METHOD/TERMINAL IN DIGITAL BROADCAST NETWORK WITH TWO-WAY TELECOMMUNICATION CONNECTION

A method and a terminal for providing a telecommunication connection in a telecommunication system comprising a distribution network transmitting broadcast services, at least one terminal arranged to receive services, and a reverse network providing a reverse connection from the terminal at least to the distribution network. At least part of the information to be transmitted as a broadcast is arranged to be selected by means of the reverse connection. A two-way telecommunication connection, which is independent of broadcast services, is established from said terminal to a second telecommunication network via the reverse network.
Method/terminal in digital broadcast network with two-way telecommunication connection

BACKGROUND OF THE INVENTION

[0001] The invention relates to interactive broadcast services, particularly to the properties of terminals designed for reception of the services.

[0002] New digital broadcast networks will be taken into use in the near future for the transmission of radio and television broadcasts. Said networks include for example a digital radio network DAB (Digital Audio Broadcasting) and a digital television network DVB (Digital Video Broadcasting). Digital broadcasts are received either by new digital terminals or present analog terminals, to which a digital tuner is connected, i.e. a Set-Top-Box (STB). The STB device enables the reception of digital broadcasts via present analog television and radio receivers. The DAB and DVB systems also comprise two-way, interactive services enabling for example the subscription of chargeable services or the transmission of feedback information associated with a service from a terminal of the network. Such interactive services include for example e-commerce, various games and video-on-demand services. This is subject to the terminal also comprising means for establishing a reverse connection, i.e. data transmission to the broadcast network. In this case, the terminal is typically in a wired connection to a fixed network, such as a public analog telephone network (PSTN, Public Switched Telephone Network) or a digital network (ISDN, Integrated Services Digital Network), from which a connection further to a DAB or DVB network is arranged. Alternatively, interactive services are controllable via a separate telephone subscription, i.e. control commands are transmitted by means of a telephone.

[0003] The services of these digital broadcast networks may also be transmitted to terminals via cable networks, allowing the reverse transmissions of interactive services to be arranged via a cable television network with a home terminal, e.g. a STB device, connected between the cable network and the terminal and comprising a cable modem. The reverse connection may also be arranged via a wideband fixed network, such as an xDSL network (Digital Subscriber Line) or by means of a wireless connection, such as a wireless local area network or a mobile network. A solution is also known, where the reverse channel for controlling interactive services is provided by a reverse signal to be transmitted via a television antenna or a satellite antenna and having a specific transmission path.
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[0004] The reverse connection enables to choose various information, which can be any kind of data, to be transmitted as a broadcast. The image or voice information to be transmitted in broadcasts is typically obtained from the servers of a service provider's network, such as a television company, or other telecommunication networks, such as networks connected to the Internet, the information provided by which can be chosen to be transmitted as a broadcast.

[0005] The problem in prior art solutions is that the data transmission connections, particularly the reverse connection, are one-way. A modem comprised by the terminal of a television or radio network is used to establish a reverse data transmission connection, typically via a telephone network. This reverse connection controls the interactive services transmitted via broadcast networks. In other words, the services can usually be received only as broadcast services, in which case the capacity provided by the telephone or cable network and used on the reverse connection partly remains unutilized. A further problem is the need for different terminals in personal data transmission. Despite the fact that a terminal of digital broadcasts uses a telephone network to establish the reverse connection, a separate terminal is required for the use of different telephone and fax services, i.e. a telephone or a fax machine. This means that the equipment and subscription costs for personal data transmission become high. Furthermore, present telephone network services provide quite limited chances to use various auxiliary services, such as banking and subscription services, which is mainly caused by the simple user interfaces of the terminals, typically telephones.

25 BRIEF DESCRIPTION OF THE INVENTION

[0006] The object of the invention is to provide an improved method and equipment for implementing the method so as to alleviate the above problems. The objects of the invention are achieved by a method and a terminal, which are characterized in what is stated in the independent claims. The preferred embodiments of the invention are disclosed in the dependent claims.

[0007] The invention is based on integrating the functionalities of a telephone into the terminal of a digital broadcast network so as to allow the use of the terminal on a two-way reverse connection in the same way as a telephone subscription. The telephone functionalities are controlled by a menu generated on the display of the terminal. The functionalities include, not only
the usual telephone functionality, but also other functions of electronic data transmission, such as fax, e-mail, text messages, video telephone calls and different data files.

