The present invention discloses a broadcasting receiving equipment, a digital broadcasting network and a method for providing broadcasting service. Particularly, the broadcasting receiving equipment includes a receiving section for receiving broadcasting signals and transforming them into broadcasting data; a storage section for storing data; a control section for extracting output data among the broadcasting data; an input section for transforming the input of subscribers into input signals; an I/O interface section for transforming the output data into output signals and the input signals into input data; an output section for outputting the output signals to subscribers. Here, the control section also generates return data by including return information data among the input data and the broadcasting data. In addition, the broadcasting receiving equipment further includes a mobile communication section for transforming the return data into mobile communication signals in order to transmit the return data to receivers through a mobile communication network. As a result, it is possible to assure the mobility of subscriber receiving equipment, and to provide interactive broadcasting service through a low-priced real time return network.
BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a broadcasting receiving device, and in particular, to a broadcasting receiving device forming a return network via a mobile communication network.

To facilitate understanding of the invention, a number of terms are defined below.

As used herein, the term “broadcasting service provider” is used in reference to the device and operating subject for providing broadcasting programs for subscribers. The term “mobile communication service provider” is used in reference to the device and operating subject for providing mobile communication service using the systems such as CDMA and GSM. The term “subscriber receiver” is used in reference to the general means for receiving broadcasting signals and outputting them to subscribers such as Set Top Box STB, Integrated Receiver & Decoder IRD or Digital Video Broadcasting-Multimedia Platform DVB-MHP.

As used herein, the term “broadcasting signal” is used in reference to the signal that broadcasting receiving device receives. In case of satellite broadcasting, the broadcasting signal means the signal that carrier wave of 11~12GHz has. The term “broadcasting data” is used in reference to the digital signal that the broadcasting signal is transformed into. The term “output data” is used in reference to the broadcasting data for being directly outputted into subscribers. The output data generally includes the streaming data such as image Packetized Elementary Stream PES and sound PES of digital broadcasting. The term “output signal” is used in reference to the signal transformed into a form suitable for outputting the output data into subscribers. The output signal
includes an electric signal for outputting sound output data to subscribers via a speaker. The term “return information data” is used in reference to the data forming a portion of the broadcasting data. The return information means the data forming a portion of return data such as receiver information to determine a receiver when subscribers receive the return data. The term “input signal” is used in reference to the signal generating from input of subscribers to handle broadcasting receiving device. The term “input data” is used in reference to the data transformed into a digital signal suitable for processing the input signal in the broadcasting receiving device.

2. Description of the Prior Art

A conventional broadcasting service subscriber is provided with broadcasting service using a broadcasting receiving device for receiving broadcasting signals via cable and radio channels from a broadcasting transmitting station. The broadcasting receiving device receives only simplex service from the broadcasting transmitting station into the broadcasting receiving device, not duplex service between the broadcasting receiving device and the broadcasting transmitting station.

As broadcasting communication technologies have been developed, various broadcasting services are provided. In case of digital satellite broadcasting, there have been efforts to provide duplex services such as home shopping, tele-education, home banking, real-time vote, interactive game, Pay Per View PPV, using characteristics of its contents. The digital satellite broadcasting is mass provided with various contents in the form of streaming data including image and sound. Wire communication networks such as PSTN and cable networks are used in return networks of satellite broadcasting receivers for duplex services.

Broadcasting receiving device using cable communication network as return network has the following problems. First, it is difficult to embody subscriber terminals that may be mounted on mobile units such as vehicles and
ships because the broadcasting receiving device should maintain the physical connection to cable communication network. Second, return traffic of satellite broadcasting receivers has just tens to hundreds of bps. The broadcasting receiving device receives burst data according to selections of subscribers, not streaming data. The subscriber occupies communication lines unnecessarily when the broadcasting receiving device is continuously connected to cable communication network, in comparison with the amount of actually transmitted data. As a result, subscribers should bear expensive communication fees. In addition, the broadcasting receiving device is newly connected to cable communication network whenever return data is required. In this case, PSTN sets up the communication according to the following steps of: 1) dialing using Dual-Tone Multi-Frequency DTMF and pulse dialing modes; and 2) line monitoring to identify the conditions of on-hook or off-hook. As a result, the time is delayed by over 5 seconds. Accordingly, this time delay prevents the subscriber using real-time interactive service appropriately.

