmitter 34 to the TV-Internet Integration Box 16 for receipt by the IR receiver 28 thereof.

As noted above, the keys may be color coded in correspondence with prearranged colors of commonly displayed icons, so that pressing on a specific key activates the displayed icon of the same color. Alternatively, at least some of the keys may be covered with transfers depicting commonly displayed icons, whereupon the appropriate keys or button for activating each icon are easily recognized.

The keys may also be programmed so that depressing the same key more than once automatically re-sizes the windows containing the TV broadcast and the Internet broadcast. For example, Fig. 7a shows the default situation where a TV screen 40 displays a conventional TV broadcast in a window 41 that is sized to occupy the whole area of the TV screen 40 and will be referred to as the primary window. Also shown are IP icons 42, 43 and 44 each of which points to a different IP content that is streamed from a respective web site of known address. On pressing the key on the remote control unit 30 that corresponds to the icon 42, the IP content corresponding thereto is displayed within a small window 45 (referred to as the secondary window) that is contained within the primary window 41 as shown in Fig. 7~~d~~a. The icons 42, 43 and 44 remain visible so that, if desired, the selected program can be changed by pressing a different key on the remote control unit 30. On pressing a key a second time in succession, the IP content is re-sized so that its window 45 occupies substantially the whole area of the screen as shown in Fig. 7c. On pressing the key a third time in succession, the situation reverts to the default shown in Fig. 7a where the primary window 41 containing the TV broadcast occupies the whole area of the TV screen 40. Thus, each key operates as a three-way toggle that switches between three different display modes.

The second data containing display information for the icons also contains data that informs the TV-Internet Integration Box 16 on which channel or channels the associated IP content is to be streamed and at what times. The second data also specifies the web site where the IP content is located. This is summarized in the following table:

Icon image	Channel	Time	Website of IP content
ICON.GIF	2; 23	19:30; 21:30	www.AB.com/adverts/123.htm

Table I: Second data - definition

Thus, the second data depicted in Table I above shows that the icon image is contained in a file called ICON.GIF and that the IP content relating thereto is to be streamed on channels 2 and 23 at times 19:30 and 21:30, these being the start times. The end times are determined by the duration of the IP content to be streamed, which is downloaded from a web site whose name is shown in the table and is contained in the second data.

The second data is downloaded from the web server 14 whose web site address is known to the TV-Internet Integration Box 16. In accordance with one embodiment, the processing unit 25 is programmed to access the web server 14 periodically and download current program data. For example, once every 2 to 3 hours the TV-Internet Integration Box 16 may automatically access the web server 14 to download the second data corresponding current program data for the next 3 hours as formatted according to Table I. The downloaded information is stored locally in the memory 26 of the TV-Internet Integration Box 16. This allows the TV-Internet Integration Box 16 to pre-fetch IP content relating to all the currently displayed icons and to store the data relating thereto in the memory 26 thus obviating the need to access the web site of a selected icon for the purpose of downloading IP selected content. Since this carries the overhead of web access and downloading of data, which can be cumbersome particularly if there is insufficient bandwidth, pre-fetching in this manner ensures that initial IP content data will be immediately available on selection of one of the icons.

Fig. 8 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box when pre-fetching a digital broadcast signal. Thus, the TV-Internet Integration Box 16 periodically accesses the web server 14 and downloads current program data, constituting the second data. It then extracts from the current program data the image files of the current icons and stores them in the memory 26. In like manner, it extracts the web sites of the IP content corresponding to the currently displayed icons and then accesses these sites to pre-fetch the respective IP content, which it likewise stores in the memory 26. On selection of an icon, the TV-Internet Integration Box 16 opens a secondary window 45 within the primary window 41, reads from the memory 26 the pre-fetched IP content and displays it in the secondary window 45.

It will be understood that the TV-Internet Integration Box according to the invention may be at least partially implemented by a suitably programmed computer. Likewise, the invention contemplates a computer program being readable by a computer for executing the method of the invention. The invention further contemplates a machine-readable memory tangibly embodying a program of instructions executable by the machine for executing the method of the invention.

