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(54) **Titre : TABLE DE CANAUX VIRTUELS POUR PROTOCOLE DE DIFFUSION, ET METHODE DE DIFFUSION ET DE RECEPTION DE SIGNAUX DE DIFFUSION AINSI UTILISES**

(54) **Title: VIRTUAL CHANNEL TABLE FOR A BROADCAST PROTOCOL AND METHOD OF BROADCASTING AND RECEIVING BROADCAST SIGNALS USING THE SAME**

Syntax	Bits	Format
terrestrial_virtual_channel_table_section () {		
table_id	8	0xC8
section_syntax_indicator	1	'1'
private_indicator	1	'1'
reserved	2	'11'
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
num_channels_in_section	8	uimsbf
for(i=0; i<num_channels_in_section;i++) {		
short_name	7*16	unicode™BMP
reserved	4	'1111'
major_channel_number	10	uimsbf
minor_channel_number	10	uimsbf
modulation_mode	8	uimsbf
carrier_frequency	32	uimsbf
channel_TSID	16	uimsbf
program_number	16	uimsbf
ETM_location	2	uimsbf
access_controlled	1	bslbf
hidden	1	bslbf
reserved	2	'11'
hide_guide	1	bslbf
reserved	3	'111'
service_type	6	uimsbf
source_id	16	uimsbf
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0;i<N;i++) {		
descriptors()		
}		
}		
reserved	6	'111111'
additional_descriptors_length	10	uimsbf
for(j=0; j<N;j++) {		
additional_descriptors()		
}		
CRC_32	32	rpchof
}		

(57) **Abrégé/Abstract:**
A method of processing a digital broadcasting signal in a digital receiver comprises receiving in a tuner, a digital broadcasting signal including a virtual channel table (VCT) which includes a short name field, a major channel number field and a minor channel

(57) **Abrégé(suite)/Abstract(continued):**
number field. In the case of an inactive channel, the program number field is set to zero, and the short name, major channel number and minor channel number fields reflect the name and channel number of the inactive channel. The inactive channel is a channel that is not presently carrying a broadcast program but is scheduled to carry a broadcast program at a predetermined later time from a broadcasting station without local viewer interaction. The corresponding virtual channel is displayed through processing by a display processor, and when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

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ABSTRACT

A method of processing a digital broadcasting signal in a digital receiver comprises receiving in a tuner, a digital broadcasting signal including a virtual channel table (VCT) which includes a short name field, a major channel number field and a minor channel number field. In the case of an inactive channel, the program number field is set to zero, and the short name, major channel number and minor channel number fields reflect the name and channel number of the inactive channel. The inactive channel is a channel that is not presently carrying a broadcast program but is scheduled to carry a broadcast program at a predetermined later time from a broadcasting station without local viewer interaction. The corresponding virtual channel is displayed through processing by a display processor, and when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

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VIRTUAL CHANNEL TABLE FOR A BROADCAST PROTOCOL AND METHOD OF BROADCASTING AND RECEIVING BROADCAST SIGNALS USING THE SAME

This application is a divisional of Canadian Patent Application No. 2,730,368, which is a divisional of Canadian Patent Application Serial No. 2,628,000, which is a divisional of Canadian Patent Application Serial No. 2,575,037, which is a divisional of Canadian Patent Application Serial No. 2,322,909, filed on October 6th, 2000.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a virtual channel table for a broadcast protocol and a method of broadcasting using the same.

Discussion of the Related Art

Generally a program and system information protocol (hereinafter, referred to PSIP) of an advanced television systems committee (hereinafter, referred to as ATSC) standard for digital television broadcasting contains a virtual channel table (VCT).

The PSIP typically contains an electronic program guide (EPG) and system information (SI). The PSIP is defined as the protocol of the ATSC standard for terrestrial and cable digital television broadcasting, which parses encoded messages by using a moving picture experts group-2 (MPEG-2; ISO/IEC 13818-1) system to thereby provide various kinds of information on the broadcast programs. This ATSC standard is described in

"Program and System Information Protocol For Terrestrial Broadcast and Cable", ATSC Document A/65, 23 DEC 1997.

In other words, the PSIP transmits and receives audio/video data with MPEG-2 video and AC-3 audio formats, and contains several tables for transmitting information on the channel of each broadcasting station, and information on the programs on each channel. The PSIP has a primary function of conducting the audio and video services of the broadcast corresponding to a desired channel, and an additional function of conducting the electronic program service for the broadcast programs.