[0008] The advantage of the method and system of the invention is more efficient use of telecommunication connection capacity, since the reverse connection of a broadcast network can be utilized. Costs for devices, subscriptions and connections also decrease, since no separate devices are needed for telephony functions and the reception of broadcast services. Part of, or in some cases all, electronic data transmission can be transferred from teleoperators’ networks to be carried out for example via an IP network, or, on the other hand, as a broadcast directly to the receiver, resulting in lower connection costs. Furthermore, the method and device of the invention enable electronic identification of users and user-specific settings in the use of different data transmission services.

15 BRIEF DESCRIPTION OF THE FIGURES

[0009] In the following, the invention will be described in detail in connection with preferred embodiments with reference to the accompanying drawings, in which

Figure 1 shows a telecommunication system for the transmission of broadcast services and the reception of reverse connection information;

Figure 2 is a block diagram of the relevant parts of the structure of the terminal of the invention; and

Figure 3 schematically shows the structure of a service menu to be used in the method of the invention.

25 DETAILED DESCRIPTION OF THE INVENTION

[0010] In the following, a typical network solution for providing a reverse connection for broadcast services will be described with reference to Figure 1. Terminals TE1 to TE3 receive broadcasts from a DVB network transmitter TR. Terminals TE1 to TE3 comprise either a digital DVB receiver or an analog television receiver, to which a digital tuner, i.e. a Set-Top-Box, is connected for the reception of digital transmissions. A broadcast typically comprises information on services and programs available for selection by the user and presented by an electronic programming guide (EPG). The information is preferably displayed on the terminal TE by means of a browser-type user interface in which different information sources are linked (cf. hyperlinks
in a WWW browser). The information can be divided into services not requiring the opening of a reverse connection and into services requiring the opening of a reverse connection.

[0011] When a user wants to affect the broadcast services to be transmitted, a reverse connection to the DVB network can be established from the terminal TE. The reverse connection is typically established via a wired telephone network PSTN to a server S1 controlling the transmissions of the DVB network. Terminals TE1 to TE3 thus comprise means, typically a modem, for establishing a reverse connection via a telephone network. For example, the user may want a program on the DVB network operator's server S2 to be transmitted via the DVB network. Furthermore, services to be transmitted as a broadcast via the DVB network can also be delivered from other networks than a DVB operator's network only. In this case, the user may for example want to receive information from a server S3 connected to the Internet via a fast broadcast. Thus, the user may transmit a request to server S1 to establish a reverse connection to another network, for example a request to establish the reverse connection via the Internet to server S3 based on the URL identifier that identifies the service.

[0012] The example in Figure 1 shows a typical DVB-T (DVB terrestrial) system, but corresponding functions are valid in any corresponding system, such as the DAB and DVB-C (DVB-cable) and DVB-S (DVB-satellite) systems. It is also evident that the establishment of a reverse connection from terminals TE1 to TE3 as described above can also be arranged wirelessly via a GSM network (Global System for Mobile communications) or a wireless local area network. A reverse connection can also be arranged by means of a cable modem via a cable network transmitting DVB-C transmissions. Furthermore, the number of terminals, servers and transmitters is in no way restricted to the numbers presented in Figure 1.

[0013] In accordance with the invention, the terminals TE are arranged to establish a two-way reverse connection allowing the terminal and the reverse connection to be used also as a telephone subscription. The terminal of a digital broadcast network according to the invention thus comprises, in accordance with Figure 2, means (202) for establishing a two-way connection to a telephone network (200), processing means (204) for processing call signals and user control signals, and connecting means (206) for connecting a speaker (208) and a microphone (210) to the terminal. In accordance with Fig-
ure 2, these means can be connected either to a digital receiver (212) or to a Set-Top-Box (214).

[0014] A usual analog (PSTN) or digital (ISDN) wired connection, a wireless connection (e.g. GSM) or an Internet telephone connection, based on IP-addresses, can be used as the telephone subscription. The telephone subscription can also be implemented via a cable network or a wideband network. Thus, the means for establishing a connection to the telephone network may, depending on the type of subscription, comprise for example a modem, an ISDN network card or a GSM network card. The terminal may preferably comprise several of the above means for establishing a connection.