**SUMMARY OF THE INVENTION**

In order to overcome the above-described problems, the present invention has the first object to provide a broadcasting receiving device, a broadcasting system and a method of providing broadcasting service using mobile communication network as return network for inexpensive communication cost and real-time interactive services.

According to a preferred embodiment of the present invention, the second object is to provide a broadcasting receiving device and a broadcasting system further comprising a remote controller adding a phoning function. In the broadcasting receiving device, the broadcasting data includes a return phone number related to broadcasting programs outputted to subscribers. The subscribers can phone via mobile communication network using the return phone number by simpler input than direct input of return phone number.

According to another preferred embodiment of the present invention, the
third object is to provide a broadcasting receiving device further comprising a self-trouble detecting means, and a broadcasting system, which can notify a broadcasting service provider of troubles via wireless communication network.

According to still another preferred embodiment of the present invention, the fourth object is to provide a method of broadcasting system and service for offering intelligent broadcasting. A mobile communication service provider grasps the condition of base station via a mobile communication unit, the base station for receiving access probe signals which are periodically generated. Then, the mobile communication service provider provides on/off condition and location information of broadcasting receiving device for a broadcasting service provider. As a result, the broadcasting system can administer subscribers effectively and provide intelligent broadcasting based on current positions of subscribers.

To accomplish the above-described objects, the broadcasting receiving device of the present invention comprises: a receiving unit for receiving the broadcasting signals and transforming the signals into broadcasting data; a storing unit for storing data; a control unit for extracting output data among the broadcasting data; an input unit for transforming subscriber input into input data; an I/O interface unit for transforming the output data into output signals and the input signals into input data; and an output unit for outputting the output signals into subscribers.

Here, the control unit further comprises a function of generating return data including input data and return information data among the broadcasting data; and the broadcasting receiving device further comprises a mobile communication unit for transforming the return data into mobile communication signals to transmit the return data to subscribers via a mobile communication network.

There is provided a digital broadcasting network comprising a broadcasting service provider for providing broadcasting data, a broadcasting station for converting the broadcasting data into broadcasting signals and delivering the modulated signals and a broadcasting receiving device for receiving the broadcasting signals and transmitting the signals into subscribers, wherein the
broadcasting receiving device further comprises a mobile communication unit for communicating with a mobile communication network, and the broadcasting service provider may be connected to the broadcasting receiving device via a mobile communication service provider.

There is provided a method of providing broadcasting service using a broadcasting receiving device for receiving broadcasting data from a broadcasting service provider and being connected to a mobile communication network, comprising the steps of: generating return data by receiving subscriber input, and transmitting the return data into a mobile communication network when the broadcasting receiving device receives broadcasting data and the data is an interactive demand signal (the first step); generating return data based on demand information and transmitting the return data into a mobile communication network when the broadcasting data is a subscriber administering signal (the second step); and outputting the subscriber output signal into a subscriber when the broadcasting data is a subscriber output signal (the third step).

**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a map illustrating a broadcasting system in accordance with a preferred embodiment of the present invention.

Fig. 2 is a block diagram illustrating a broadcasting receiving device in accordance with a preferred embodiment of the present invention.

Fig. 3 is a block diagram illustrating a remote controller in accordance with a preferred embodiment of the present invention.

Fig. 4 is a flow chart illustrating a method of providing broadcasting service in accordance with a preferred embodiment of the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

The present invention will be explained in terms of exemplary embodiment described in detail with reference to the accompanying drawings, which are given only by way of illustration and thus are not limitative of the
present invention.

Fig. 1 is a map illustrating a broadcasting system in accordance with a preferred embodiment of the present invention applied to satellite broadcasting. A broadcasting system includes a broadcasting service provider domain, a subscriber domain and a mobile communication network 30. The broadcasting service provider domain comprises a broadcasting service provider 10, a broadcasting station 12, and a satellite 14. The subscriber domain comprises a broadcasting receiving device 20 including a mobile communication unit 22. The mobile communication network 30 comprises a mobile communication service provider (not shown), a mobile switching center MSC, home location resister HLR 32 and a base station.