The channel information for the channel selection and the packet identification (PID) information for reception of the audio and video data are contained in a virtual channel table (VCT), and the electronic program service information on the broadcast programs on each channel is contained in an event information table (EIT). Also, the PSIP contains a system time table (STT) for time information, a rating region table (RRT) for transmitting information on the region and organization for program rating, an extended text table (ETT) for providing an additional explanation on the channel and broadcast program, and a master guide table (MGT) for management of the version of each table mentioned above and the packet identification (PID). These tables are transmitted in data units, which are called sections. Namely, all of the tables have one or more sections as a basic unit.

By way of example, the virtual channel table may be divided into 256 sections. A single section may contain information on several virtual channels, but information for a

single virtual channel may not be spread over on two or more sections.

Fig. 1 is a diagram illustrating the bit stream syntax of a general virtual channel table for terrestrial broadcast, which has been described in the above-mentioned document A/65. The general virtual channel table contains a transport stream identifier, a major channel number, a minor channel number, a short channel name, a carrier frequency, a program number and the like, and contains additional information in the descriptor(s) thereof.

Referring to Fig. 1, the virtual channel table has the table identifier field of "0xC8", and the value of the packet identification (PID) for the virtual channel table is "0x1FFB". The version number field "version_number" represents the version value of the virtual channel table, the section number field "section_number" represents a corresponding section number, the last section number field "last_section_number" represents a last section number of the virtual channel table, and the section number channel field "num_channels_in_section" represents the number of whole virtual channels existing within the sections of the virtual channel table.

The short name field "short_name" within the statement in the "for_loop" represents the name of the virtual channel, and the major channel number field "major_channel_number" represents a major channel number among the virtual channels defined in the statement mentioned above. Each virtual channel number is connected to the major and minor channel numbers, respectively, and the major and minor channel numbers function as the user reference number for the

corresponding virtual channel. In other words, the virtual channel table carries the data for each virtual channel through the statement of the "for_loop".

The program number field "program_number" contains the information for connecting the virtual channel where the MPEG-2 program association table (PAT) and program map table (PMT) are defined, which corresponds to the program numbers in the program association table and the program map table. In this case, the program association table defines the components of the program for every program number, namely, indicates the packet identification of the transport packet transmitting the program map table. The program map table defines the list and the annex information thereof on the packet identification of the

transport packet transmitting the program identification number and the bit stream of the video and audio signals constituting the program.

The source identifier field "source_id" represents the program source connected to the corresponding virtual channel. In this case, the source means a specific source such as image, text, data or sound. The source identifier field "source_id " has a unique value in the transport stream transmitting the virtual channel table. The descriptor length field "descriptors_length" indicates the whole length of the descriptors of the corresponding virtual channel, and the additional descriptor length field "additional_descriptors_length" indicates the whole length of all of the additional descriptors of the virtual channel table.

Fig. 5 shows an exemplary list of descriptors for PSIP tables according to the ATSC standard.

Fig. 2 is a diagram illustrating an example of executing scheduled broadcasting by using four virtual channels in a broadcasting station.

By way of example, it is assumed that the scheduled broadcast as shown in Fig. 2 is executed through the four virtual channels, 51-1, 51-2, 51-3 and 51-8 in an arbitrary broadcast station and a virtual channel table composed of a single section is transmitted.

If the current time is 20:15, the system time table transmits the current time information. In this case, the channels 51-1 and 51-3 broadcasting at the current time 20:15 are defined as the active channels.

On the other hand, the channel 51-2 is not broadcasting at the current time and is going to be broadcast the next day, and the channel 51-8 is going to be broadcast next at 06:00. In this case, the channels 51-2 and 51-8, which are not broadcasting at the current time

20:15 and are going to be broadcast in the future, are defined as the inactive channels.

As a result, each channel may be an active or inactive channel, based upon an arbitrary point in time.

Within the PSIP, the virtual channel table should contain the active channels as required and may also contain the inactive channels as recommended facts, for conducting the electronic program guide.

Therefore, at the current time 20:15 the virtual channel table may contain information on all of the channels 51-1, 51-2, 51-3 and 51-8, and thus a digital television broadcast receiver or a digital cable broadcast receiver receives the virtual channel table to thereby provide the channel selection information to TV viewers.