Method and apparatus for facilitating toggling between Internet and TV broadcasts

FIELD OF THE INVENTION

This invention relates to the broadcast of audio/video content over the TV infrastructure and Internet.

BACKGROUND OF THE INVENTION

With the proliferation of cable TV and the high bandwidth currently available for the Internet, which promises to increase even more in the near future, Internet TV is fast becoming a viable alternative to regular and cable TV broadcast channels. Moreover, Internet TV is not subject to the government licensing laws required by cable and broadcast TV channels and thus offers programs that may not be obtainable using regular and cable TV broadcast channels.

It is not uncommon for Internet broadcasters to offer near DVD-quality movies that can be viewed either using video streaming or downloaded to the hard disk of a subscriber's computer for viewing "off-line". The video quality of such movies is vastly superior to that obtainable on a regular TV set, owing to the high resolution associated with computer displays that cannot presently be matched by TV screens. However, this is not particularly troublesome where only pictures are displayed; but it becomes a problem when textual information is displayed that is formatted for high resolution computer monitors since the text is then barely legible when displayed on lower resolution TV screens. Thus, if a regular TV set is used to display Internet content that is rich in text, the resulting display quality is poor.

It would therefore be a significant benefit to users of low resolution displays such as TV screens, to be able to watch regular and cable TV broadcasts and to integrate with Internet content on demand. In particular, it would be desirable to provide such a user with a visual and legible indication when viewing a regular or TV broadcast of available Internet movies or other programs and allow him to use the displayed indication to integrate with a desired Internet broadcast.

These requirements have been only partially addressed in the art. WO 00/08855 to United Video Properties, Inc. and entitled *"A system and method for synchronizing television-related product content and internet-delivered information"* describes a screen generator that merges program guide data with a TV image and superimposes an Interactive TV Guide on the regular TV image.

US 2002/0093594 (Kikinis) entitled *"Method and system for identifying addressing data within a television presentation"* illustrates in Fig. 5 the common connection of TV and Internet to a set-top box.

US 6,606,746 to OpenTV, Inc. entitled *"Interactive television system and method for displaying a graphical user interface using insert pictures"* discloses interactive television having a compressed background picture and one or more compressed insert pictures commonly connected to a TV-Internet Integration box. The compressed insert pictures represent items of a GUI. The local system i.e. computer "pastes" the insert pictures into the background image.

US 6,130,898 to Bell Atlantic Network Services, Inc., entitled *"Simulcasting digital video programs for broadcast and interactive services"* teaches an interactive TV system where TV broadcast data is merged with Internet data. To this end, public wireless packet data network is combined with a broadband digital broadcast network at a plurality of transmitter sites. Customer premises receiving systems include a receiving antenna and one or more digital entertainment terminals. The terminal includes a channel selector and digital receiver for capturing a digital transport stream from a selected channel. A processor converts selected program information from the transport stream for presentation, e.g. via a television set. The terminal also includes a CPU controlling the operation of the channel selector and the processor in response to user inputs.

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US 2002/0088004 (corresponding to WO0219689 published Mar. 7, 2002) to Sony Electronics Inc. describes a system and method for interactive television (ITV) includes presenting both TV channels and "virtual channels" on an ITV. A virtual channel can be a Web page stored in memory of the ITV (or remote therefrom) and accessed by a microprocessor in the ITV when a user selects the virtual channel number using a conventional TV remote control. The particular Web page can be established based on consumer data, such as demographic data supplied by the consumer or consumer responses to prompts displayed along with a channel. The Web page associated with the virtual channel can be updated or changed by sending data to the ITV through the VBI of a TV signal or via the Internet, through a modem on the ITV. Video TV broadcast data and content conveyed via the Internet are fed to separate inputs of a subscriber's TV set, thus requiring the TV set to have a digital data input, as well as the facility to combine both signals to form a composite signal.

US 2004/0107437 (Herrington *et al.)* published June 3, 2004 discloses systems and methods for providing enhanced advertising and merchandising opportunities. Advertisements may be provided for passive programming such as television programs, commercials, pay-per-view programs, passive video products, or other suitable passive programming. Interactive advertisements may be provided in interactive applications such as interactive television program guides, web browsers, home shopping applications, operating systems, or other suitable interactive applications. It appears that composite video data is prepared off-line by what is referred to as a main facility and then conveyed to a subscriber's TV set.

