SPECIFICATION

TITLE OF THE INVENTION

A BROADCASTING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a broadcasting system in which a broadcast program is offered on pay basis in satellite television broadcasting, cable television broadcasting, or in terrestrial television broadcasting service via broadcasting satellite (BS) or communication satellite (CS).

In the information-oriented society of today, satellite television broadcasting via broadcasting satellite (BS) or communication satellite (CS) as well as cable television broadcasting called CATV (cable television) using coaxial cable or optical fiber cable are increasingly propagated.

Also, multiplex teletext broadcasting for separately transmitting character information via television wave is also being propagated.

In some of these satellite television broadcasting systems, unlike conventional type terrestrial television

broadcasting, to which anybody is entitled to have access, a scrambled television program is transmitted so that only the subscribed viewers who signed the viewing contract can view the program and the subscribed viewers receive the program on pay basis using tuner/decoder, which can descramble the program.

In order to view the program on such pay satellite television broadcasting, it is necessary to use special-purpose tuner/decoder. The tuner/decoder is provided with ID code, which is transmitted regularly (e.g. once monthly) from satellite, and only the tuner/decoder accepting the transmitted ID code can descramble the program.

For this reason, problems may arise in some cases. For instance, the television viewers cannot view by contract in some cases, or if they failed to accept ID code for some reason, it is not possible to view the program even though they have already subscribed for the program.

Because the tuner/decoder is of special-purpose type, many types of tuner/decoders are needed in order to view the programs from many pay satellite television broadcasting systems.

In CATV, which can transmit several tens of channels

at the same time, special channels for broadcasting motion pictures, sports programs, music programs, etc. are broadcast in addition to general channels, which are not scrambled and can be viewed by comprehensive contract. The programs of such special television channels are transmitted as scrambled pay television channels. To view the programs in the scrambled channels, it is necessary to sign a contract for descrambling. Because the contract period is normally renewed by about one month, it is not possible to view the programs by contract signed at any desired time.

In the conventional pay-per-view program receiving system, scramble decode data for descrambling the scrambled broadcasting program signal are supplied to the receiving apparatus through the same electric wave as the broadcasting program signal.

Fig. 15 and Fig. 16 each represents the arrangement of a conventional type receiving apparatus.

The receiving apparatus shown in Fig. 15 is a conventional type example only for receiving the broadcast-ing program. In this receiving apparatus, a display device53 is coupled to a tuner/decoder 51. The tuner/decorder 51 comprises a tuner 54, a decoder 55 coupled to the tuner, and a decoder controller 56 coupled to the tuner 54 and the

decoder 55. An antenna 52 is coupled to the tuner 54, and the display device 53 is coupled to the decoder 55.

In this receiving apparatus, the tuner 54 picks up the scrambled program signal and the scrambled decode data from the received broadcasting wave. The scramble decode data thus picked up is stored in the decoder controller 56 and is supplied to the decoder 55 when the scrambled broadcasting program is viewed, and the scrambled broadcasting program signal is descrambled. Thus, the descrambled broadcasting program is outputted to the display device 53.

Fig. 16 shows a conventional example of a receiving apparatus, which receives broadcasting program and performs recording/playing. The display device 53 is coupled to a tuner/decoder-recorder/player 57 of this receiving apparatus. The tuner/decoder-recorder/player 57 comprises a tuner 54, a decoder 55 coupled to the tuner 54, and a decoder controller 56 coupled to the tuner 54 and to the decoder 55, and further, a recorder 58 coupled to the decoder 55, and a player 59 coupled to the recorder 58. An antenna 52 is coupled to the tuner 54, and the display device 53 is coupled to the player 59.

The tuner 54 of the tuner/decoder-recorder/player 57

picks up the scrambled program signal and the scrambled decode data from the received broadcasting wave. The scramble decode data thus picked up is stored in the decoder controller 56 and is supplied to the decoder 55 when the scrambled broadcasting program signal is recorded, and the broadcasting program signal is descrambled. Thus, the descrambled broadcasting program signal is recorded on tape or disk at the recorder 58. The broadcasting program signal recorded on tape or disk is played by the player 59 and is outputted to the display device 53.