However, as shown in Fig. 1, according to the bit stream syntax of the virtual channel table according to the A/65 standard, the digital television broadcast receiver or the digital cable broadcast receiver cannot discriminate between the active channels (for example, the channels 51-1 and 51-3) and the inactive channels (for example, the channels 51-2 and 51-8), when parsing the virtual channel table.

As a consequence, the TV viewers see a black screen because of the information on the inactive channels transmitted from the broadcast station for providing the electronic program guide. The black screen means the black background color is displayed on the screen when an inactive channel not broadcasting at a current time is selected. On the other hand, the character message "service not provided" is displayed on the screen of the black background color by the on-screen

display function of the digital television broadcast receiver or the digital cable broadcast receiver. By way of example, if the TV viewer selects the channel 51-2 with a channel up key while viewing the channel 51-1, the audio and video data are not displayed because the channel 51-2 is an inactive channel, such that the black background color is displayed on the screen.

The above-mentioned problem may give many inconvenience to the TV viewers at a point of time when digital television broadcast receivers or digital cable broadcast receivers become popular and a large number of virtual channels are broadcast.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a method of processing a digital broadcasting signal in a digital television receiver, comprising: receiving in a tuner a digital broadcasting signal including a virtual channel table (VCT), the VCT including a version_number field, a section_number field, a last_section_number field, a short_name field, a major_channel_number field, a minor_channel number_field, a modulation_mode field, a carrier_frequency field, a channel_TSID field, a program number field, an ETM_location field, and an access_controlled field, wherein for an inactive channel the program number field is set to zero, wherein for the inactive channel, the short name, major channel number, and minor channel number fields reflect name and channel number of the inactive channel, and wherein the inactive channel is a channel that is not presently carrying a broadcast program; however, the same inactive channel is scheduled to carry a broadcast program at a predetermined later

time from a broadcasting station without local viewer interaction; and processing in a display processor to display the corresponding virtual channel, wherein when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

According to another aspect of the present invention, there is provided a digital television receiver comprising: a tuner to receive a digital broadcasting signal including a virtual channel table (VCT), the VCT including a version_number field, a section_number field, a last_section_number field, a short_name field, a major_channel_number field, a minor_channel_number field, a modulation_mode field, a carrier_frequency field, a channel_TSID field, a program number field, an ETM_location field, and an access_controlled field, wherein for an inactive channel the program number field is set to zero, wherein for the inactive channel, the short name, major channel number, and minor channel number fields reflect name and channel number of the inactive channel, and wherein the inactive channel is a channel that is not presently carrying a broadcast program; however, the same inactive channel is scheduled to carry a broadcast program at a predetermined later time from a broadcasting station without local viewer interaction; and a display processor to process display of the corresponding virtual channel, wherein when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

Other aspects are directed to a virtual channel table that, in some embodiments, may substantially obviate one or more of the problems due to limitations and disadvantages of the related art.

Some embodiments may provide a virtual channel table for a broadcast protocol, and a method of broadcasting by using the same table, which are capable of identifying and permitting discrimination between active and inactive channels from the channels received by a broadcast receiver.

Some embodiments may provide a virtual channel table for a broadcast protocol, and a method of broadcasting by using the same table, which are capable of rapidly displaying only the channels being broadcast at a current time.

Additional features and advantages of embodiments of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of some embodiments of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

According to another aspect, there is provided a virtual channel table for a broadcast protocol which comprises identification information capable of identifying and permitting discrimination between active and inactive channels in the bit stream syntax thereof.

The identification information may be loaded on or included in at least one reserved field in the virtual channel table. Preferably, the identification information assigns at least one or more bits of a reserved field as a flag, thereby indicating that a corresponding channel is an inactive channel.

For example, the value of the program number field "program_number" in the virtual channel table is set to "0", thereby indicating that the corresponding channel is the inactive channel.

The identification information sets the value of the number elements field "number_elements" (which indicates the number of PID's used for a program) of the service position descriptor field "service_location_descriptor" (which is used to list available bit streams by their PID's) in the virtual channel table to "0", thereby indicating that the corresponding channel is an inactive channel.

In a case where the corresponding channel is an inactive channel, the virtual channel table does not contain the service location descriptor field therein, for the purpose of indicating that the corresponding channel is an inactive channel.