None of these references appears to disclose the ability to merge broadcast TV signals with IP packet data at a customer site, specifically in such a manner that a conventional TV set is able to display Internet program selection data while viewing a TV broadcast program and to use the selected data to select an Internet channel, such as a movie, for display on the TV set instead of the TV broadcast program.

WO 02/19689 A (Sony Electronics Inc.) discloses a system and method for interactive television (ITV) for presenting both TV channels and "virtual channels" on an ITV. A virtual channel can be a Web page stored in memory of the ITV (or remote therefrom) and accessed by a microprocessor in the ITV when a user selects the virtual channel number using a conventional TV remote control. The particular Web page can be established based on consumer data or consumer responses to prompts displayed along with a channel. The Web page associated with the virtual channel can be updated

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or changed by sending data to the ITV through the VBI of a TV signal or via the Internet, through a modem on the ITV.

US 2001/0003212 discloses a system that communicates video information including television content associated with a plurality of channels and ancillary information. Information may be transmitted with the ancillary information that is indicative of the type of content included in the ancillary information.

US 2002/0056129 discloses an interactive television trigger having a time attribute value that indicates a future time when the trigger is to be executed. In situations where the trigger cannot be sent to the receiver unit at the desired time of trigger execution (for example, due to limited available bandwidth of a communication channel to the receiver unit), the trigger is sent prior to the future time. The receiver unit then executes the trigger on the receiver unit at the future time as indicated by the time attribute.

The public standard ATVEF (Advanced Television Enhancement Forum) Specification describes delivery mechanisms for interactive television experiences using existing Internet technologies.

None of the above ducuments discloses that the source of the TV broadcast content and the overlay display information are unrelated and received via mutually distinct and independent inputs of a merging device at a customer site.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a TV-Internet Integration Box having the ability to merge broadcast TV signals with IP packet data at a customer site.

It is a further object that such a TV-Internet Integration Box permits a TV set connected thereto to display Internet program selection data while viewing a TV broadcast program and to use the selected data to select an Internet movie for display instead of the TV broadcast program.

These objectives are realized in accordance with the attached independent claims. Various embodiments of the present invention are specified by the dependent claims.

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BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Fig. 1 is pictorial representation showing a TV-Internet Integration Box according to the invention connected to a mixed broadcast network for combining Internet and broadcast TV signals;

Fig. 2 is a flow diagram showing the principal actions carried out by the web server shown in Fig. 1;

Fig. 3 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box shown in Fig. 1;

Fig. 4 is a flow diagram showing the principal actions carried out by an IP content provider such as an advertiser for creating IP content for overlaying by the TV-Internet Integration Box with a broadcast TV signal;

Fig. 5 is a block diagram showing the functionality of the TV-Internet Integration Box shown in Fig. 1;

Fig. 6 is a block diagram showing the functionality of a remote control unit for interfacing with the TV-Internet Integration Box shown in Fig. 5;

Figs. 7a, 7b and 7c are pictorial representations showing a TV set during different stages of receiving and displaying combined Internet and broadcast TV signals; and

Fig. 8 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box when pre-fetching a digital broadcast signal.

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DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Fig. 1 is pictorial representation showing a mixed broadcast network 10 having a Cable TV Box 11 coupled to a satellite 12 and a Cable TV transmitter 13 for receiving a cable TV broadcast signal (constituting first data). An Internet broadcast signal comprising IP packet data (constituting second data) is streamed from a web server 14 via the Internet 15 (constituting a digital data communications network) to a TV-Internet Integration Box 16 for display on a TV set 17 coupled thereto. The TV set 17 may be constituted by a computer having a video card and a high resolution display monitor. However, the principal benefit of the invention is obtained when a regular TV set having low resolution is used, since such a configuration has not so far been used to integrate Internet programs with conventional TV broadcasts in the manner proposed by the invention. The TV-Internet Integration Box 16 is connected to the Cable TV Box 11 for combining the broadcast TV signals received by the Cable TV Box 11 with the IP packet data broadcast via the Internet 15. Also shown is an advertiser 18 having a computer coupled to the Internet 15 for downloading advertising content to the web server 14 for storage in a database 19 and a telephone 20 coupled to the TV-Internet Integration Box 16 for feeding telephony signals to the TV-Internet Integration Box 16, which combines the received telephony signals with video data received from the Cable TV Box 11 and/or the Internet 15.

