(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) **International Patent Classification:**
H04N 7/24 (2011.01)

(21) **International Application Number:**
PCT/CN2014/087980

(22) **International Filing Date:**
30 September 2014 (30.09.2014)

(25) **Filing Language:** English

(26) **Publication Language:** English

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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) **Title:** METHOD AND DEVICE FOR PARENTAL CONTROL IN AUDIOVISUAL AND MULTIMEDIA SYSTEMS

FIG. 4
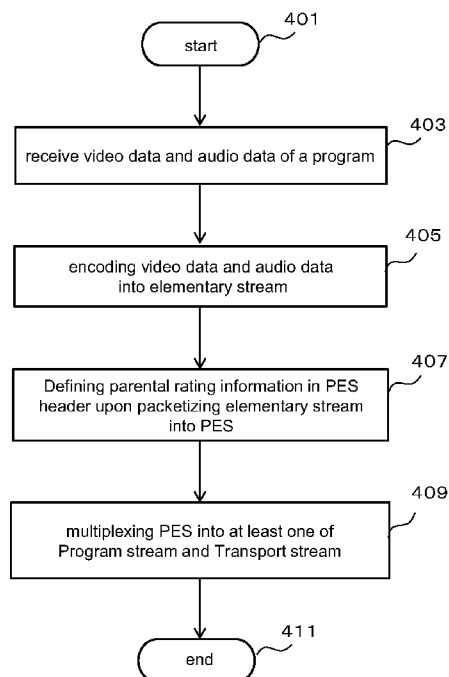
(57) **Abstract**: A device for implement parental control of a program in an encoding side, comprising: an encoder (201, 203) for encoding video data and audio data of a program into an elementary stream; a packetizer (205, 207) for packetizing the elementary stream into PES (Packetized Elementary Stream), wherein parental rating information is included in PES header; and a multiplexer (209, 211) for multiplexing the PES into at least one of program stream and transport stream.

METHOD AND DEVICE FOR PARENTAL CONTROL IN AUDIOVISUAL AND MULTIMEDIA SYSTEMS

TECHNICAL FIELD

5   The present invention relates to a method and a device for parental control in audiovisual and multimedia systems, and more particularly related to a method and a device for parental control in audiovisual and multimedia systems using PES header.

10 BACKGROUND ART

In digital video broadcasts, parental control is implementedby using a parental rating descriptor specified under the MPEG-2 standard.This parental rating descriptor including in a parental rating table is used to control program 15   viewing on an event level. The parental rating table is carried by EIT (Event Information Table) in DVB (Digital Video Broadcasting) or ATSC (Advanced Television Systems Committee) system.

However,the implementation is not entirely satisfactory 20   because of possible timing mismatch between receipt of the parental rating descriptor and audio video decoding. For example, under certain circumstances, some audio-video frames may have already been shown unexpectedly before the parental rate descriptor is received, or play is blockeduntil parental 25   rating table receiving. Some STB (Set Top Box) might play the AV immediately before receiving parental rating table; andsome STB might block the play until receiving parental rating table, even if no parental rating table is broadcasted in the network. There is no solution to this problem using the existing 30   specification.

In digital video broadcasts, most of programs are provided by other content vendors, not manufactured by network operators, thus, network operators need the additional work to add the

parental rating descriptor to adapt the controlled program.In digital video broadcasts, if the programs are recorded into hard disk, the parental rating information will be lost, unless the parental rating information isalso individual

5   recorded.IfTransport Stream is converted into program stream formatsuch as DVD disk, the parental rating information will also be lost. There is no solution to this problem using the existing specification.

10 **SUMMARY**

Accordingly, embodiments of the present invention may provide a novel and useful digital video broadcasting network system and a method of obtaining program information in digital video broadcasting solving one or more of the problems

15 discussed above.

More specifically, the embodiments of the present invention may provide a digital video broadcasting network system and a method of obtaining program information in digital video broadcasting that can directly obtain necessary

20 information from a memory of a client device without filtering and analyzing a SI table sent from a SI (DVB or ATSC system) server.

According to an embodiment of the present invention, there is providedadevice for implement parental control of a program

25 in an encoding side, comprising:an encoder for encoding video data and audio data of a program into an elementary stream;a packetizer for packetizing the elementary stream into PES (Packetized Elementary Stream), wherein parental rating information is included in PES header; anda multiplexer for

30 multiplexing the PES into at least one of program stream and transport stream.

According to an embodiment of the present invention, there is provideda devicefor implement parental control of a program

in a decoding side, comprising: a demultiplexer for demultiplexing program stream or transport stream including encoded data of a program into PES (Packetized Elementary Stream) to acquire parental rating information from PES header;

5　anda decoder for decoding audio data and video data of the PES and a means for determining if the program is going to be displayed on the basis of the parental rating information.