According to another aspect, there is provided a method for broadcasting by using a virtual channel table for a broadcasting protocol, which comprises the steps of: including identification information capable of indentifying and permitting discrimination between active and inactive channels in the bit stream syntax of the virtual channel table for a broadcasting protocol and transmitting the virtual channel table, at a transmitting side; and, at a receiving side, determining whether the channel currently received is an active channel or an inactive channel with the identification information defined in the virtual channel table by parsing the virtual channel table transmitted.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of embodiments of the invention.

In the drawings:

FIG. 1 is a diagram illustrating the bit stream syntax of a general virtual channel table for terrestrial broadcast;

FIG. 2 is a diagram illustrating an example of executing schedule broadcasting by using four virtual channels in a broadcast station;

FIG. 3 is a diagram illustrating the bit stream syntax of a virtual channel table for terrestrial broadcast according to an embodiment of the present invention;

FIG. 4 is a diagram illustrating the bit stream syntax of a virtual channel table for cable according to another embodiment of the present invention; and

FIG. 5 is chart listing various descriptors available according to a program and system information protocol of an

advanced television systems committee standard digital television broadcast.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

According to an embodiment of the present invention, a virtual channel table for a broadcast protocol comprises identification information capable of identifying and permitting discrimination between active and inactive channels in the bit stream syntax thereof. A transmitting side, namely, a broadcast station transmits the virtual channel table having the identification information to the receivers. Each of the receivers parses the virtual channel table received, thereby determining whether the channel currently selected is an active channel or an inactive channel.

The identification information, which is capable of identifying and permitting discrimination between an active channel and an inactive channel under the standard of the PSIP, is contained in at least one field of the virtual channel table of the above protocol, such that only active channels being currently broadcast are displayed to TV viewers.

Hereinafter, preferred embodiments of a virtual channel table and a method according to the present invention will be in detail described with reference to Figs. 3 and 4.

In order for a digital television receiver and a digital cable broadcast receiver to parse the virtual channel table and thus to determine whether the channel selected

currently is an active channel or an inactive channel, the bit stream syntax of the virtual channel table may be corrected.

For example, the fact that channels 51-2 and 51-8 are not broadcast at the current time 20:15, but are going to be broadcast in the future, should be recognized in a digital television receiver and a cable broadcast receiver. In a preferred embodiment, the identification information capable of identifying an inactive channel is contained in the program number field "program_number"; the service location descriptor field "service_location_descriptor" and/or other reserved fields contained in the bit stream syntax of the virtual channel table.

Fig. 3 is a diagram illustrating the bit stream syntax of a virtual channel table for terrestrial broadcast according to an embodiment of the present invention. To indicate that a corresponding channel is an inactive channel, the value of the program number field "program_number" is set to "0". And, since there are no audio and video signals of the current service location descriptor, the value of the number elements field "number_elements" of the service location descriptor "service_location_descriptor" is set to "0". Also, or alternatively, to indicate that the corresponding channel is an inactive channel, the service location descriptor "service_location_descriptor" (see Fig. 5) is not contained in the virtual channel table. In other words, for the digital television receiver and the cable broadcast receiver, the service location descriptor field should be contained in the virtual channel table only in a case where the corresponding channel is the active channel. If the corresponding channel is

an inactive channel, however, the service location descriptor field is not contained in the virtual channel table.

In a preferred embodiment, in order to recognize the fact that the corresponding channel is an inactive channel in a more apparent manner, 1 bit of the reserved field of 6 bits for each channel is assigned to define a flag indicative of an inactive channel. In the preferred embodiment, 1 bit in the reserved field between the hidden field "hidden" and the service type field "service_type" in the statement of the "for_loop" is assigned to define a flag indicative of an inactive channel. For example, in a case where the flag indicative of the inactive channel is "1", the corresponding channel is an active channel, and if the flag is "0", the corresponding channel is an inactive channel.

In the preferred embodiment, the above three cases may be added as requirements to the A/65 standard. Any of all of the three cases may be added to the A/65 standard.