The advertiser 18 typically pays for specific time slots and for one or more specific channels during which his advertisement will be broadcast. Thus, in addition to the advertising content which is prepared and then stored on the web server 14 in known manner, the advertiser 18 also specifies when the advertisement is to be broadcast and on which TV channel or channels. By such means, a sports advertiser can request time during the interval of a football match to broadcast a commercial, while a toy advertiser would obviously prefer to broadcast a commercial during a children's TV program. Different time slots may be charged out at different rates depending on the ratings associated with the associated TV program. After selecting one or more time slots, the

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advertisement content as well as the selected time slots and program data are stored in the database 19 accessed by the web server 14.

Fig. 2 is a flow diagram showing the principal actions carried out by the web server 14, which is responsive to an event timetable stored and updated in the database 19. To this end, an IP content provider interfaces with the web server for creating IP content and associating therewith calendar and program data indicating dates, times and channels in respect of which the IP content is to be streamed to the customer premises. Once this is done, the web server 14 monitors events, which are triggered in known manner causing the web server 14 to extract from the database 19 pre-stored IP content for streaming over the Internet 15 to the TV-Internet Integration Box 16, where it is processed as described below with reference to Fig. 3 of the drawings.

Fig. 3 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box 16. In accordance with one embodiment of the invention, the subscriber selects what kind of IP content he wishes to receive and in respect of which program details, such as icons and/or textual data, are to be displayed together with the TV broadcast data. For example, a subscriber may wish to block certain types of program material or may wish to receive details thereof only during limited hours, for example when the children are asleep. To this end, the subscriber is able to program the TV-Internet Integration Box 16 in much the same way that a video cassette recorder is programmed so as to store in the memory 26 a timetable indicating what type of IP data is to be displayed and when. The timetable is updated as and when required by the subscriber. The TV-Internet Integration Box 16 is adapted to check the timetable periodically and to filter out incoming IP content that is either of a type that is not required or that is broadcast during an unauthorized time window. By such means, an additional layer of authorization may be provided to that stored in the database 19 for access by the web server 14, thus allowing pre-fetching of IP content and storage in the memory 26 of the TV-Internet Integration Box 16. Upon detecting a matching event, corresponding to received IP content that is of interest to the subscriber, the TV-Internet Integration Box 16 overlays the matched IP content with the current broadcast and displays the new integrated video on the subscriber's TV set 17. For example, the matched information may be an icon that indicates to the subscriber that an Internet

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movie is currently being broadcast; or it may be an advertisement or information related to the TV program being broadcast.

The subscriber can respond to the overlaid data using a remote control unit, described below with reference to Fig. 6 of the drawings, which is programmed to interact with the displayed icon or other data that is overlaid on the TV broadcast. To this end, the displayed IP content may optionally contain textual information advising the subscriber to press a particular button on the remote control unit. Alternatively, buttons on the remote control unit may be color-coded and the icon may be colored so as to indicate to the subscriber which color-coded button to press for selection of the corresponding IP content. If the subscriber responds to the overlaid data by pressing a button on the remote control unit, the TV-Internet Integration Box 16 receives the signal from the remote control unit and changes the priorities for use with the Picture-in-Picture (PIP) technique to display the TV broadcast in a reduced window and to show the other media, i.e. the IP content, in an enlarged window. The IP content can be a custom designed web page for TV, or a game or advertisement movie or any other information placed on the matched record. PIP techniques are known *per se* and allow a video or graphics image to be inserted on top of a movie clip and to be positioned and sized. An Effect In and Effect Out may be used to fade or move the inserted video to the screen. In accordance with one such technique, the bulk of the IP content e.g. corresponding to a movie may be rendered transparent so as to provide a transparent window through which an icon e.g. relating to the movie is visible. The video content of the TV broadcast is displayed in one window and the IP content in another window. Since the bulk of the IP content is transparent it will remain invisible to the subscriber, while the icon (or text) will be visible since it is opaque. On selecting the displayed icon, the attributes may simply be reversed so as to hide the icon while displaying the movie or other content. At the same time, the TV broadcast may be re-sized either to display it in a minimized window it the case that it is to be suppressed altogether, or to display it superimposed on the IP content so that both are visible at the same time in different, possibly overlapping, windows.