According to an embodiment of the present invention, there is provideda methodcomprising:receiving video data and audio

10　data of the program;encoding the video data and audio data into an elementary stream;defining parental rating information in PES (Packetized Elementary Stream) header upon packetizing the elementary stream into PES; andmultiplexing the PES into at least one of program stream and transport stream.

15　According to an embodiment of the present invention, there is provideda methodto implement parental control of a program in a decoding side, the method comprising: demultiplexing a program stream or transport stream including encoded data of the program into PES (Packetized Elementary Stream);acquiring

20　parental rating information from PES header; decoding audio data and video data of the PES; anddetermining if the program is going to be displayed on the basis of the parental rating information.

25　**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a software block diagram according to an embodiment of the present invention;

FIG. 2 is a hardware block diagram illustrating encoder according to an embodiment of the present invention;

30　FIG. 3 is a hardware block diagram illustrating decoder according to an embodiment of the present invention;

FIG. 4 is a sequence diagram for explaining how toimplement parental control of a program in anencoding

sideaccording to an embodiment of the present invention; and

FIG. 5 is a sequence diagram for explaining how to implement parental control of a program in a decoding side according to an embodiment of the present invention.

5

DESCRIPTION OF EMBODIMENT

A description is given below of embodiments of the present invention, with reference to the drawings.

The parental rating information is defined in

10   PES(Packetized Elementary Stream)header when PES stream is generated, or streams from other program vendors are re-multiplexed.If adecoder driverdetects there is a parental rating information change(from the status in which parental rating is not presented in PES header to the status in which it

15   is presented in PES header, or from the status in which parental rating is presented in PES header to the status in which it is not presented, or parental rating value is updated), it can notify a parental rating changed event to upper software componentsuch as UI application, like the

20   notification of PTS (Presentation Time Stamp), then the upper software component can compare it with the decoder's parental control configuration to decide whether the program can be played. The parental rating information can also be defined in PES header when the program from other content vendor is

25   transmitted, or when the program in PES or TS format is recorded, or the program betweenTransport Streams and Program Streams is converted.

If the parental rating information is defined into PESheader, the parental rating information will be got before

decoding AV data, and then we can avoid the unexpected display completely. Further, if the parental rating information is defined in PES header, the information can easy remain when the program from other content vendor is transmitted, and when the

5   program is recorded in TS format or PES format. Since Transport Stream and Program Stream are each logically constructed from PES packets,parental rating information can also remain when the stream format is converted between Transport Stream and Program Stream.

10   There are two ways to define the parental rating information in PES header:

1. Utilize current PES specification to define the parental rating in PES header. Syntax below marked in italic typeis only an example; and the parental rating information is

15   possible presented in other field of the PES header.

Table 1-1 – PES packet

Syntax	No. of bits	Mnemonic
PES_packet() {		
packet_start_code_prefix	24	bslbf
stream_id	8	uimsbf
PES_packet_length	16	uimsbf
if (stream_id != program_stream_map		
&& stream_id != padding_stream		
&& stream_id != private_stream_2		
&& stream_id != ECM		
&& stream_id != EMM		
&& stream_id != program_stream_directory		
&& stream_id != DSMCC_stream		
&& stream_id != ITU-T Rec. H.222.1 type E stream) {		
'10'	2	bslbf
PES_scrambling_control	2	bslbf
PES_priority	1	bslbf
data_alignment_indicator	1	bslbf
copyright	1	bslbf
original_or_copy	1	bslbf
PTS_DTS_flags	2	bslbf
ESCR_flag	1	bslbf
ES_rate_flag	1	bslbf
DSM_trick_mode_flag	1	bslbf
additional_copy_info_flag	1	bslbf
PES_CRC_flag	1	bslbf
PES_extension_flag *=1*	1	bslbf
PES_header_data_length	8	uimsbf
if (PTS_DTS_flags == '10') {		
'0010'	4	bslbf
PTS [32..30]	3	bslbf
marker_bit	1	bslbf
PTS [29..15]	15	bslbf
marker_bit	1	bslbf
PTS [14..0]	15	bslbf
marker_bit	1	bslbf
}		

Syntax	No. of bits	Mnemonic
if (PTS_DTS_flags == '11') {		
'0011'	4	bslbf
PTS [32..30]	3	bslbf
marker_bit	1	bslbf
PTS [29..15]	15	bslbf
marker_bit	1	bslbf
PTS [14..0]	15	bslbf
marker_bit	1	bslbf
'0001'	4	bslbf
DTS [32..30]	3	bslbf
marker_bit	1	bslbf
DTS [29..15]	15	bslbf
marker_bit	1	bslbf
DTS [14..0]	15	bslbf
marker_bit	1	bslbf
}		
if (ESCR_flag == '1') {		
reserved	2	bslbf
ESCR_base[32..30]	3	bslbf
marker_bit	1	bslbf
ESCR_base[29..15]	15	bslbf
marker_bit	1	bslbf
ESCR_base[14..0]	15	bslbf
marker_bit	1	bslbf
ESCR_extension	9	uimsbf
marker_bit	1	bslbf
}		
if (ES_rate_flag == '1') {		
marker_bit	1	bslbf
ES_rate	22	uimsbf
marker_bit	1	bslbf
}		