[0015] The processing means for processing call signals preferably comprise a signal processor that separates speech signals from data signals. Received speech signals are directed to the speaker comprised by the connecting means, and, correspondingly, user speech signals from the microphone are directed to the processing means for further transmission to the transmission path. Data signals are processed in accordance with preset specifications or according to the user’s control commands. The processing means can be implemented for example as a processor integrated into the device or by means of a card modem arranged in a PCMCIA card slot.

[0016] The connecting means for connecting a speaker and a microphone to a terminal can be implemented in various ways. For example, the speakers of a terminal connected to a digital receiver or Set-Top-Box can be used as the speaker, and the receiver may preferably comprise an inbuilt microphone. On the other hand, speaker and microphone functions can be taken care of by means of a separate telephone earpiece, which may be for example an earpiece of a wired telephone, known per se, connected with a wire to the receiver by means of a suitable connector. An earpiece can also be connected to the terminal wirelessly, for example by an infrared (IR) or short-range radio frequency connection (LPRF). Wireless data transmission protocols suitable for the purpose include for example series-mode point-to-point infrared connection IrDA (Infrared Data Association) and Bluetooth, designed for wireless connection of several electronic devices by a radio-frequency connection. These short-range data transmission protocols are described in detail for example on the Internet pages of both consortiums (www.irda.com, www.bluetooth.com). An earpiece can also preferably be integrated into a remote control, which can then be connected to the terminal in any of the above-de-
scribed ways.

[0017] The functionalities of the invention can be integrated into a part of the terminal or they can be implemented by means of a separate auxiliary device. The auxiliary device naturally comprises connecting means for connecting the auxiliary device to a digital receiver or a Set-Top-Box, and the connecting means may comprise for example a Scart connection, a PCMCIA card slot or any other known interface.

[0018] The terminal or auxiliary device of the invention may preferably comprise several telephone numbers and IP addresses to which a connection can be established with external terminals, such as telephones, fax machines, e-mail, etc. In other words, for example different members of the family are able to receive personal calls, e-mail messages or text messages. The device of the invention identifies the accesses incoming to the different telephone numbers or IP addresses, and notifies the user in accordance with predetermined settings. Notification settings allow for example different ringing tones to be set for accesses to different users or messages to be displayed on the display of the receiver. An incoming call may activate default speaker and microphone functions, whereby answering a call may for example be set to take place primarily via an earpiece connected to the terminal. These settings can be changed in a manner to be described later.

[0019] The device of the invention may also preferably comprise voice mail for storing messages left by a caller, should the call not be answered. Thus, the device comprises storing means for storing messages, and the means can be implemented in a manner known per se, for example as a tape recorder or a digital memory circuit, which stores speech modified into a digital form. The device preferably comprises means for identifying incoming fax calls, and storing means for storing faxes in a memory, both means being known per se from existing fax machines. The device also comprises storing means for storing e-mail messages, text messages and other corresponding electronic messages in the memory of the device. All the above-described storing means can be preferably implemented by means of one digital memory circuit, e.g. RAM memory (Random Access Memory).

[0020] The device of the invention can also preferably comprise connecting means for a video camera, allowing the two-way reverse connection to be used for transmission of video telephone calls. The image and speech to be received via the video camera and the microphone are then en-
coded with suitable video telephone software comprised by the device of the invention for transmission on the reverse connection to be used. Similarly, video telephone call transmission from the reverse connection to the terminal is decoded with said video telephone software to be presented by means of the display and speaker of the terminal.

[0021] The device of the invention is able to use the two-way reverse connection also for downloading files from data networks, such as from a server S3 connected to the Internet according to Figure 1. Downloadable files may comprise any data, such as different audiovisual files, games, computer programs or files to be processed with a computer. The terminal TE preferably comprises enough memory for storing the files in the terminal, allowing the files to be presented or processed immediately or later at a time chosen by the user. The terminal may further comprise means for transferring files to a computer for processing, and the means can be implemented for example with a wired or wireless connection between the terminal and the computer in a manner known per se, as was described above for example for connecting the terminal and the earpiece.