The broadcasting service provider 10 transforms broadcasting programs which will be provided to subscribers into broadcasting signals, and delivers the signals to the satellite 14 via the broadcasting station (42). The subscriber receiving device 20 receives the broadcasting signals via the satellite 14 (42). When it has data to transmit to the broadcasting service provider 10, the subscriber receiving device 20 generates return data and transmits the return data into the mobile communication network 30 via the mobile communication unit 22. The mobile communication network 30 may be connected to the broadcasting service provider 10 wirelessly such as general mobile communication terminals. However, it is desirable to be connected to the provider 10 via a separate communication network such as optical transmission cable in order to receive return data transmitted from a plurality of broadcasting receiving devices 20, heighten security and receive additional information from the mobile communication service provider (46).

The return data from the broadcasting receiving device is not necessarily routed to the broadcasting service provider 10. If necessary, the return data may be routed to a program provider PP (not shown). For example, when a program provider offers home shopping service, return data is routed to the program provider via the wireless communication network 30.
Fig. 2 is a block diagram illustrating a broadcasting receiving device 10 in accordance with a preferred embodiment of the present invention. Like a conventional device, a broadcasting receiving device 10 comprises a receiving unit 110, a control unit 120, an I/O interface unit 130, a memory unit 150, an output unit 132 and an input unit 134, and further comprises a mobile communication unit 160 for being connected to a return network.

Broadcasting data provided by the broadcasting service provider 10 is modulated into broadcasting signals via the broadcasting device 12 and transmitted into the receiving unit 110 of the broadcasting receiving device 10. Like a conventional receiving unit, the receiving unit 110 restores the received broadcasting signals into data having streaming form via down-converting, demodulation, error-correcting and decoding. The streaming data is suitable to administer in the control unit. The operation of receiving unit 110 is not explained because it can be embodied using the conventional art.

Output data among broadcasting data is extracted in the control unit 120, and return information data is stored in the memory unit 150. In the I/O interface unit 130, the output data is modulated into output signals suitable to administer in the output unit 132, and the output unit 132 outputs the output signals to subscribers (in case of video data, via screen; in case of audio data via speaker).

Here, subscribers can input user operation via the input unit 134 such as control panel, keyboard, pointing device or remote controller. The user operation inputted via the input unit 134 is 1) to generate input signals for controlling broadcasting receiving device 10 such as channel selection, and 2) to prepare selections of subscribers (e.g. orders of home shopping products, votes of particular subjects) into return data when broadcasting data supports an interactive function.

The input of subscribers is transformed into input signals such as electric signals via the input unit 134. The input signals are modulated into input data via the I/O interface unit 130 and transmitted into the control unit 120. The control unit 120 generates return data using input data by input of subscribers and return
information data stored in the memory unit 150 in case of response to interactive function. More desirably, when it includes brief information, return data may be modulated into data having short message service SMS format such as CDMA and GSM. The SMS format data is defined in mobile communication protocol supported by the mobile communication unit 160. In order to identify from which broadcasting receiving device 20 return data is, return data may include one number selected from the group of a phone number given to the mobile communication unit 160, a MAC address given to the broadcasting receiving device, an identifying number given to subscribers or the combination thereof, as an identifier.

Return data is modulated into mobile communication signals suitable to the mobile communication network via the mobile communication unit 160, and provided. As described above, return data is routed to the broadcasting service provider 10 or the program provider according to return information included in return information data. The mobile communication unit 160 has a structure identical or similar to modem for mobile communication.

More desirably, the mobile communication unit 160 transmits and receives email data via the mobile communication network 30. In other words, the mobile communication unit 160 transmits the email inputted via the input unit 134 into the mobile communication network 30, receives the email via the mobile communication 30, and then outputs the email via the output unit 132 into subscribers.

Fig. 3 is a block diagram illustrating an I/O interface unit 130 and a remote controller 134 adding a phoning function in accordance with a preferred embodiment of the present invention. The broadcasting receiving device 20 comprising the mobile communication unit 160 may comprise a remote controller 134 adding a phoning function to offer subscribers phone service using mobile communication network via the mobile communication unit 160. The remote controller 134 comprises an IR transmitting unit 180, a local area wireless communication I/O 182, an input unit 186, a speaker 184 and a microphone 183.
The I/O interface unit 130 comprises an IR receiving unit 172 and a local area wireless communication I/O 174.