7

Syntax	No. of bits	Mnemonic
if (DSM_trick_mode_flag == '1') {		
trick_mode_control	3	uimsbf
if (trick_mode_control == fast_forward) {		
field_id	2	bslbf
intra_slice_refresh	1	bslbf
frequency_truncation	2	bslbf
}		
else if (trick_mode_control == slow_motion) {		
rep_cntrl	5	uimsbf
}		
else if (trick_mode_control == freeze_frame) {		
field_id	2	uimsbf
reserved	3	bslbf
}		
else if (trick_mode_control == fast_reverse) {		
field_id	2	bslbf
intra_slice_refresh	1	bslbf
frequency_truncation	2	bslbf
else if (trick_mode_control == slow_reverse) {		
rep_cntrl	5	uimsbf
}		
else		
reserved	5	bslbf
}		
if (additional_copy_info_flag == '1') {		
marker_bit	1	bslbf
additional_copy_info	7	bslbf
}		
if (PES_CRC_flag == '1') {		
previous_PES_packet_CRC	16	bslbf
}		

Syntax	No. of bits	Mnemonic
if (PES_extension_flag == '1') {		
PES_private_data_flag	1	bslbf
pack_header_field_flag	1	bslbf
program_packet_sequence_counter_flag	1	bslbf
P-STD_buffer_flag	1	bslbf
reserved	3	bslbf
PES_extension_flag_2 =1	1	bslbf
if (PES_private_data_flag == '1') {		
PES_private_data	128	bslbf
}		
if (pack_header_field_flag == '1') {		
pack_field_length	8	uimsbf
pack_header()		
}		
if (program_packet_sequence_counter_flag == '1') {		
marker_bit	1	bslbf
program_packet_sequence_counter	7	uimsbf
marker_bit	1	bslbf
MPEG1_MPEG2_identifier	1	bslbf
original_stuff_length	6	uimsbf
}		
if (P-STD_buffer_flag == '1') {		
'01'	2	bslbf
P-STD_buffer_scale	1	bslbf
P-STD_buffer_size	13	uimsbf
}		

Syntax	No. of bits	Mnemonic
if (PES_extension_flag_2 == '1') {		
marker_bit =1	1	bslbf
PES_extension_field_length =1	7	uimsbf
Parental rating		
}		
}		
for (i = 0; i < N1; i++) {		
stuffing_byte	8	bslbf
}		
for (i = 0; i < N2; i++) {		
PES_packet_data_byte	8	bslbf
}		
}		
else if (stream_id == program_stream_map		
|| stream_id == private_stream_2		
|| stream_id == ECM		
|| stream_id == EMM		
|| stream_id == program_stream_directory		
|| stream_id == DSMCC_stream		
|| stream_id == ITU-T Rec. H.222.1 type E stream) {		
for (i = 0; i < PES_packet_length; i++) {		
PES_packet_data_byte	8	bslbf
}		
}		
else if (stream_id == padding_stream) {		
for (i = 0; i < PES_packet_length; i++) {		
padding_byte	8	bslbf
}		
}		
}		

Semantic definitions of fields which marked in italic

type are as follows (for other fields, refer to the PES

definition which described in specification iso13818-1):

PES_extension_flag: value is 1, indicates that an

5   extension field exists in this PES packet header.

PES_extension_flag_2: value is 1, to indicate there is

parental rating information.

marker_bit: value is 1, as the specification requirement.

PES_extension_field_length: value is 1, to indicate the

10   length of parental rating field is 1byte.

parental rating: same definition as with rating field of

parental rating descriptor. 0x00, undefined; 0x01-0x0F,

minimum+3years, so 0x01-0x0F represents a range from age

(0x01+3) to age(0x0F+3); 0x10-0xff, defined by the operator.

15   2. In the future, if the PES Syntax definition needsto be

re-designed, or replace it with other Syntax

structures."Parental_control_indicator" is recommended to add

or replace other indicators, which is similar to the additional

copyright information definition which described in current PES

20   Syntax. Table below is an example to add the

parental_control_indicator. The new definition is marked in

italic type.