Fig. 4 is a flow diagram showing the principal actions carried out by an IP content provider such as an advertiser for creating IP content for overlaying by the TV-Internet Integration Box with a broadcast TV signal. Thus, the advertiser designs an

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advertisement and sends it together with a request to a web site link via the Internet or off-line as required. Since the IP content is intended for display on a low resolution TV screen, any textual information that forms part of the IP content is formatted so as to be legible when displayed on lower resolution TV screens. Generally, this requires reducing the quantity of textual information to a minimum and sizing any text so that it is legible. Often, a web advertiser will wish to create an on-line advertisement based on an existing web page. In such case, it may be necessary to reduce and resize any textual information so as to comply with these requirements.

The request specifies calendar and program data as explained above, which the web site operator checks for availability and type, defining to which group of users it belongs. If the required time slots are available for the requested channels, the site operator confirms the request and forwards the request to the web control room for final confirmation. On confirming the request, a status flag of the advertisement is changed so as to indicate that the advertisement is awaiting final confirmation from the web control room. At the web control room the advertisement is checked for content by human evaluators who either approve or reject the advertisement content and, in the case of rejection, may provide reasons therefor. If the advertisement (or other IP content) is approved by the web control center, its status is set to "approved" and the web control center bills the customer and the web site operator adds the advertisement and the scheduling information to the database 19. The customer who is billed is typically the advertiser but may be any entity that is identified by a digital signature associated with the advertisement. If either of the requests for approval is rejected the status of the advertisement is set to "rejected" and the web control room informs the advertiser of the grounds for rejection, allowing the advertiser to change the request and re-send to the web site operator. Optionally, in such case the web server may be adapted to display to the advertiser the occupied timetable and suggest new timetable. Only those advertisements whose status flag indicates that they are approved by the web control room are actually available for transmission. The time slot and channel information associated with any advertisement that is not so approved remain available for other advertisements and will be shown as available to another advertiser who attempts to schedule an advertisement. Only when the advertisement is actually

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approved by the web site operator and its status is updated accordingly, are the transmission time and channel locked for use by other users.

The IP packet data may optionally be associated with predefined user-profiles that are also stored in the database 19 so that the advertisement or other IP data is sent only to specific TV-Internet Integration Boxes. Such user-profiles may be configured by the advertiser or by the user. Thus, for example, the invention allows supplementary or complementary program content to be associated with a TV broadcast, while providing the facility to view the supplementary program content only to specific subscribers, according to their user-profiles.

Thus, by way of non-limiting example, the invention allows sign language to be associated with a TV broadcast for the hard of hearing. It is known to display sign language in a corner of the screen, but since this is usually done indiscriminately it also apt to disturb the majority of viewers who do not need the sign language. The invention may be used to avoid this by conveying the sign language as IP content separate from main TV broadcast and allowing subscribers to register for a "sign language" service so that only registered subscribers receive the IP content. IP content files corresponding to sign language to be associated with different TV broadcasts are created as explained above, and stored in the database 19 together with user-profile data indicating which subscribers are registered to obtain the service. The user-profile data may contain data that further refines the target audience, such as categories of TV program alongside which the sign language is to be displayed. The user-profile data may further contain geographical data or language data that allows sign language corresponding to a target language to be conveyed to specific audiences. By such means, a TV program can be accompanied by a sign language overlay that is customized to a target language depending on the location of the IP target address or the language requested by the subscriber on registering for the service.