In order to have access to live sports programs, motion picture programs or music programs to be broadcast through the scrambled satellite television broadcasting or CATV channels, there is a special system, in which a viewing time recorder is installed on each television set, and a fee is to be paid by deferred payment based on the actually viewed programs. However, much labor is required for the control and fee collection for such system.

When a television viewer receives programs from terrestrial or satellite television broadcasting and secondarily distributes them to a number of display devices, general television viewers may have to pay for some of the programs due to copyright even though the programs are

offered free of charge from the original broadcasting station.

In this way, if the viewer wants to distribute the programs from terrestrial or satellite television broadcasting on pay basis, there is no means to sign the subscription contract for individual programs same as in the cases of viewing satellite television broadcasting or CATV programs, and each viewer must sign subscription contract for each channel for the distribution.

To solve the above problems, the present inventors have filed Japanese Patent Application No. 4-199942, which discloses a pay broadcasting system, characterized in that a charging center sends a viewing permit code for viewing a pay program to a data communication device in response to a request for viewing the pay program, which is executed from a pay-per-program viewer through a public telephone line by a data communication device and collects a fee for such program, and a receiving device, when it accepts the viewing permit code, displays a pay program according to the viewing permit code.

In the following, description will be given on the above invention.

Fig. 1 shows a pay-per-view broadcasting system of the present invention. The broadcasting system comprises a satellite television broadcasting system 1, a CATV system 2, a multiplex teletext broadcasting system 3 using terrestrial television broadcasting, and a charging system 4.

In the satellite television broadcasting system 1 using BS or CS, reference numeral 11 represents a terrestrial station of satellite television broadcasting, and television wave including a program code and a scrambled television signal is transmitted from a satellite communication transmitting antenna 12 to a geostationary satellite 13 on a geostationary orbit about 36,000 km above the equator.

When the television wave from satellite communication transmitting antenna 12 is received, the geostationary satellite 13 amplifies the received television wave, converts it to the frequency in the order of 10 GHz, and transmits it to the ground.

The viewer receives the television wave of 10 GHz from the geostationary satellite 13 by a satellite television broadcasting receiving antenna 14, and the wave is converted to the frequency in the order of 1 GHz and is sent to a satellite television broadcasting receiving tuner/decoder

15. The satellite broadcasting receiving tuner/decoder 15 picks up video signal and audio signal from the television wave, sends them directly as video and audio signals to a television set or converts them again to the frequency receivable by the television set.

This satellite broadcasting system itself is the same as a conventional system, while, in this satellite television broadcasting, the program is scrambled, and only the viewers having the viewing permit code for descrambling the program can view the television program.

In CATV system 2, reference numeral 21 represents a CATV broadcasting center, 22 a coaxial cable or an optical fiber cable for transmitting TV signal, and 23 is a CATV adapter/decoder. CATV adapter/decoder 23 picks up video signal and audio signal from CATV signal, descrambles them by decode signal. Further, the signals are sent directly as video and audio signals to the television set or by converting them to the frequency receivable by the television set.

In the multiplex teletext broadcasting system 3, reference numeral 31 is a terrestrial multiplex teletext broadcasting station for transmitting television signal

with multiplex teletext on television wave program as terrestrial television wave from a television transmitting antenna 32. The transmitted terrestrial television wave is received by a television wave receiving antenna 33, and multiplex teletext signal is picked up from the television signal by a multiplex teletext adapter 34, and the signal is distributed to display devices 35, 35, 35, ... such as video monitor, LED (light emitting diode) display device, LCD (liquid crystal device) display device, display-phone, personal computer display device, etc.

On the other hand, the charging system 4 comprises a charging center 41, a public telephone line 42 and a data communication device 43.

In this charging system 4, the pay-per-viewer requests to the charging center 41 through the public telephone line 42 by the data communication device 43 such as display-phone.

Upon receipt of the request from the pay-per-viewer, a viewing permit code for viewing a pay program is sent from the charging center 41 to the data communication device 43.

The viewing permit code sent to the data communication device 43 is sent to a satellite broadcasting tuner/decoder 15, a CATV adapter/decoder 23 or a multiplex teletext

adapter 34 by on-line via a parallel data line, serial data line of RS-232C standard or ordinary public telephone line using modem, or by off-line via semiconductor memory unit such as IC card, memory card, etc. or magnetic memory unit such as magnetic card, magnetic disk, etc.