1. **Table 1-1 – PES packet**

Syntax	No. of bits	Mnemonic
PES_packet() {		
packet_start_code_prefix	24	bslbf
stream_id	8	uimsbf
PES_packet_length	16	uimsbf
if (stream_id != program_stream_map		
&& stream_id != padding_stream		
&& stream_id != private_stream_2		
&& stream_id != ECM		
&& stream_id != EMM		
&& stream_id != program_stream_directory		
&& stream_id != DSMCC_stream		
&& stream_id != ITU-T Rec. H.222.1 type E stream) {		
'10'	2	bslbf
PES_scrambling_control	2	bslbf
PES_priority	1	bslbf
data_alignment_indicator	1	bslbf
copyright	1	bslbf
original_or_copy	1	bslbf
PTS_DTS_flags	2	bslbf
ESCR_flag	1	bslbf
ES_rate_flag	1	bslbf
DSM_trick_mode_flag	1	bslbf
additional_copy_info_flag	1	bslbf
parental_control_indicator	*1*	*bslbf*
PES_CRC_flag	1	bslbf
reserve	*7*	*bslbf*
PES_extension_flag	1	bslbf
PES_header_data_length	8	uimsbf
if(PTS_DTS_flags == '10') {		
'0010'	4	bslbf
PTS [32..30]	3	bslbf
marker_bit	1	bslbf
PTS [29..15]	15	bslbf
marker_bit	1	bslbf
PTS [14..0]	15	bslbf
marker_bit	1	bslbf
}		

Syntax	No. of bits	Mnemonic
if (PTS_DTS_flags == '11') {		
'0011'	4	bslbf
PTS [32..30]	3	bslbf
marker_bit	1	bslbf
PTS [29..15]	15	bslbf
marker_bit	1	bslbf
PTS [14..0]	15	bslbf
marker_bit	1	bslbf
'0001'	4	bslbf
DTS [32..30]	3	bslbf
marker_bit	1	bslbf
DTS [29..15]	15	bslbf
marker_bit	1	bslbf
DTS [14..0]	15	bslbf
marker_bit	1	bslbf
}		
if (ESCR_flag == '1') {		
reserved	2	bslbf
ESCR_base[32..30]	3	bslbf
marker_bit	1	bslbf
ESCR_base[29..15]	15	bslbf
marker_bit	1	bslbf
ESCR_base[14..0]	15	bslbf
marker_bit	1	bslbf
ESCR_extension	9	uimsbf
marker_bit	1	bslbf
}		
if (ES_rate_flag == '1') {		
marker_bit	1	bslbf
ES_rate	22	uimsbf
marker_bit	1	bslbf
}		

Syntax	No. of bits	Mnemonic
if (DSM_trick_mode_flag == '1') {		
trick_mode_control	3	uimsbf
if (trick_mode_control == fast_forward) {		
field_id	2	bslbf
intra_slice_refresh	1	bslbf
frequency_truncation	2	bslbf
}		
else if (trick_mode_control == slow_motion) {		
rep_cntrl	5	uimsbf
}		
else if (trick_mode_control == freeze_frame) {		
field_id	2	uimsbf
reserved	3	bslbf
}		
else if (trick_mode_control == fast_reverse) {		
field_id	2	bslbf
intra_slice_refresh	1	bslbf
frequency_truncation	2	bslbf
else if (trick_mode_control == slow_reverse) {		
rep_cntrl	5	uimsbf
}		
else		
reserved	5	bslbf
}		
if (additional_copy_info_flag == '1') {		
marker_bit	1	bslbf
additional_copy_info	7	bslbf
}		
if (parental_control_indicator == '1') {		
Parental_rating	*8*	*bslbf*
}		
if (PES_CRC_flag == '1') {		
previous_PES_packet_CRC	16	bslbf
}		

Syntax	No. of bits	Mnemonic
if (PES_extension_flag == '1') {		
PES_private_data_flag	1	bslbf
pack_header_field_flag	1	bslbf
program_packet_sequence_counter_flag	1	bslbf
P-STD_buffer_flag	1	bslbf
reserved	3	bslbf
PES_extension_flag_2	1	bslbf
if (PES_private_data_flag == '1') {		
PES_private_data	128	bslbf
}		
if (pack_header_field_flag == '1') {		
pack_field_length	8	uimsbf
pack_header()		
}		
if (program_packet_sequence_counter_flag == '1') {		
marker_bit	1	bslbf
program_packet_sequence_counter	7	uimsbf
marker_bit	1	bslbf
MPEG1_MPEG2_identifier	1	bslbf
original_stuff_length	6	uimsbf
}		
if (P-STD_buffer_flag == '1') {		
'01'	2	bslbf
P-STD_buffer_scale	1	bslbf
P-STD_buffer_size	13	uimsbf
}		
if (PES_extension_flag_2 == '1') {		
marker_bit	1	bslbf
PES_extension_field_length	7	uimsbf
for (i = 0; i < PES_extension_field_length; i++) {		
reserved	8	bslbf
}		
}		
}		