Fig. 5 is a block diagram showing the functionality of the TV-Internet Integration Box 16 shown in Fig. 1. Thus, the TV-Internet Integration Box 16 comprises a first input 21 for receiving first data corresponding to a TV broadcast signal, typically being a cable TV signal and a second input 22 for receiving respective second data corresponding to IP packet data. The IP packet data may optionally be downloaded to specific TV-Internet Integration Boxes in accordance with predefined user-profiles

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associated with IP packet data and stored in the database 19. A combiner unit 23 is coupled to the first and second inputs for combining the first data and the second data to form a combined video signal. A video output 24 is coupled to the combiner unit 23 for conveying the combined video signal to a TV set in a user premises. The TV set may be a conventional TV having a relatively low resolution screen for displaying a first image corresponding to the first data and having superimposed thereon a second image corresponding to the second data. Alternatively, it can be a computer having a video card for displaying a combined video image on a high resolution display monitor.

The combiner unit 23 is shown coupled to a processing unit 25 although in practice it may be implemented in software by the processing unit 25. A memory 26 is coupled to the processing unit 25 for storing program data, such as profiles and program timetables etc. so as to allow the processing unit 25 to filter incoming IP content according to pre-defined profiles and other selection data. The processing unit 25 is also coupled to a user interface 27 that allows the subscriber to program the TV-Internet Integration Box 16 and store the program data in the memory 26. An IR receiver 28 is adapted to receive IR commands from a remote control unit described below with reference to Fig. 6 and is coupled to a decoder 29, which decodes a received IR signal and feeds it to the processing unit 25 for further processing.

Fig. 6 is a block diagram showing the functionality of a remote control unit 30 for interfacing with the TV-Internet Integration Box 16 shown in Fig. 5. The remote control unit 30 includes a processing unit 31 coupled to a user interface 32, typically having a keypad or pushbuttons for program selection and setting as well as other functions. The user interface 32 is coupled to an encoder 33 which is responsive to a pressed key or key combination for producing a corresponding IR signal that is transmitted by an IR transmitter 34 to the TV-Internet Integration Box 16 for receipt by the IR receiver 28 thereof.

As noted above, the keys may be color coded in correspondence with prearranged colors of commonly displayed icons, so that pressing on a specific key activates the displayed icon of the same color. Alternatively, at least some of the keys may be covered with transfers depicting commonly displayed icons, whereupon the appropriate keys or button for activating each icon are easily recognized.

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The keys may also be programmed so that depressing the same key more than once automatically re-sizes the windows containing the TV broadcast and the Internet broadcast. For example, Fig. 7a shows the default situation where a TV screen 40 displays a conventional TV broadcast in a window 41 that is sized to occupy the whole area of the TV screen 40 and will be referred to as the primary window. Also shown are IP icons 42, 43 and 44 each of which points to a different IP content that is streamed from a respective web site of known address. On pressing the key on the remote control unit 30 that corresponds to the icon 42, the IP content corresponding thereto is displayed within a small window 45 (referred to as the secondary window) that is contained within the primary window 41 as shown in Fig. 7a. The icons 42, 43 and 44 remain visible so that, if desired, the selected program can be changed by pressing a different key on the remote control unit 30. On pressing a key a second time in succession, the IP content is re-sized so that its window 45 occupies substantially the whole area of the screen as shown in Fig. 7c. On pressing the key a third time in succession, the situation reverts to the default shown in Fig. 7a where the primary window 41 containing the TV broadcast occupies the whole area of the TV screen 40. Thus, each key operates as a three-way toggle that switches between three different display modes.

The second data containing display information for the icons also contains data that informs the TV-Internet Integration Box 16 on which channel or channels the associated IP content is to be streamed and at what times. The second data also specifies the web site where the IP content is located. This is summarized in the following table:

Icon image	Channel	Time	Website of IP content
ICON.GIF	2; 23	19:30; 21:30	www.AB.com/adverts/123.htm

Table I: Second data - definition

Thus, the second data depicted in Table I above shows that the icon image is contained in a file called ICON.GIF and that the IP content relating thereto is to be streamed on channels 2 and 23 at times 19:30 and 21:30, these being the start times. The end times are determined by the duration of the IP content to be streamed, which is downloaded from a web site whose name is shown in the table and is contained in the second data.