Upon receipt of the viewing permit code, the satellite broadcasting tuner/decoder 15, CATV adapter/decoder 23 or multiplex teletext adapter 34 descrambles the program, to which a program code corresponding to the viewer permit code had been given, and television signal is sent to a television set 16 or 24 or teletext signal is sent to display devices 35, 35, 35, ... Thus, the viewable picture is displayed on the television set 16 or 24, and character signal is displayed on the display devices 35, 35, 35, ...

On the other hand, the information of a fee for each pay program and the viewing permit code for each pay program are sent in advance from the satellite broadcasting terrestrial station 11, CATV center 21 or the terrestrial wave broadcasting station 31 to the charging center 41. The charging center 41 sends scrambled decode data, i.e. the viewing permit code to the viewers, who had requested for viewing, and collects the fee on behalf of the satellite broadcasting terrestrial station 11, CATV center 21 or the

terrestrial wave broadcasting station 31.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a broadcast system to actualize the so-called "pay-per-view", in which viewers can receive individual program on pay basis without signing a comprehensive contract.

For this purpose, the broadcast system according to one aspect of the present invention includes a receiver comprising a recording apparatus for receiving and recording scrambled broadcast program signals on a recording medium; means for supplying descrambled data for descrambling scrambled signals; and a player decoder apparatus for decoding the scrambled signal obtained by playing the recorded medium and for supplying a descrambled signal to a display device.

In one embodiment of a broadcast system in accordance with the present invention the player decoder apparatus preferably comprises a player for playing the scrambled broadcasting program signal recorded by the recorder; and a decoder for descrambling the scrambled broadcasting program signal by the scramble decode data supplied from a decoder controller and for outputting it to a display device.

Preferably, the decoder controller is coupled with a data communication device for accepting the scramble decode data sent from a charging centre and used for supplying the scramble decode

data accepted by said data communication to said decoder.

Preferably, a tuner can be provided for picking up scrambled broadcasting program signals from a receiving broadcasting wave.

In an alternative preferred form of the system in accordance with the present invention there is provided an encoder for scrambling a signal and for supplying it to a recorder; and a recorder for recording the scrambled signal supplied from said encoder to a recording medium.

Conveniently, there may also be provided a player for playing a recording medium and for supplying scrambled signals to a decoder; and said decoder for descrambling the scrambled signals supplied from said player and for outputting it said display device.

The scramble decode data is supplied on on-line basis by public telephone and telegraph line through communication system or on off-line bases by IC card, etc. The scramble decode data is supplied from the communication system to the decoder controller on on-line basis by electric signal, electric wave, light or sound wave or on off-line basis by IC card or flexible disk.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a general view of a broadcast system according to the present invention;

Fig. 2 is a block diagram of a decoder of an embodiment of the present invention;

Fig. 3 is a block diagram of a decoder of another embodiment of the present invention;

Fig. 4 is a block diagram of a tuner/decoder;

Fig. 5 is a block diagram of a further tuner/decoder;

Fig. 6 is a block diagram of a further decoder-recorder/player;

Fig. 7 is a block diagram of another decoder-recorder/player;

Fig. 8 is a block diagram of a tuner/decoder-recorder/player

Fig. 9 is a block diagram of another tuner/decoder-recorder/player

Fig. 10 is a block diagram of a decoder-recorder/player of an embodiment of the present invention;

Fig. 11 is a block diagram of a decoder-recorder/player of another embodiment of the present invention;

Fig. 12 is a block diagram of a tuner/decoder-

recorder/player of an embodiment of the present invention;

Fig. 13 is a block diagram of a tuner/decoder-recorder/player of another embodiment of the present invention;

Fig. 14 is a block diagram of recording/playing system;

Fig. 15 is a block diagram of a conventional type tuner/decoder; and

Fig. 16 is a block diagram of a conventional type tuner/decoder-recorder/player.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following, description will be given on several embodiments of the present invention in connection with the drawings.

First, description will be given on a broadcast system receiver, which only receives broadcasting program signal, referring to Fig. 2 to Fig. 5.