Syntax	No. of bits	Mnemonic
for (i = 0; i < N1; i++) {		
stuffing_byte	8	bslbf
}		
for (i = 0; i < N2; i++) {		
PES_packet_data_byte	8	bslbf
}		
}		
else if (stream_id == program_stream_map		
|| stream_id == private_stream_2		
|| stream_id == ECM		
|| stream_id == EMM		
|| stream_id == program_stream_directory		
|| stream_id == DSMCC_stream		
|| stream_id == ITU-T Rec. H.222.1 type E stream) {		
for (i = 0; i < PES_packet_length; i++) {		
PES_packet_data_byte	8	bslbf
}		
}		
else if (stream_id == padding_stream) {		
for (i = 0; i < PES_packet_length; i++) {		
padding_byte	8	bslbf
}		
}		
}		

Semantic definitions of fields which marked in italic
type are as follows (for other fields, refer to the PES
definition which described in specification iso13818-1):

parental_control_indicator: a 1-bit flag, when set to
5   '1',it indicates the presence of the parental_rating field.
When set to '0', it indicates that this field is not presented.

parental_rating: same definition as rating field of

parental rating descriptor. 0x00, undefined; 0x01-0x0F,

minimum+3years, so 0x01-0x0F represents a range from age

10   (0x01+3) to age(0x0F+3); 0x10-0xff, defined by the operator.

FIG. 1 is a software block diagram according to an
embodiment of the present invention. As shown in FIG 1, the
application 101 is executed by driver 102 via operating system
(OS) 103andhardware platform 105. The operating system (OS) 103
15   and hardware platform 105manages hardware and software
resourcesto function. As an option, middleware 107, CA 109,
adaption layer 111, and option drivers can be included in the
system. The middleware 107 is the software layer that lies
between the operating system, hardware platform driver and
20   application, it integrates and abstracts all lower layer
features to support the application and reach the effect to
cross the operating system and hardware.The CA 109 is the
condition access system to scramble/descramble AV data and
other data.The adaption layer 111 is the encapsulation of
25   hardware platform driver and operating system, to supports the
upper components, i.e. middleware and CA if they are present,
or Application if the middleware and CA are not present. The
option Drivers 113 are not the necessary component for decoder

prototype, but they are used on most of decoder.

      FIG. 2 is a hardware block diagram illustrating encoder according to an embodiment of the present invention. Video data and audio data are sent to a video encoder 201 and an audio

5   encoder 203, respectively. The video encoder 201 and the audio encoder 203 encode the video data and audio data into elementary stream. The elementary streams are packetized to generate PES stream in the packetizer 205, 207. In this procedure, the parental rating information is defined in PES

10   header. Both of video PES and audio PES are multiplexed in each of TS Mux 209 and PS Mux 211 to generate TS stream and PS stream. The parental rating information is also defined in PES header when the streams from other program vendors are re-multiplexed.

15   FIG. 3 is a hardware block diagram illustrating decoder according to an embodiment of the present invention.Channel specified decoder 301 specifies channel to decode. CPU 303 includes TS demultiplexer or PS decoder 305, video decoder 307, audio decoder 309, and clock control 311. TS stream or PS

20   stream sends to the TS demultiplexer or PS decoder 305. The demultiplexer305 demultiplexes Program stream or Transport stream including encoded data of a program into PES (Packetized Elementary Stream) to acquire parental rating information from PES header.The resulting streams send to the video decoder 307,

25   the clock control 311, and the audio decoder 309. Since the parental rating information has been acquired before decoding video and audio data,the unexpected display can be avoided completely.The CPU 303 determines if the program is going to be displayed on the basis of the parental rating information.DDR

30   313 is the RAM memory, it is the abbreviation of Double Data Rate Synchronous Dynamic Random Access Memory. Persistent device 315 is Non-Volatile Random Access Memory for save the configuration parameters to avoid the data losing after power

down, such as flash device, EEPROM(Electrically Erasable
Programmable Read-Only Memory) device. HDD 317 is the Hard Disk
as an option.

5   FIG. 4 is a sequence diagram for explaining how to
implement parental control of a program in an encoding side
according to an embodiment of the present invention. At step
401, a procedure starts. At step 403, video encoder and audio
encoder receive video data and audio data of a program. At step
405, the video encoder and audio encoder encode the video data
10   and audio data into elementary stream. At step 407, parental
rating information is defined in PES (Packetized Elementary
Stream) header upon packetizing the elementary stream into PES.
At step 409, multiplexer multiplexes the PES into at least one
of Program stream or Transport stream.The multiplexer also re-
15   multiplexes steam from other program vender.At step 411, the
procedure ends.

FIG. 5 is a sequence diagram for explaining how to
implement parental control of a programin a decoding side
according to an embodiment of the present invention. At step
20   501, a procedure starts. At step 503, Program stream or
Transport stream including encoded data of the program is
demultiplexed into PES (Packetized Elementary Stream). At step
505, parental rating information is acquiredfrom PES header. At
step 507, audio data and video data of the PES is decoded. At
25   step 509, a decision whether the program is going to be
displayed is determined on the basis of the parental rating
information. At step 511, the procedure ends. In addition, if a
driver of a decoder detects any change of the parental rating
information, it notifies the changed event of the parental
30   control information to an upper software component. Then, the
upper software componentcompares it with decoder's parental
control configuration to determine if the program can be
displayed.