The input unit 186 having various button keys serves as operation of subscriber receiving device 20 by subscribers or preparation of input data which becomes the base of return data. The IR transmitting unit 180 of the remote controller 134 and the IR receiving unit 172 of the I/O interface unit 130 are used to relay user input via the input unit 186 into the control unit.

The microphone 183 and the speaker 184 are used for phone calls of subscribers. The local area wireless communication I/O 174 and 182 are used to transmit and receive sound data between the remote controller 134 and the subscriber receiving device 20 when the subscriber is on telephone. This local area wireless communication may use one of various systems such as Blue Tooth, IrDA, Wireless LAN. The local area wireless communication should also ensure data transfer rate which can support sound communication and data transmission within feasible distance of remote controllers. Here, signals of the input unit 186 may be transmitted into I/O interface units using local area wireless communication I/O. In this case, the IR receiving unit 172 and the IR transmitting unit 180 may be omitted.

More desirably, the broadcasting service provider 10 includes return phone numbers related to broadcasting programs in return information data of broadcasting data, and transmits the numbers to subscribers. The remote controller 134 enables the mobile communication unit 160 to phone using the return phone numbers by subscriber input simpler than direct input of the return phone numbers. For example, when a home shopping program introduces a product requiring explanation on technical details, the broadcasting service provider 10 includes a return phone number of a person in charge of the explanation in broadcasting data in advance, and transmits the number to each broadcasting receiving device 20. The broadcasting receiving device 20 stores the return phone number in the memory unit 150. The subscriber requiring detail explanation of products pushes a predetermined key (telephone connection key) of
the remote controller one time. The mobile communication unit 160 then phones with the return phone stored in the memory unit 150. Finally, the subscriber is phone-connected to the person in charge of explanation. The memory unit 150 of the subscriber receiving device 20 automatically memorizes return phone numbers included in each broadcasting data. As a result, subscribers can be phone-connected to people in charge conveniently by pushing one time a predetermined key without memorizing or inputting whole return phone numbers of each program.

The control unit 120 further comprises a self-trouble detecting means 124 for detecting troubles. When the self-trouble detecting means 124 detects a trouble, the control unit 120 generates return data including particulars about the trouble and transmits the data into the mobile communication network 30 via the mobile communication unit 160. More desirably, if the self-trouble detecting means 124 transmits the particulars of troubles via the mobile communication network 30 into the broadcasting service provider 10, the broadcasting service provider 10 takes the necessary steps according to particulars of a trouble. As a result, it is not necessary that a subscriber in person then registers the trouble into the broadcasting service provider 10 or explains of particulars of the trouble, who do not know about the broadcasting receiving device.

A mobile communication service provider grasps the condition of broadcasting receiving device 20 on operation, and provides the grasped information for the broadcasting service provider 10. Like general mobile communication terminals, the mobile communication unit 160 periodically transmits access probe signals into the mobile communication network base station 30. The access probe signals registers its current location to home location register HLR 32 of mobile switching center MSC. When the mobile communication unit 160 operates by interlocking to a power source of the broadcasting receiving device 20, the broadcasting receiving device 20 including the mobile communication unit 160 of which the access probe signals is received by the mobile communication network base station 30 may take the power source for ON condition. As a result, the broadcasting service provider 10 can
administer subscribers effectively by receiving the information from the mobile communication service provider.

The mobile communication service provider grasps location information of broadcasting receiving device 20 on operation, and offers the location information to broadcasting service provider 20. The broadcasting service provider 20 may offer selectively broadcasting information corresponding with the location information to relevant broadcasting receiving devices 20, respectively. In other words, the broadcasting service provider 10 provides intelligent broadcasting services related to location for the broadcasting receiving device 20 because the location information of each broadcasting receiving device 20 is on real-time or periodically offered to the provider 10 from HLR 32 of mobile communication network 30. The intelligent broadcasting services include navigation, regional information for mobile broadcasting receiving device 20, and other itemized information such as weather, advertising necessary for each area.