[0022] In accordance with a preferred embodiment of the invention, the terminal TE comprises means for identifying the user such that the above-described messages stored in the storing means, such as voice mail messages or e-mail messages, or files, such as fax files or files downloaded from a network, cannot be opened until the user is identified. For user identification, a smart card can be used comprising keys and algorithms required for the identification. In this case the means for user identification preferably comprise a card reader and input means for inputting a password. A smart card typically comprises separate user identification, such as a PIN identifier (Personal Identification Number), allowing only a user knowing the right identifier to use the smart card. The same smart card can also be used for user identifications performed by a broadcast network and required for example when certain interactive services are subscribed to for delivery as a broadcast service. In this case the broadcast network receives a connection establishment request and checks the right of the user of the terminal TE to interactive broadcast services for example by inquiring for a user identifier and a password. User identification may be taken care of by transmitting the request as a broadcast to the terminal TE and by transferring the identifiers comprised by the smart card via the reverse connection, or the identification can be completely taken care of
via the two-way reverse connection.

[0023] Furthermore, user identification can be used together with a telephone connection in different telephony services requiring electronic identification and signature of the user. This facilitates for example banking services used by means of a telephone connection, since the terminal provides an illustrative display and user identification for banking services. This allows banking services or other similar services to be taken care of simply via a telephone connection, and a there is no need to establish for example a separate Internet connection.

[0024] The above-described functionalities are controlled by software connected to the user interface of a digital terminal or a Set-Top-Box via an electronic interface. The software can be used in the same way by means of a graphic menu screen as the electronic program guide EPG of a DVB receiver, whereby menus are created by using a terminal-specific browser and an application programming interface (API) adapted thereto. Graphic menus including optional settings of the above-described services can be preferably controlled by means of the remote control of a DVB receiver. The menus can also be implemented for example in accordance with general HTML browser specifications (HyperText Mark-up Language).

[0025] Figure 3 schematically shows an example of the implementation of menus. The example of Figure 3 comprises a main menu (310) displayed on a TV screen (300), and the menu further comprises the different services to be provided for the user, such as telephone functions (312), fax (314), e-mail (316) etc. The services to be provided for the user were described above and will be described in detail later. The main menu also comprises a menu for identifying (318) the user.

[0026] The selection of a service, such as telephone functions, with a controller, e.g. a remote control, opens a service-specific menu (320), from which the desired service can be controlled. For example, the service-specific menu of telephone functions may further comprise settings or submenus for the establishment or reception (322) of a call, voice mail (324), various settings (326), such as call transfer and ringing tones etc. Thus, service-specific menus may comprise several separate submenus for different purposes, and submenus may comprise further submenus. The number of menus is preferably limited so that the user interface remains graphically and visually distinct to the user.
The above-described manner of implementing menus is only an example of how the services of the invention can be provided for the user of a terminal. The services may be controlled in any other way, and the control does not necessarily have to be menu-based, but each service may be available for example in the remote control under a specific button, or the services may be controlled by means of HTML-based text links. On the other hand, if menus are used, the menu structure does not have to conform to what was described above, but any other menu structure may be used, such as the menu structure known from Windows® programs, wherein the main menu forms horizontally at the upper edge of the display.

Software and a graphic menu provide the user with selection means for adjusting the settings of the reception and transmission of calls, e-mail, text messages, faxes and different data services. In the reception settings, default settings may be set on all the above connections, whereby the terminal is always set to receive different speech-based, data-based and text-based messages. Certain transmission settings may also be set to a default value in all services. Furthermore, in transmission, the selection means preferably request a specification of the contact data of the receiver, such as the telephone, fax or modem number, the identification data on the receiver and optionally the transmitter, e-mail address, etc.

The menu can be used for setting personal call numbers or IP addresses for example for each member of the family, enabling the terminal to use the call number or the IP address to identify to whom the message is intended. In this case, the terminal notifies the right person by using personal notification settings, such as different ringing tones or other notifications. The menu also comprises a setting menu for selecting these personal user settings, including a personal memo for storing and browsing contact data, such as telephone numbers and address data.

If need be, the menu can be used for setting different transfer settings on calls. The menu can also be used for controlling the functions of voice mail. The menu may also be used for controlling a fax machine and for storing received fax messages in memory and for opening stored messages from memory.

Furthermore, the software and the graphic menu provide input means for the user's smart card identification for inputting a PIN in response to the smart card being inserted in the card reader means.
[0032] Still further, the menu and the software can be used to select a video telephone call as the connection to be used, should a camera be connected to the terminal. The menu is also used for setting different parameters of video telephone calls, such as the compression method to be used for the video signal.