As mentioned above, since the information on an inactive channel is contained in the virtual channel table, the digital television receiver can determine whether the virtual channel currently received is an active channel or an inactive channel by parsing only the virtual channel table. For example, if the value of the program number field "program_number" in the virtual channel table is "0", if the value of the information on the inactive channel defined by assigning a predetermined bit in the reserved field is "0", or if the service location descriptor field "service_location descriptor" is not contained in the virtual channel table, the major channel number field "major_channel_number" and the minor channel number field "minor_channel_number" defined in the bit

stream syntax of the virtual channel table currently transmitted can be used to determine that the current virtual channel is an inactive channel for example by both being assigned a value of "0".

On the other hand, if an inactive channel has been determined under the above process, the digital television receiver can skip the inactive channel, without displaying it on

the screen, upon channel conversion by means of a channel up key or a channel down key.

Fig. 4 is a diagram illustrating the bit stream syntax of a virtual channel table for cable according to another embodiment. As shown, the virtual channel table may be applied to cable broadcasting in the same manner as above.

As is apparent from the foregoing description, a virtual channel table for a broadcast protocol, and a method of broadcasting by using the virtual channel table are capable of including the identification information capable of identifying and permitting discrimination between active and inactive channels in a transmitting side, and in a receiving side parsing the virtual channel table to thereby determine whether the channel currently selected is the active channel or the inactive channel. Therefore, inactive channels may be skipped, without being displayed, upon the channel conversion by using a channel up key or a channel down key, such that the TV viewer can enjoy channel surfing in a convenient manner, without viewing a black screen. In addition, the virtual channel table may be transmitted, while containing the inactive channels therein, thereby making it possible to provide a more abundant electronic program service.

It will be apparent to those skilled in the art that various modifications and variations can be made to the embodiments described above. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

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CLAIMS:

1. A method of processing a digital broadcasting signal in a digital television receiver, comprising:

receiving in a tuner a digital broadcasting signal including a virtual channel table (VCT), the VCT including a version_number field, a section_number field, a last_section_number field, a short_name field, a major_channel_number field, a minor_channel number_field, a modulation_mode field, a carrier_frequency field, a channel_TSID field, a program number field, an ETM_location field, and an access_controlled field,

wherein for an inactive channel the program number field is set to zero,

wherein for the inactive channel, the short name, major channel number, and minor channel number fields reflect name and channel number of the inactive channel, and

wherein the inactive channel is a channel that is not presently carrying a broadcast program; however, the same inactive channel is scheduled to carry a broadcast program at a predetermined later time from a broadcasting station without local viewer interaction; and

processing in a display processor to display the corresponding virtual channel,

wherein when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

2. The method of claim 1, wherein the digital broadcasting signal is a digital terrestrial broadcast signal.

3. The method of claim 1, wherein the digital broadcast signal is a digital cable broadcast signal.

4. The method of claim 1, wherein the program number field is included in a statement of a for_loop in a bit stream syntax of the VCT.

5. The method of claim 1, further comprising decoding the received VCT.

6. The method of claim 1, wherein the version_number filed is a 5-bit field.

7. The method of claim 1, wherein the section_number field is an 8-bit field.

8. The method of claim 1, wherein the last_section_number filed is an 8-bit field.

9. A digital television receiver comprising:

a tuner to receive a digital broadcasting signal including a virtual channel table (VCT), the VCT including a version_number field, a section_number field, a last_section_number field, a short_name field, a major_channel_number field, a minor_channel_number field, a modulation_mode field, a carrier_frequency field, a channel_TSID field, a program number field, an ETM_location field, and an access_controlled field,

wherein for an inactive channel the program number field is set to zero,

wherein for the inactive channel, the short name, major channel number, and minor channel number fields reflect name and channel number of the inactive channel, and

wherein the inactive channel is a channel that is not presently carrying a broadcast program; however, the same inactive channel is scheduled to carry a broadcast program at a predetermined later time from a broadcasting station without local viewer interaction; and

a display processor to process display of the corresponding virtual channel,

wherein when the virtual channel is currently inactive, the receiver is capable of skipping over the virtual channel while a user is surfing.

10. The digital television receiver of claim 9, wherein the digital broadcasting signal is a digital terrestrial broadcast signal.

11. The digital television receiver of claim 9, wherein the digital broadcasting signal is a digital cable broadcast signal.

12. The digital television receiver of claim 9, wherein the program number field is included in a statement of a for_loop in a bit stream syntax of the VCT.