Fig. 4 is a flow chart illustrating a method of providing broadcasting service in accordance with a preferred embodiment of the present invention. The method of providing broadcasting service has three steps. The first step is when broadcasting data is an interactive demand signal, the second step when broadcasting data is a subscriber administering signal, and the third step when broadcasting data is subscriber output data.

The method of providing broadcasting service passes through the first step of receiving broadcasting data for the broadcasting receiving device 20 (S20). The signals may be transmitted via aerial waves such as general TV broadcasting, satellite broadcasting or cable network.

The method passes through the second step of performing the process of managing interactive demand signals when broadcasting data is an interactive demand signal (S30). The interactive demand signal is to identify interactive broadcasting for replying input of users among broadcasting contents or to enable input of users. For example, in home shopping programs, the interactive demand signal replies orders into return data via the broadcasting receiving device 20.
The signal also includes data for votes, polls, interactive movies and games requiring selection of subscribers.

The method passes through the third step of performing the process of managing subscriber administering signals when as a decision result of the second step (S30) broadcasting data is not an interactive demand signal but a subscriber administering signal (S40). The subscriber administering signal is to grasp the operation condition of broadcasting receiving device 20 irregardless of broadcasting programs which subscribers currently watch. This signal is to demand that the broadcasting receiving device 20 itself generates return data and replies the data without waiting for input of subscribers unlike interactive demand signals.

The method passes through the fourth step of outputting broadcasting data into subscribers when as a decision result of the third step (S40) broadcasting data is not a subscriber administering signal (S70). The signal as general broadcasting signal is transmitted in the same way when the conventional broadcasting receiving device 20 receives broadcasting signals. In other words, the image signals are transmitted into subscribers via screen of broadcasting receiving device 20, and the sound signal via speaker thereof.

However, the above-described process of managing interactive signals comprises the fifth step of waiting for subscriber input (S35), the sixth step of generating return data including subscriber input (S60) and the seventh step of transmitting the return data via mobile communication network (S60). As described above, in input unit 134, user operation is inputted. Return data is generated in control unit 120. The return data is transmitted in mobile communication unit 160.

When interactive demand signals include data for home shopping service, subscriber input of the fifth step S35 is input for selection of purchase products, and return data of the sixth and seventh steps S50 and S60 include information on the subscriber input and purchased products. When interactive demand signals include data for votes, polls, interactive movies and games, subscriber input of the
fifth step S35 is input for selection of subscribers, and return data of the sixth and seventh steps include information on the subscriber input and purchased products.

Similarly, the process of managing subscriber administering signals comprises the eighth step of generating return data including information required by subscriber administering signals (S50), the ninth step of transmitting return data via mobile communication network (S60). When the subscriber administering signal requires information on channels that subscribers currently watch or watched for a predetermined period, return data of the eighth and ninth steps S50 and S60 may include information on channels that subscribers currently watch or watched for a predetermined period.

Desirably, the broadcasting receiving device 20 further comprises a phoning function. An interactive demand signal is a return phone demand signal. When the signal includes information on return phone numbers, subscriber input of the fifth step S35 is to phone with a return phone number using a simpler way than the way to directly input the return phone number. Return data of the seventh step may be data requiring phone connection to the return phone number via the mobile communication network. The relevant operation is omitted because it is previously explained in Fig. 3.

More desirably, the broadcasting receiving device 20 further comprises the self-trouble detecting means 124. In one step of the first through eighth steps S20~S60, when the self-trouble detecting means 124 detects a trouble, the method may further comprises the tenth step of preparing return data including information on particulars about the trouble, and the eleventh step of transmitting the return data into mobile communication network.

As discussed earlier, broadcasting receiving device, digital broadcasting network and method of providing broadcasting service can ensure mobility and have remarkable effect to transmit a small amount of burst return data on real-time at a low cost, due to return network as mobile communication network. Because separate physical connection is not required, the device can be simply installed and mounted on vehicles and ships.
According to a preferred embodiment of the present invention, the broadcasting receiving device further comprises a remote controller adding a phoning function, and a broadcasting system. In the broadcasting receiving device, the broadcasting data includes a return phone number related to broadcasting programs outputted to subscribers. The subscribers can phone via mobile communication network using the return phone number by simpler input than direct input of return phone number.