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The second data is downloaded from the web server 14 whose web site address is known to the TV-Internet Integration Box 16. In accordance with one embodiment, the processing unit 25 is programmed to access the web server 14 periodically and download current program data. For example, once every 2 to 3 hours the TV-Internet Integration Box 16 may automatically access the web server 14 to download the second data corresponding current program data for the next 3 hours as formatted according to Table I. The downloaded information is stored locally in the memory 26 of the TV-Internet Integration Box 16. This allows the TV-Internet Integration Box 16 to pre-fetch IP content relating to all the currently displayed icons and to store the data relating thereto in the memory 26 thus obviating the need to access the web site of a selected icon for the purpose of downloading IP selected content. Since this carries the overhead of web access and downloading of data, which can be cumbersome particularly if there is insufficient bandwidth, pre-fetching in this manner ensures that initial IP content data will be immediately available on selection of one of the icons.

Fig. 8 is a flow diagram showing the principal actions carried out by the TV-Internet Integration Box when pre-fetching a digital broadcast signal. Thus, the TV-Internet Integration Box 16 periodically accesses the web server 14 and downloads current program data, constituting the second data. It then extracts from the current program data the image files of the current icons and stores them in the memory 26. In like manner, it extracts the web sites of the IP content corresponding to the currently displayed icons and then accesses these sites to pre-fetch the respective IP content, which it likewise stores in the memory 26. On selection of an icon, the TV-Internet Integration Box 16 opens a secondary window 45 within the primary window 41, reads from the memory 26 the pre-fetched IP content and displays it in the secondary window 45.

It will be understood that the TV-Internet Integration Box according to the invention may be at least partially implemented by a suitably programmed computer. Likewise, the invention contemplates a computer program being readable by a computer for executing the method of the invention. The invention further contemplates a machine-readable memory tangibly embodying a program of instructions executable by the machine for executing the method of the invention.

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Amended claims

1. A method for generating at a user's premises a video output (24) consisting of a TV broadcast signal constituting a first data and overlay display information constituting a second data, the method comprising:

(a) providing a combiner unit (23) at the user's premises, wherein:

the combiner unit (23) is connected to said video output (24) at the user's premises, and

the combiner unit (23) is also connected to an Internet data source providing said overlay display information over the Internet (15),

characterized in that:

said TV broadcast signal and overlay display information originate from unrelated sources and are transmitted to the user's premises by different resources as mutually distinct and independent first and second inputs (21, 22), respectively, and wherein

said overlay display information includes at least:

a Web link indicating a website where an internet content that is associated with said overlay display information is stored,

an icon and/or textual data indicative of the content associated with said overlay display information, and

an overlay trigger criterion; and

(b) processing at the user's premises said overlay display information and generating at the user's premises a corresponding overlay only if said criterion related to overlay trigger is met, wherein generating an overlay includes:

generating at the user's premises a first display screen including at least a first portion corresponding to said TV broadcast signals and a second portion overlaid over said first portion and corresponding at least to said icon and/or textual data, and

associating the Web link with said second portion of the first display screen thereby allowing a user to cause the combiner unit (23) to retrieve said internet content, generate a

second video display screen including at least a portion which corresponds to said internet content, and providing the second video display screen as output.

2. The method according to claim 1, wherein said overlay display information is received at the user premises according to a pre-stored user profile.

3. The method according to any one of claims 1 to 2, further including:

receiving a command from a user at said user premises; and

responsive to said command, resizing said first portion and/or said second portion of said first display screen.

4. The method according to any one of claim 1 to 3, further including: identifying a website address of the program broadcast by the Internet associated with the second data; and pre-fetching and buffering the program broadcast by the Internet from said website; thereby allowing said program to be displayed substantially without delay upon redirection by the user.

5. The method according to any one of the preceding claims, wherein the overlay display information comprises data representative of one or more second images and for each of said one or more second images said overlay display information comprises respective web site addresses where IP content associated with the respective second image is stored, and wherein said generating an overlay further includes within said first display said one or more second images.