In satellite broadcasting receiving system, CATV receiving apparatus or AV (audio video) system, tuner and decoder are provided separately, and these are used in combination. Fig. 2 and Fig. 3 each shows an embodiment, in which tuner and decoder are provided separately.

The broadcast receiver shown in Fig. 2 is the most basic arrangement of a receiving apparatus, which only receives broadcasting program signal. To a decoder apparatus 101, serving as a broadcast receiver, a tuner 105, a data communication device 107 and a display device 103 are coupled.

The decoder apparatus 101 comprises a decoder 106 and a decoder controller 108 coupled to the decoder 106. The

tuner 105, to which an antenna 102 is coupled, is coupled to the decoder 106, and the display device 103 is coupled to the decoder 106. The data communication device 107, which is coupled to a charging center 104 through public telephone line, is coupled to the decoder controller 108.

To the decoder 106 of the decoder apparatus 101, scrambled broadcasting program signal picked up from broadcasting wave received by the antenna 102 by the tuner 105 is supplied. On the other hand, to the viewing request executed through public telephone line, scramble decode data, which is a viewing permit code, is sent from the charging center 104 tothe decoder controller 108 through the data communication device 107.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scrambled decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when viewing the scrambled broadcasting program, and the scrambled broadcasting program signal supplied from the tuner 105 is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communication devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving apparatus by a single apparatus.

If the function of an FM receiving set is given to this PDA device, it can be used as a receiving apparatus for FM multiplex teletext broadcasting.

Another form of broadcast receiver is shown in Fig. 3 being similar to the receiver shown in Fig. 2. To a decoder apparatus 109, serving as a broadcast receiver, a tuner 105 and a display device 103 are coupled. The decoder apparatus 109 comprises a decoder 106, a decoder controller 108 coupled to the decoder 106, and a data communication device 107 coupled to the decoder controller 108. A tuner 105, to which an antenna 102 is coupled, is coupled to the decoder 106, and the display device 103 is coupled to the decoder 106. A charging center 104 is coupled to the data communication device 107 through public telephone line.

To the decoder 106 of the decoder apparatus 109, scrambled broadcasting program signal picked up by the tuner 105 from broadcasting wave received by the antenna 102 is supplied. On the other hand, to a request of viewing executed through public telephone line, scramble decode data, which is a viewing permit code, is supplied to the decoder controller 108 through the data communication device 107 from the charging center 104.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store

the scramble decode data thus supplied, while it may be stored, in addition to the decoder controller 108, at data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when viewing scrambled broadcasting program, and the scrambled broadcasting programsignal supplied from the tuner is descrambled.

Thus, the descrambled broadcasting program signal is outputted to the display device 103.

In the most commonly used receiving apparatus, the tuner and the decoder are integrally provided.

Fig. 4 and Fig. 5 each represents an apparatus, in which a tuner and a decoder are integrated. To a tuner/decoder apparatus 110, serving as a receiving apparatus, a display device 103 is coupled.

The tuner/decoder 110 comprises a tuner 105, a decoder 106 coupled to the tuner 105, and a decoder controller 108 coupled to the decoder 106. An antenna 102 is coupled to the tuner 105, and a display device 103 is coupled to the decoder 106. A data communication device 107 provided outside the tuner/decoder 110 and coupled to the charging center 104 through public telephone line is coupled to the decoder controller 108.

The tuner 105 of the tuner/decoder 110 picks up scrambled broadcasting program signal from the received broadcasting wave. On the other hand, to a request of viewing executed through public telephone line, scramblede code data, i.e. viewing permit code, is sent from the charging center 104 to the data communication device 107. The scrambled decode data sent to the data communication device 107 is supplied to the decoder controller 108 of thet uner/decoder 110 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to storet he supplied scrambled decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when viewing the scrambled broadcasting program , and the scrambled broadcasting program signal is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communi-

cation devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving apparatus by a single apparatus.

If the function of an FM receiving set is given to this PDA device, it can be used as a receiving apparatus for FM multiplex teletext broadcasting.

Fig. 5 shows another form of the receiving apparatus of Fig. 4. To a tuner/decoder 111, serving as a receiving apparatus, a display device 103 is coupled.