According to another preferred embodiment of the present invention, the broadcasting receiving device further comprises a self-trouble detecting means which can notify a broadcasting service provider of troubles via wireless communication network. As a result, subscribers need not check troubles and directly notify broadcasting service providers of the troubles. On the contrary, the device automatically notifies the providers of the troubles, thereby reducing waste of effort such as trouble notices.

According to still another preferred embodiment of the present invention, broadcasting service providers can increase convenience of subscriber administration by receiving ON/OFF conditions of subscriber receivers and location information from mobile communication service providers, and offer intelligent broadcasting services to subscribers.

According to still another preferred embodiment of the present invention, the broadcasting receiving device can grasp the condition of broadcasting programs that subscribers currently watch or watched for a predetermined period using return network via subscriber administering signals. As a result, broadcasting service providers can conveniently make an audience rating survey without performing any separate phone questionnaire or comprising any separate device for audience rating grasp.

While the invention is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and described in detail herein. However, it should be understood that the invention is not limited to the particular forms disclosed. Rather, the invention
covers all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined in the appended claims.
WHAT IS CLAIMED IS:

1. A broadcasting receiving device for receiving broadcasting signals and outputting the signals to users, comprising:
   a receiving unit for receiving the broadcasting signals and transforming the signals into broadcasting data;
   an input unit for transforming subscriber input into input data;
   a control unit for extracting output data and return information data among the broadcasting data and generating return data including input data and return information data; and
   a mobile communication unit for transmitting the return data into a mobile communication network.

2. The broadcasting receiving device according to claim 1, wherein the input unit comprises a remote controller comprising a microphone and a speaker; and wherein the mobile communication unit serves as a telephone function through the medium of mobile communication network and the remote controller.

3. The broadcasting receiving device according to claim 2, wherein the control unit decides whether the return information data includes return phone numbers related to broadcasting programs, responds to the input via the remote controller using a simpler way than the way a subscriber directly inputs the return phone number, and enables the mobile communication unit to phone via the return phone number.

4. The broadcasting receiving device according to claim 1 or 2, wherein the return data corresponds with a data communication system of mobile communication network supported by the mobile communication unit, and includes a return data identifier selected from the group consisting of a MAC address given to the broadcasting receiving device, a subscriber identifying
number in the MAC address of the broadcasting receiving device, and the combination thereof.

5. The broadcasting receiving device according to claim 1 or 2, wherein the control unit decides whether the broadcasting data is data for home shopping service, prepares return data based on subscriber orders via the input apparatus and then transmits the return data via the mobile communication unit.

6. The broadcasting receiving device according to claim 1 or 2, wherein the control unit decides whether the broadcasting data is data for votes, polls, interactive movies or games requiring selections of subscribers, prepares return data based on subscriber orders via the input apparatus and then transmits the return data via the mobile communication unit.

7. The broadcasting receiving device according to claim 1 or 2, wherein the control unit decides whether the broadcasting data is data requiring information on channels that subscribers currently watch or watched for a predetermined period, prepares return data based on channel information and transmits the return data via the mobile communication unit.

8. The broadcasting receiving device according to claim 1 or 2, wherein the control unit outputs reception emails to subscribers, prepares transmission emails based on subscriber input via the input apparatus and transmits the transmission emails via the mobile communication unit.

9. The broadcasting receiving device according to claim 1 or 2, wherein the mobile communication unit transmits emails inputted via the input unit into the mobile communication network, receives the emails via the mobile communication network and then outputs the emails into subscribers via the output unit.
10. A digital broadcasting network comprising a broadcasting service
provider for providing broadcasting data, a broadcasting station for converting the
broadcasting data into broadcasting signals and delivering the modulated signals
and a broadcasting receiving device for receiving the broadcasting signals and
transmitting the signals into subscribers,
wherein the broadcasting receiving device further comprises a mobile
communication unit for communicating with a mobile communication network,
and the broadcasting service provider may be connected to the broadcasting
receiving device via a mobile communication service provider.

11. The digital broadcasting network according to claim 10, wherein the
mobile communication service provider grasps the condition of the broadcasting
receiving device on operation and provides the grasped information for the
broadcasting service provider.