13. The digital television receiver of claim 9, further comprising decoding means for decoding the received VCT.

14. The digital television receiver of claim 13, wherein the decoding means comprises a transport decoder.

15. The digital television receiver of claim 9, wherein the version_number field is a 5-bit field.

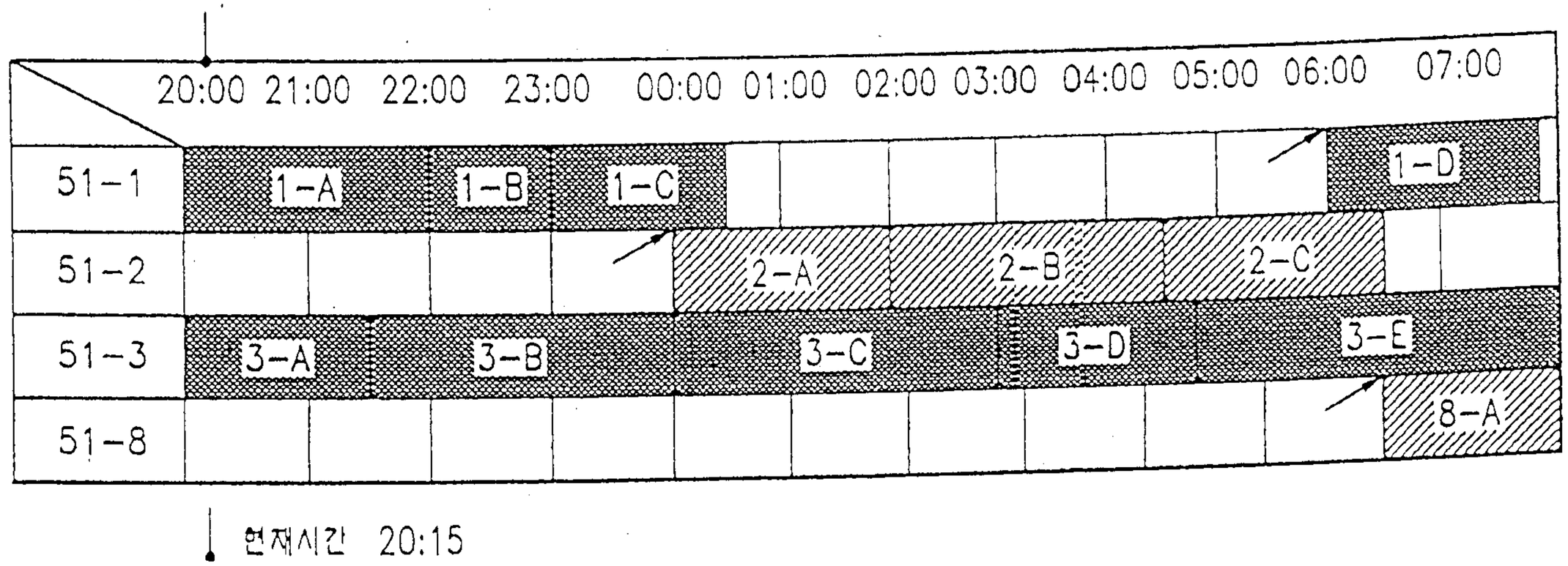
16. The digital television receiver of claim 9, wherein the section_number field is an 8-bit field.

17. The digital television receiver of claim 9, wherein the last_section_number field is an 8-bit field.

Syntax	Bits	Format
terrestrial_virtual_channel_table_section () {		
table_id	8	0xC8
section_syntax_indicator	1	'1'
private_indicator	1	'1'
zero	2	'00'
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
num_channels_in_section	8	uimsbf
for(i=0; i<num_channels_in_section;i++) {		
short_name	7*16	unicode™ BMP
reserved	4	'1111'
major_channel_number	10	uimsbf
minor_channel_number	10	uimsbf
modulation_mode	8	uimsbf
carrier_frequency	32	uimsbf
channel_TSID	16	uimsbf
program_number	16	uimsbf
ETM_location	2	uimsbf
access_controlled	1	bslbf
hidden	1	bslbf
reserved	6	'111111'
service_type	6	uimsbf
source_id	16	uimsbf
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0;i<N;i++) {		
descriptors()		
}		
}		
reserved	6	'111111'
additional_descriptors_length	10	uimsbf
for(j=0; j<N;j++) {		
additional_descriptors()		
}		
CRC_32	32	rpchof
}		