The tuner/decoder 111 comprises a tuner 105, a decoder

106 coupled to the tuner 105, a data communication device 107, and a decoder controller 108 coupled to the data communication device 107 and the decoder 106. An antenna 102 is coupled to the tuner 105, and the display device 103 is coupled to the decoder 106. A charging center 104 is coupled to the data communication device 107 through public telephone line.

The tuner 105 of the tuner/decoder 111 picks up scrambled broadcasting program signal from broadcasting wave received by the antenna 102. On the other hand, to a request of viewing executed through public telephone line, scramble decode data, i.e. viewing permit code, is sent to the decoder controller 108 through the data communication device 107 from the charging center 104.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when viewing the scrambled broadcasting program, and the scrambled broadcasting program signal supplied from the tuner 105 is

descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

Next, description will be given on a form of a receiving apparatus for receiving broadcasting program signal and for performing recording/playing, referring to Fig. 6 to Fig. 9.

Fig. 6 and Fig. 7 each represents one form of a receiving apparatus, in which a tuner is separately furnished.

The receiving apparatus shown in Fig. 6 has the most basic arrangement of a receiving apparatus, which receives broadcasting program signal and performs recording/playing. To a decoder-recorder/player 112, serving as a receiving apparatus, a tuner 105, a data communication device 107 and a display device 103 are coupled.

The decoder-recorder/player 112 comprises a decoder 106 and a decoder controller 108 coupled to the decoder 106, and further, a recorder 113 coupled to the decorder 106, and a player 114 coupled to the recorder 113. The tuner with an antenna 102 coupled to it is coupled to the decoder 106, and

the display device 103 is coupled to the player 114. The data communication device 107 coupled to a charging center 104 via public telephone line is coupled to a decoder controller 108.

To the decoder 106 of the decoder-recorder/player 112, scrambled broadcasting program signal picked up by the tuner 105 from broadcasting wave received by the antenna 102 is supplied. On the other hand, to a request of viewing executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the decoder controller 108 through the data communication device 107.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when recording the scrambled broadcasting program signal, and the scrambled broadcasting program signal supplied from the tuner 105 is descrambled.

In this way, the descrambled broadcasting program signal is recorded on a recording medium such as tape or

disk by the recorder 113. The broadcasting program signal recorded on the recording medium is played by the player 114 and is outputted to the display device 103.

The receiving apparatus shown in Fig. 7 is another form of the receiving apparatus of Fig. 6. To a decoder-recorder/player 115, serving as a receiving apparatus, a tuner 105 and a display device 103 are coupled.

The decoder-recorder/player 115 comprises a decoder 106, a decoder controller 108 coupled to the decoder 106, and a data communication device 107 coupled to the decoder controller 108, and further, a recorder 113 coupled to the decorder 106, and a player 114 coupled to the recorder 113.

The tuner 105 with an antenna 102 coupled to it is coupled to the decoder 106, and the display device 103 is coupled to the player 114. A charging center 104 is coupled to the data communication device 107 through public telephone line.

To the decoder 106 of the decoder-recorder/player 115, scrambled broadcasting program signal picked up by the tuner 105 from broadcasting wave received by the antenna 102 is supplied. On the other hand, to a request of viewing executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging

center 104 to the decoder controller 108 through the data communication device 107.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when recording the scrambled broadcasting program signal, and the scrambled broadcasting program signal supplied from the tuner 105 is descrambled.

In this way, the descrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. The broadcasting program signal recorded on the recording medium is played by the player 114 and is outputted to the display device 103.

Fig. 8 and Fig. 9 each represents one form of a receiving apparatus integrated with a tuner.

To a tuner/decoder-recorder/player 116, serving as a receiving apparatus of Fig. 8, a display device 103 is coupled. The tuner/decoder-recorder/player 116 comprises at uner 105, a decoder 106 coupled to the tuner 105, and a

decoder controller 108 coupled to the decoder 106, and further, a recorder 113 coupled to the decoder 106, and a player 114 coupled to the recorder 113. An antenna 102 is coupled to the tuner 105, and the display device 103 is coupled to the player 114. A data communication device 107 provided outside the tuner/decoder-recorder/player 116 and coupled to the charging center 104 through public telephone line is coupled to the decoder controller 108.