All examples and conditional language recited herein are
intended for pedagogical purposes to aid the reader in
understanding the invention and the concepts contributed by the
inventor to furthering the art, and are to be construed as
5   being without limitation to such specifically recited examples
and conditions, nor does the organization of such examples in
the specification relate to a showing of superiority or
inferiority of the invention. Although the embodiments of the
present invention have been described in detail, it should be
10   understood that various changes, substitutions, and alterations
could be made hereto without departing from the spirit and
scope of the invention.

CLAIMS

1. A device for implement parental control of a program in
an encoding side, comprising:

5   an encoder for encoding video data and audio dataof a
program into an elementary stream;

a packetizer for packetizing the elementary stream into
PES (Packetized Elementary Stream), wherein parental rating
information is includedin PES header; and

10   amultiplexerfor multiplexing the PES into at least one of
program stream andtransport stream.

2. The device as claimed in claim 1, wherein the
multiplexer further re-multiplexes steam from other program
15   vender.

3. Adevice for implement parental control of a program in
a decoding side, comprising:

a demultiplexer for demultiplexing program stream or
20   transport stream including encoded data of a program into PES
(Packetized Elementary Stream) to acquire parental rating
information from PES header; and

adecoder fordecoding audio data and video data of the
PES;and

25   a means for determining if the program is going to be
displayed on the basis of the parental rating information.

4. The device as claimed in claim 4, whereinif a driver of
the decoder detects any change of the parental rating
30   information, the drivernotifies the changed event of the
parental rating information to anupper software component, and
the upper software component consequently compares it with
decoder's parental control configuration to determining if the

program is going to be displayed.

    5. A method to implement parental control of a program in
an encoding side, the method comprising:
5   receivingvideo data and audio data of the program;
        encoding the video data and audio data into an elementary
stream;
        defining parental rating information in PES (Packetized
Elementary Stream) header upon packetizing the elementary
10   stream into PES;and
        multiplexing the PES into at least one of program stream
and transport stream.

    6. The method as claimed in claim 5, further comprising:
15   re-multiplexing steam from other program vender.

    7. A method to implement parental control of a program in
a decoding side, the method comprising:
        Demultiplexing a program stream or transport stream
20   including encoded data of the program into PES (Packetized
Elementary Stream);
        acquiring parental rating information from PES header;
        decodingaudio data and video data of the PES; and
        determining if the program is going to be displayed on the
25   basis of the parental rating information.