6. The method according to claim 5, further including: periodically accessing a web server (14) for downloading said second data; extracting from the second data the second images and the respective web site corresponding to each of said second images; retrieving and storing digital content from said internet content; and

if the overlay trigger criterion is met and a user command that is associated with an image from amongst said one or more second images is identified, displaying the respective image from amongst the second images, accessing the respective web site associated with the displayed image and extracting and buffering content from the internet (15).

7. The method according to any one of claims 1 to 6, wherein the overlay display information is supplementary or complementary to the first data.

8. The method according to any one of claims 1 to 7, wherein the overlay display information includes an icon that indicates to the user that Internet content is currently being displayed and which provides an indication of a nature of said content.

9. The method according to claim 8, including selecting specific Internet content by pressing a color-coded button on a remote control unit (30) in accordance with a color of said icon.

10. The method according to any one of claims 1 to 7, wherein said overlay display information contains textual information advising the user to press a particular button on the remote control unit (30).

11. A TV-Internet Integration Box (16) for generating at a user's premises a video output consisting of a TV broadcast signal constituting a first data and overlay display information constituting a second data, the TV-Internet Integration Box comprising:

a combiner unit (23) at a user's premises coupled to a video output (24) , wherein

the combiner unit (23) is also connected to an Internet data source providing said overlay display information over the Internet (15),

characterized in that:

said TV broadcast signals and overlay display information originate from unrelated sources and are transmitted to the user's premises by different resources as mutually distinct and independent first and second inputs (21, 22), respectively, and wherein

said overlay display information includes at least:

a Web link indicating a website where an internet content that is associated with said overlay display information is stored,

an icon and/or textual data (or- program details) indicative of the content associated with said overlay display information, and

an overlay trigger criterion; and

wherein said combiner unit (23) is configured to process at the user's premises said overlay display information and to generate at the user's premises a corresponding overlay only if said criterion related to overlay trigger is met, wherein generating an overlay includes:

generating at the user's premises a first display screen including at least a first portion corresponding to said TV broadcast signal and a second portion overlaid over said first portion and corresponding at least to said icon and/or textual data or program details, and

associating the Web link with said second portion of the first display screen thereby allowing a user to cause the combiner unit (23) to retrieve said internet content, generate a second video display screen including at least a portion which corresponds to said internet content, and providing the second video display screen as output.

12. The TV-Internet Integration Box according to claim 11, wherein said overlay display information is received at the user premises according to a pre-stored user-profile.

13. The TV-Internet Integration Box according to claim 11 or 12, further including; a command input for receiving a command from a user at said user premises; and a frame adjuster for resizing said first portion and/or said second portion of said first display screen in response to said command.

14. The TV-Internet Integration Box according to any one of claims 11 to 13, wherein the overlay display information comprises data representative of one or more second images, and for each of said one or more second images said overlay display information comprises respective web site addresses where IP content associated with the respective second image is stored, and wherein the combiner unit (23) is configured to:

periodically access a web server (14) for downloading said overlay display information;

extract from the overlay display information said one or more second images and the respective web sites corresponding to each of said second images;

retrieve and store internet content from said web sites; and

if the overlay trigger criterion is met, and a user command that is associated with an image from amongst said one or more second images is identified, display the respective image from amongst the second images, access the respective web site associated with the displayed image and extract and buffer content from the website.

15. The TV-Internet Integration Box according to any one of claims 11 to 14, wherein the overlay display information includes an icon that indicates to the user that digital data from Internet content is currently being displayed and which provides an indication of a nature of said Internet content.

16. The TV-Internet Integration Box according to any one of claims 11 to 15, wherein the icon is colored so as to allow user selection of a specific Internet content by pressing a color-coded button on a remote control unit (30) in accordance with a color of said icon.

17. The TV-Internet Integration Box according to any one of claims 11 to 15, wherein said overlay trigger criterion includes at least one of the following: a timing information, data specifying one or more TV subscriber channels, a user command information.

18. The method according to claim 1, wherein said overlay trigger criterion includes at least one of the following: a timing information, data specifying one or more TV subscriber channels, a user command information.