The tuner 105 of the tuner/decoder-recorder/player 116 picks up scrambled broadcasting program signal from received broadcasting wave. On the other hand, to a request of viewing executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication device 107. The scramble decode data sent to the data communication device 107 is sent to the decoder controller 108 of the tuner/decoder-recorder/player 116 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the

decoder 106 from the decoder controller 108 when recording the scrambled broadcasting program signal, and the broadcasting program signal supplied from the tuner 105 is descrambled.

In this way, the descrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. The broadcasting program signal recorded on the recording medium is played by the player 114 and is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communication devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public

telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving apparatus by a single apparatus.

If the function of an FM receiving set is given to this PDA device, it can be used as a receiving apparatus for FM multiplex teletext broadcasting.

Fig. 9 represents an alternative form of the receiving apparatus shown in Fig. 8. To a tuner/decoder-recorder/player 117, serving as a receiving apparatus, a display device 103 is coupled. The tuner/decoder-recorder/player 117 comprises a tuner 105, a decoder 106 coupled to the tuner 105, a data communication device 107, a decoder controller 108 coupled to the data communication device 107 and the decoder 106, and further, a recorder 113 coupled to the decoder 106, and a player 114 coupled to the recorder 114. An antenna 102 is coupled to the tuner 105, and the display device 103 is coupled to the player 114. The data communication device 107 is coupled to a charging center 104 through public telephone line.

The tuner 105 of the tuner/decoder-recorder/player 117 picks up scrambled broadcasting program signal from received broadcasting wave. On the other hand, to a vieving appli-

cation executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication device 107, and the scramble decode data sent to the data communication device 107 is supplied to the decoder controller 108 of the tuner/decoder-recorder/player 117 andis stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, ina ddition to the decoder controller 108, at the data communication device 107 or other means.

The stored scramble decode data is supplied to the decoder 106 from the decoder controller 108 when recording the scrambled broadcasting program signal, and the broadcasting program signal supplied from the tuner 105 is descrambled.

In this way, the descrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. The broadcasting program signal recorded on the recording medium is played by the player 114 and is outputted to the display device 103.

Next, referring to Fig. 10 to Fig. 13, description will be given on various embodiments of the invention, each of which is a

for receiving broadcasting program signal and performs recording/playing and has the same element as the receiving apparatus of Fig. 6 to Fig. 9 but has different order of the elements.

By the arrangement of these embodiments, it is possible to record a plurality of programs broadcast at midnight without subscription and to achieve pay-per-view on demand basis, i.e. to descramble any of the recorded broadcasting program signal.

Fig. 10 and Fig. 11 each represents an embodiment of a broadcast receiver in which a tuner is separately arranged.

The receiver shown in Fig. 10 is a receiving apparatus with the most basic arrangement and has different arrangement from that of the receiving apparatus as described above, which receives broadcasting program signal and performs recording/playing. To a decoder-recorder/player 118, serving as a receiving apparatus, a tuner 105, a data communication device 107 and a display device 103 are coupled. The decoder-recorder/player 118 comprises a recorder 113, a player 114 coupled to the recorder 113, a decoder controller 108, and a decoder 106 coupled to the decoder controller 108 and the player 114. The tuner 105 with an antenna 102 coupled to it is coupled to the recorder 113, and the data communication device 107 provided outside

the tuner-recorder/player 118 and coupled to the charging center 104 through public telephone line is coupled to the decoder controller 108.

The tuner 105 coupled to the decoder-recorder/player 118 picks up scrambled broadcasting program signal from received broadcasting wave, and the scrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. On the other hand, to a request of viewing executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication device 107. The scramble decode data sent to the data communication device 107 is sent to the decoder controller 108 of the tuner-recorder/player 118 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The scramble decode data thus stored is supplied from the decoder controller 108 to the decoder 106 when the broadcasting program signal, which is recorded on the recording medium as it is scrambled, is played by the

player 114, and the scrambled broadcasting program signal is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communication devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving apparatus by a single apparatus.

If the function of an FM receiving set is given to this

PDA device, it can be used as a receiver for FM multiplex teletext broadcasting.