FIGURE 1
(Prior Art)

FIG. 2
Background Art



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Syntax	Bits	Format
terrestrial_virtual_channel_table_section () {		
table_id	8	0xC8
section_syntax_indicator	1	'1'
private_indicator	1	'1'
reserved	2	'11'
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
num_channels_in_section	8	uimsbf
for(i=0; i<num_channels_in_section;i++) {		
short_name	7*16	unicode™BMP
reserved	4	'1111'
major_channel_number	10	uimsbf
minor_channel_number	10	uimsbf
modulation_mode	8	uimsbf
carrier_frequency	32	uimsbf
channel_TSID	16	uimsbf
program_number	16	uimsbf
ETM_location	2	uimsbf
access_controlled	1	bslbf
hidden	1	bslbf
reserved	2	'11'
hide_guide	1	bslbf
reserved	3	'111'
service_type	6	uimsbf
source_Id	16	uimsbf
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0;i<N;i++) {		
descriptors()		
}		
}		
reserved	6	'111111'
additional_descriptors_length	10	uimsbf
for(j=0; j<N;j++) {		
additional_descriptors()		
}		
CRC_32	32	rpchof
}		

FIGURE 3

Syntax	Bits	Format
cable_virtual_channel_table_section () {		
table_id	8	0xC9
section_syntax_indicator	1	'1'
private_indicator	1	'1'
reserved	2	'11'
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
num_channels_in_section	8	uimsbf
for(i=0; i<num_channels_in_section;i++) {		
short_name	7*16	unicode™BMP
reserved	4	'1111'
major_channel_number	10	uimsbf
minor_channel_number	10	uimsbf
modulation mode	8	uimsbf
carrier_frequency	32	uimsbf
channel_TSID	16	uimsbf
program_number	16	uimsbf
ETM_location	2	uimsbf
access_controlled	1	bslbf
hidden	1	bslbf
path_select	1	bslbf
out_of_band	1	bslbf
hide_guide	1	bslbf
reserved	3	'111'
service_type	6	uimsbf
source_id	16	uimsbf
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0;i<N;i++) {		
descriptors()		
}		
}		
reserved	6	'111111'
additional_descriptors_length	10	uimsbf
for(j=0; j<N;j++) {		
additional_descriptors()		
}		
CRC_32	32	rpchof
}		

FIGURE 4

Descriptor Name	Descriptor tag	Terrestrial				Cable		
		PMT	MGT	VCT	EIT	PMT	MGT	VCT
stuffing descriptor	0x80	*	*	*	*	*	*	*
AC-3 audio descriptor	0x81	*			*	*		
program identifier descriptor	0x85	*				*		
caption service descriptor	0x86	*			*	*		
content advisory descriptor	0x87	*			*	*		
extended channel name descriptor	0xA0			*				*
service location descriptor	0xA1			*				
time-shifted service descriptor	0xA2			*				*
component name descriptor	0xA3					*		
user private	0xC0-0xFF		*	*	*		*	*

FIGURE 5
(Prior Art)

Syntax	Bits	Format
terrestrial_virtual_channel_table_section () {		
table_id	8	0xC8
section_syntax_indicator	1	'1'
private_indicator	1	'1'
reserved	2	'11'
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	'11'
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
protocol_version	8	uimsbf
num_channels_in_section	8	uimsbf
for(i=0; i<num_channels_in_section;i++) {		
short_name	7*16	unicode™BMP
reserved	4	'1111'
major_channel_number	10	uimsbf
minor_channel_number	10	uimsbf
modulation_mode	8	uimsbf
carrier_frequency	32	uimsbf
channel_TSID	16	uimsbf
program_number	16	uimsbf
ETM_location	2	uimsbf
access_controlled	1	bslbf
hidden	1	bslbf
reserved	2	'11'
hide_guide	1	bslbf
reserved	3	'111'
service_type	6	uimsbf
source_id	16	uimsbf
reserved	6	'111111'
descriptors_length	10	uimsbf
for (i=0;i<N;i++) {		
descriptors()		
}		
}		
reserved	6	'111111'
additional_descriptors_length	10	uimsbf
for(j=0; j<N;j++) {		
additional_descriptors()		
}		
CRC_32	32	rpchof
}		