[0033] The menu can also be used for setting the terminal to receive several distribution channels simultaneously for example in such a way that at the same time a call or a fax message is received, e-mail messages and Internet files are also received via a broadcast service. The menu can be used to control the terminal to transmit a message for example to an Internet operator requesting the transmission of certain files or services via the broadcast service for the time being, whereby the two-way reverse connection is simultaneously available for a call connection.

[0034] In the above, the invention is described by way of example in connection with the DVB system. However, the invention is not limited thereto, but can be applied to any telecommunication system comprising a network providing terminals with broadcasts and a network providing terminals with a reverse connection.

[0035] It is obvious to a person skilled in the art that as technology advances, the basic idea of the invention can be implemented in a variety of ways. The invention and its embodiments are thus not limited to the above examples, but may vary within the claims.
CLAIMS

1. A method of providing a telecommunication connection in a telecommunication system comprising a distribution network transmitting broadcast services, at least one terminal arranged to receive the services, and a reverse network providing a reverse connection from the terminal at least to the distribution network, in which system at least part of the information to be transmitted as a broadcast is arranged to be selected by means of the reverse connection, characterized by

   establishing a two-way telecommunication connection, which is independent of broadcast services, from said terminal to a second telecommunication network via the reverse network.

2. A method as claimed in claim 1, characterized by said two-way telecommunication connection comprising at least one of the following: call connection, fax connection, e-mail connection, text message connection, file transfer connection.

3. A method as claimed in claim 1 or 2, characterized by controlling said two-way telecommunication connection via the user interface of the terminal.

4. A method as claimed in claim 3, characterized by controlling said two-way telecommunication connection from menus comprised by the terminal or the display of a display means connected thereto with the remote control of the terminal.

5. A terminal in a digital broadcast network, the terminal being arranged to receive information to be transmitted as a broadcast and select at least part of the information to be transmitted as a broadcast via a reverse network providing a reverse connection, characterized in that the terminal is arranged to establish a two-way telecommunication connection, which is independent of broadcast services, to a second telecommunication network via said reverse network.

6. An auxiliary device for a terminal in a digital broadcast network, the terminal being arranged to receive information to be transmitted as a broadcast and select at least part of the information to be transmitted as a broadcast via a reverse network providing a reverse connection, and the auxiliary device being arranged to be connected to the terminal, characterized in that


the auxiliary device is arranged to establish a two-way telecommunication connection, which is independent of broadcast services, to a second telecommunication network via said reverse network.

7. A device as claimed in claim 5 or 6, characterized in that said two-way telecommunication connection comprises at least one of the following: call connection, fax connection, e-mail connection, text message connection, file transfer connection.

8. A device as claimed in any one of claims 5 to 7, characterized in that the device comprises connection establishing means for establishing a two-way connection to a telephone network, processing means for processing call signals and user control signals, and connecting means for connecting a speaker and a microphone to the terminal.

9. A device as claimed in claim 8, characterized in that the device is arranged to support the use of several telephone numbers and to identify and notify the receiver on the basis of a received telephone number.

10. A device as claimed in claim 8 or 9, characterized in that the device comprises voice mail.

11. A device as claimed in any one of claims 8 to 10, characterized in that the device comprises a camera and software means for establishing a video telephone call connection.

12. A device as claimed in any one of claims 8 to 11, characterized in that the device comprises memory for storing files in various electronic forms.

13. A device as claimed in any one of claims 8 to 12, characterized in that the connecting means for connecting a speaker and a microphone to the terminal comprise a telephone earpiece integrated into the remote control of the device.

14. A device as claimed in any one of claims 8 to 13, characterized in that the device comprises software means for creating, on the display of
the terminal, a menu for controlling telecommunication connections.

15. A device as claimed in any one of claims 5 to 14, characterized in that

the device comprises means for identifying the user, such as a

smart card reader and inputting means for inputting a password.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 01/00232

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04N 7/173, H04Q 3/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04N, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US 5768539 A (ERIK CHRISTOPHER METZ ET AL), 16 June 1998 (16.06.98), column 1, line 48 - column 2, line 2; column 3, line 13 - line 17; column 27, line 65 - column 28, line 5, column 36, line 23 - line 47; abstract</td>
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents
  "A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search: 11 July 2001
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