Fig. 11 represents another embodiment of the broadcast receiver shown in Fig. 10. To a decoder-recorder/player 119, serving as a r e c e i v e r, a tuner 105 and a display device 103 are coupled. The decoder-recorder/player 119 comprises a recorder 113, a player 114 coupled to the recorder 113, a data communication device 107, a decoder controller 108 coupled to the data communication device 107, and a decoder 106 coupled to the decoder controller 108 and the player 114. The tuner 105 with an antenna 102 coupled to it is coupled to the recorder 113, a display device 103 is coupled to the decorder 106, and the data communication device 107 is coupled to a charging center 104 through public telephone line.

The tuner 105 coupled to the decoder-recorder/player 119 picks up scrambled broadcasting program signal from received broadcasting wave, and the scrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. On the other hand, to a request of viewing executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication

device 107 of the decoder-recorder/player 119. The scramble decode data sent to the data communication device 107 is sent to the decoder controller 108 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The scramble decode data thus stored is supplied from the decoder controller 108 to the decoder 106 when the broadcasting program signal, which is recorded on the recording medium as it is scrambled, is played by the player 114, and the scrambled broadcasting program signal is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communication devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices

include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving apparatus by a single apparatus.

If the function of an FM receiving set is given to this PDA device, it can be used as a receiving apparatus for FM multiplex teletext broadcasting.

Fig. 12 and Fig. 13 each represents an embodiment of a receiving apparatus with a tuner integrated with it.

To a tuner/decoder-recorder/player 120, serving as a broadcast receiver of Fig. 12, a display device 103 is coupled. The tuner/decoder-recorder/player 112 comprises a tuner 105, a recorder 113 coupled to the tuner 105, a player 114 coupled to the recorder 113, a decoder controller 108, and a decoder 106 coupled to the decoder controller 108, and further, the decoder 106 is coupled to the player 114. An

antenna 102 is coupled to the tuner 105, and a data communication device 107 provided outside the tuner/decoder-recorder/player 120 and coupled to the charging center 104 through public telephone line is coupled to the decoder controller 108.

The tuner 105 of the tuner/decoder-recorder/player 120 picks up scrambled broadcasting program signal from received broadcasting wave, and the scrambled broadcasting program signal is recorded on a recording medium such as tape or disk by the recorder 113. On the other hand, to a request of viewing through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication device 107. The scramble decode data sent to the data communication device 107 is supplied to the decoder controller 108 of the tuner-recorder/player 120 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The scramble decode data thus stored is supplied from the decoder controller 108 to the decoder 106 when the

broadcasting program signal, which is recorded on the recording medium as it is scrambled, is played by the player 114, and the scrambled broadcasting program signal is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

A data communication device 43 of a system shown in Fig. 1 is a display phone. In addition, the data communication devices include telephone set capable to execute data communication such as pushbutton telephone set, portable telephone set, etc. or devices such as personal computer or word-processor connected with modem.

On-line input means from the data communication devices include communication means using cable such as RS232C as wired input means, and communication means such as electric wave, light, ultrasonic wave, etc. as wireless input means. Also, IC card, flexible disk, etc. are available as off-line input means.

If the so-called PDA (personal digital assistants), i.e. a portable electronic device connectable to public telephone line and having optical communication function, is used, it is possible to accept decode information from the charging center and to supply it to the receiving

apparatus by a single apparatus.

If the function of an FM receiving set is given to this PDA device, it can be used as a receiving apparatus for FM multiplex teletext broadcasting.

The receiver shown in Fig. 13 is another embodiment of the broadcast receiver of Fig. 12. To a tuner/decoder-recorder/player 121, serving as a receiving apparatus, a display device 103 is coupled. The tuner-recorder/player 121 comprises a tuner 105, a recorder 113 coupled to the tuner 105, a player 114 coupled to the recorder 113, a data communication device 107, a decoder controller 108 coupled to the data communication device 107, and the decoder 106 coupled to the decoder controller 108, and further, the player 114 is coupled to the decoder 106. The tuner 105 is coupled to an antenna 102, and the display device 103 is coupled to the decoder 106. The data communication device 107 is coupled to a charging center 104 through public telephone line.