12. The digital broadcasting network according to claim 10 or 11,
wherein the mobile communication service provider grasps location
information of the broadcasting receiving device on operation and provides the
location information for the broadcasting service provider; and
wherein the broadcasting service provider provides broadcasting data
selectively for the relevant broadcasting receiving device.

13. The digital broadcasting network according to claim 10 or 11,
wherein the broadcasting receiving device further comprises a remote
controller for interlocking with the mobile communication unit and performing a
telephoning function via a mobile communication network;
wherein the broadcasting service provider further comprises a return phone
number related to broadcasting data and delivers the return phone number via the
broadcasting station; and
wherein the remote controller enables the mobile communication unit to phone with the return phone number by using the simpler subscriber input than the direct input of the return phone number.

14. A method of providing broadcasting service using a broadcasting receiving device for receiving broadcasting data from a broadcasting service provider and being connected to a mobile communication network, comprising the steps of:

- generating return data by receiving subscriber input, and transmitting the return data into a mobile communication network when the broadcasting receiving device receives broadcasting data and the data is a interactive demand signal (the first step);

- generating return data based on demand information and transmitting the return data into a mobile communication network when the broadcasting data is a subscriber administering signal (the second step); and

- outputting the subscriber output signal into a subscriber when the broadcasting data is a subscriber output signal (the third step).

15. The method according to claim 14, when the broadcasting receiving device further comprises a phoning function, and when the interactive demand signal is a return phone demand signal and includes return phone number information,

wherein the subscriber input of the first step is to phone with the return phone than to direct input the return number;

when the return data of the first step is to demand phone connection to the return phone number via the mobile communication network.

16. The method according to claim 14, when the interactive demand signal includes data for home shopping service,

wherein the subscriber input of the first step is to select purchase products;
and

wherein the return data of the first step includes the subscriber input and information on purchased products.

17. The method according to claim 14, when the interactive demand signal includes data for votes, polls, interactive movies and games requiring the selection of subscribers,

wherein the subscriber input of the first step is the input for the selection of subscribers; and

wherein the return data of the first step includes the input of the subscribers and information on selected particulars.

18. The method according to claim 14, when the subscriber administering signal is to demand information on channels that subscribers currently watch or watched for a predetermined period,

wherein the return data of the second step includes the information on channels that subscribers currently watch or watched for a predetermined period.

19. The method according to claim 14, wherein the broadcasting receiving device further comprises a self-trouble detecting means; and

when the self-trouble detecting means checks troubles in the first through third steps, further comprising the fourth step of preparing return data based on information of troubles and transmitting the return data into a mobile communication network.

20. The method according to one of claims 14 through 19, wherein the return data corresponds with a data communication system of mobile communication network supported by the mobile communication unit, and includes identifiers selected from the group of a phone number given to the mobile communication unit, a MAC address given to a subscriber terminal, a subscriber identifying number and combinations thereof.
Fig. 4

START

S10: INITIATE VARIABLES

S20: RECEIVE BROADCASTING DATA

S30: IS THERE INTERACTIVE DEMAND SIGNALS?

S35: IS THERE SUBSCRIBER INPUT?

S40: IS THERE SUBSCRIBER ADMINISTERING SIGNALS?

S50: GENERATE RETURN DATA

S60: TRANSMIT RETURN DATA

S70: OUTPUT BROADCASTING DATA
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04N 7/173

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 7/173, H04B 7/005, H04N 1/10, H04B 7/14, H04B 7/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Patents and applications since 1975
Korean Utility models and applications Utility since 1975

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US005412416A(NBL COMMUNICATION, INC) 02 MAY 1995 SEE THE WHOLE DOCUMENT</td>
<td>1-20</td>
</tr>
<tr>
<td>Y</td>
<td>US005729549A(BELL ATLANTIC NETWORK SERVICES, INC) 17 MARCH 1998 SEE THE WHOLE DOCUMENT</td>
<td>1-20</td>
</tr>
</tbody>
</table>

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

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

Date of the actual completion of the international search 25 JULY 2002 (25.07.2002)

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Date of mailing of the international search report 25 JULY 2002 (25.07.2002)

Authorized officer
KO, Kwang Seok
Telephone No. 82-42-481-5771

Form PCT/ISA/210 (second sheet) (July 1998)