The tuner 105 of the tuner-recorder/player 121 picks up scrambled broadcasting program signal from received broadcasting wave, and the scrambled broadcasting program signal is recorded on recording medium such as tape or disk by the recorder 113. On the other hand, to a request of viewing

executed through public telephone line, a scramble decode data, i.e. a viewing permit code, is sent from the charging center 104 to the data communication device 107, and the scramble decode data sent to the data communication device 107 is supplied to the decoder controller 108 and is stored there.

When a broadcasting program is broadcast after a request of viewing has been filed, it is necessary to store the supplied scramble decode data, and it may be stored, in addition to the decoder controller 108, at the data communication device 107 or other means.

The scramble decode data thus stored is supplied from the decoder controller 108 to the decoder 106 when the broadcasting program signal, which is recorded on the recording medium as it is scrambled, is played by the player 114, and the scrambled broadcasting program signal is descrambled.

In this way, the descrambled broadcasting program signal is outputted to the display device 103.

The apparatus shown in Fig. 14 does not fall within the concept of a broadcast receiver because no tuner is provided, however, it is given to illustrate a recorder apparatus

This system comprises a recording apparatus 122 and a playing apparatus 126. The recording apparatus 122 comprises an encoder 124, serving as a scrambler, and a recorder 113. The playing apparatus 126 comprises a player 114 and a decoder 127, serving as a descrambler.

In the recording apparatus 122, an audio signal or a video signal 123 is scrambled by the encoder 124 and is supplied to the recorder 113 in the scrambled state, and it is recorded on a recording medium 125 such as tape or disk.

In the playing apparatus 126, the signal recorded on the recording medium 125 in scrambled state is sent to the player 114 and it is descrambled by the decoder 127 by descramble data stored in a descramble data supplying means 128 such as IC card and the like, which is supplied separately from the recording medium to be played. Thus, the descrambled audio or video signal is outputted on the display device 103.

By the system and the apparatus with the above arrangement, it is possible to record a plurality of programs on the recording media and to sell or rent it, and also to view a desired program from among the recorded programs.

In the above embodiments, description has been given on the broadcast systems used in a charging system for television broadcasting or audio broadcasting. However, these systems can be applied for the other information transmitting means, for which it is desired to charge a fee for each individual program, e.g. broadcasting and communication means such as data broadcasting, data communication, etc., or various types of broadcasting and communication means using terrestrial waves such as data broadcasting or data communication such as multiplex television broadcasting or FM multiplex broadcasting. Thus, it is possible according to the present invention to provide a receiving apparatus to charge the scrambled broadcasting program.

The broadcasting system described herein is also described and claimed in Divisional Appln. No.(22521/GBD) GB 9526301.8

CLAIMS:

1. A broadcast system including a receiver comprising a recording apparatus for receiving and recording scrambled broadcast program signals on a recording medium;

means for supplying descrambled data for descrambling scrambled signals; and

a player decoder apparatus for decoding the scrambled signal obtained by playing the recorded medium and for supplying a descrambled signal to a display device.

2. A system as claimed in claim 1, wherein the player decoder apparatus comprises a player for playing scrambled broadcasting program signal recorded by said recorder.

3. A system as claimed in claim 1 or claim 2, wherein the player decoder apparatus comprises a decoder for descrambling the scrambled broadcasting program signal by the scrambled decode data supplied from a decoder controller and for outputting it to the display device.

4. A system as claimed in claim 3, wherein the decoder controller is coupled with a data communication device for accepting a scramble decode data sent from a charging centre and used for supplying the scramble decoder data accepted by said data communication device to

said decoder.

5. A system as claimed in any of the preceding claims, including a tuner for picking up scrambled broadcasting program signals from a receiving broadcasting wave.

6. A system as claimed in claim 1, comprising an encoder for scrambling a broadcasting signal and for supplying it to the recording apparatus; and a recorder constituting the recording apparatus for recording the scrambled signal supplied from said encoder to the recording medium.

7. A system as claimed in claim 6, comprising a player for playing the recording medium and for supplying scrambled signals to a decoder constituting at least part of the player decoder apparatus for descrambling the scrambled signal arranged to be supplied from said player and for outputting to said display device.

8. A broadcast system as claimed in claim 1, and substantially as herein before described with reference to, and as illustrated in, Fig. 10, or Fig. 11, or Fig. 12, or Fig. 13 of the accompanying drawings.