    8. The method as claimed in claim 7, further comprisingif
a driver of the decoder detects any change of the parental
rating information,notifyingby the driver the changed event of
30   the parental control information to an upper software
component; comparing it with decoder's parental control
configuration by the upper software component to determineif
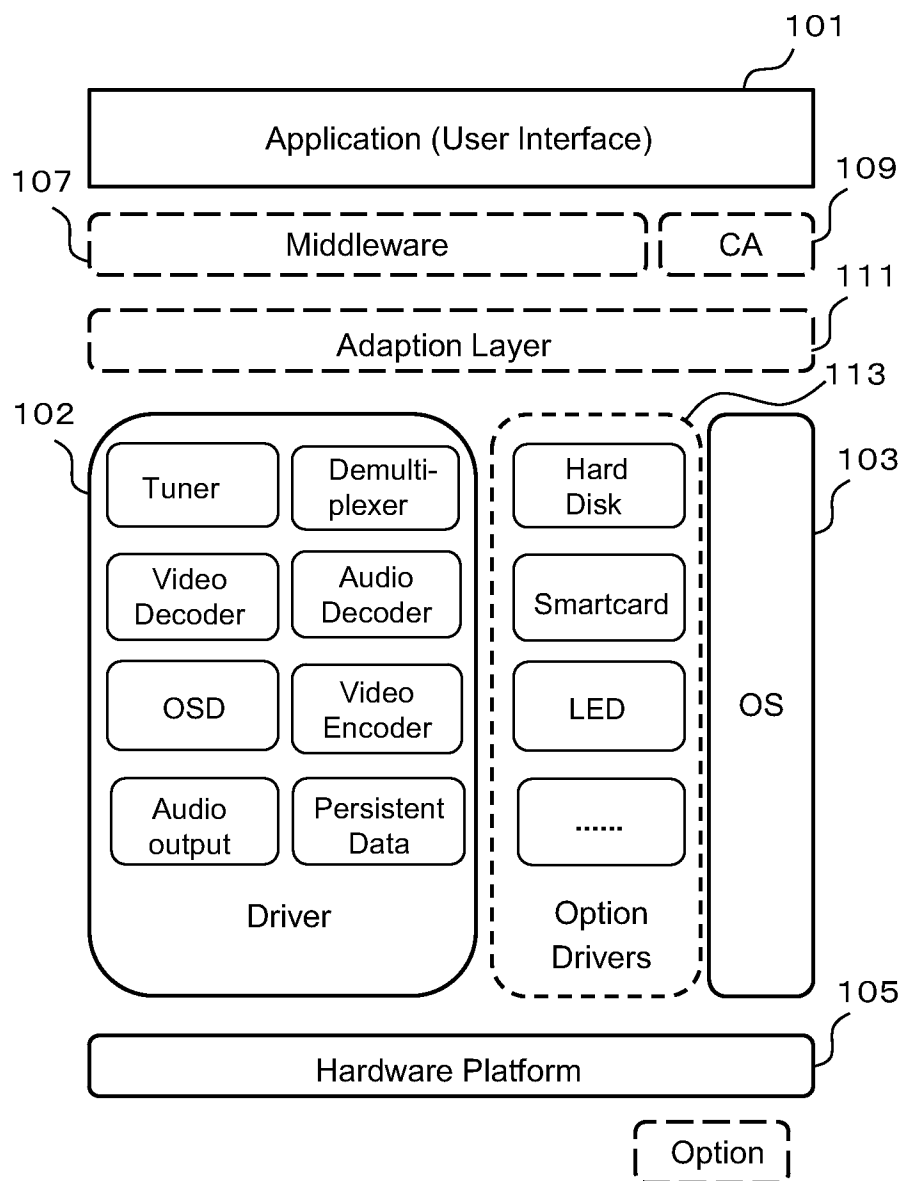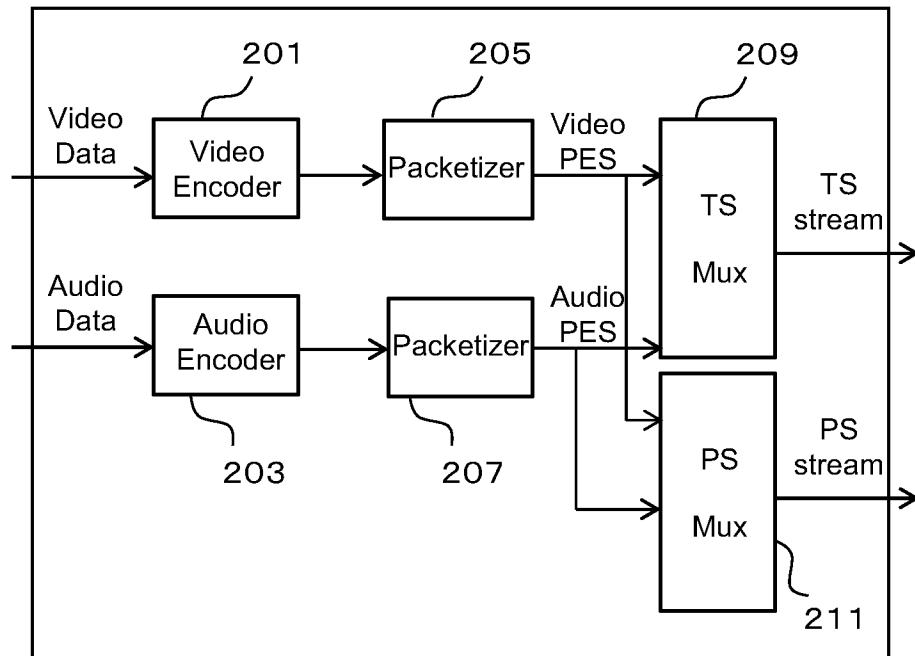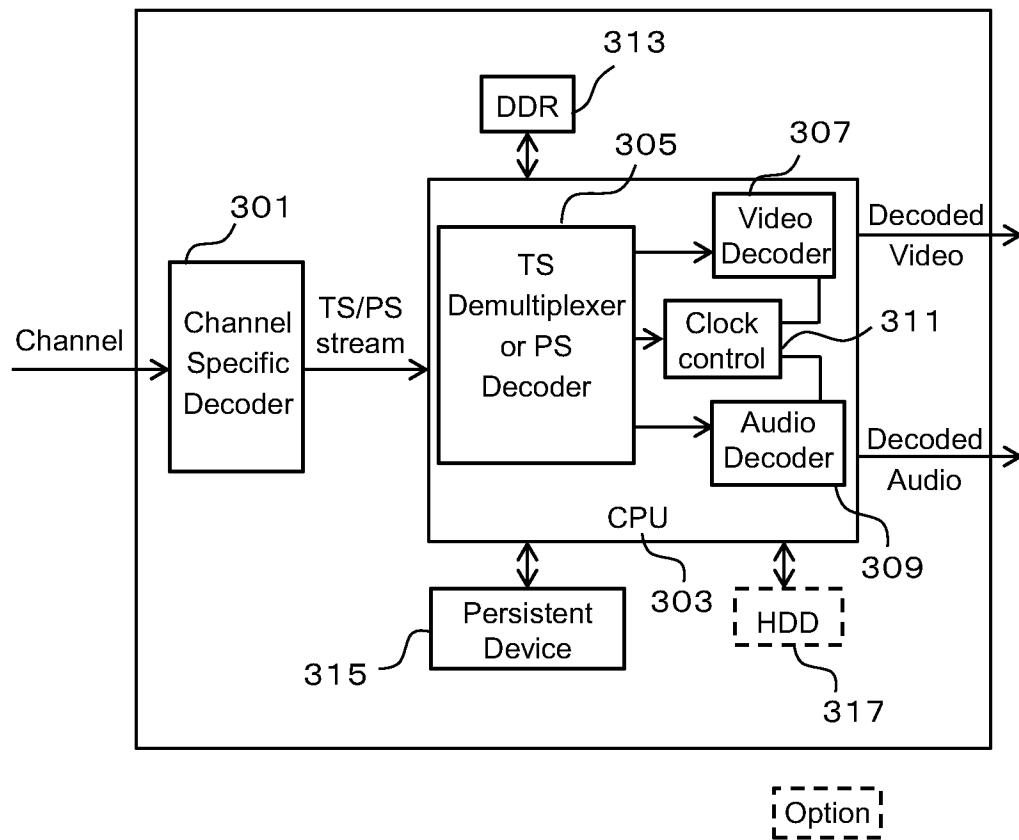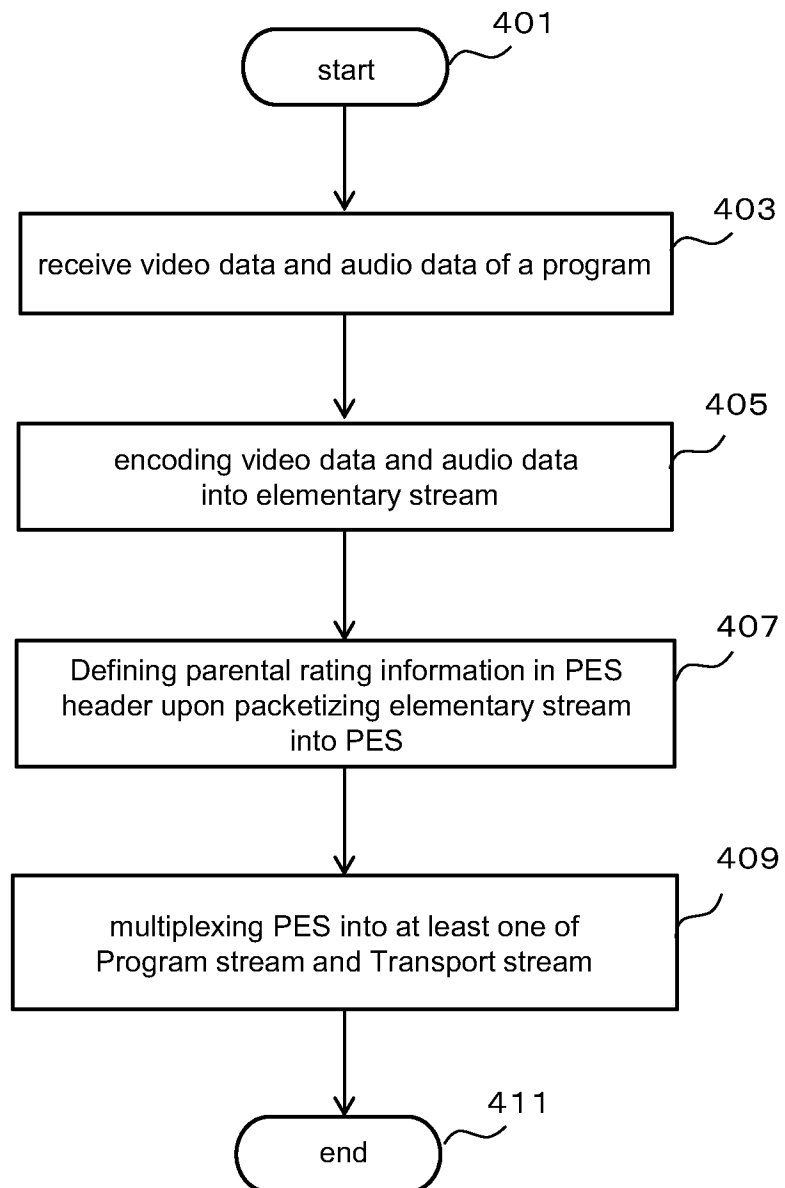the program is going to be displayed.

FIG. 1

FIG. 2

FIG. 3

FIG. 4
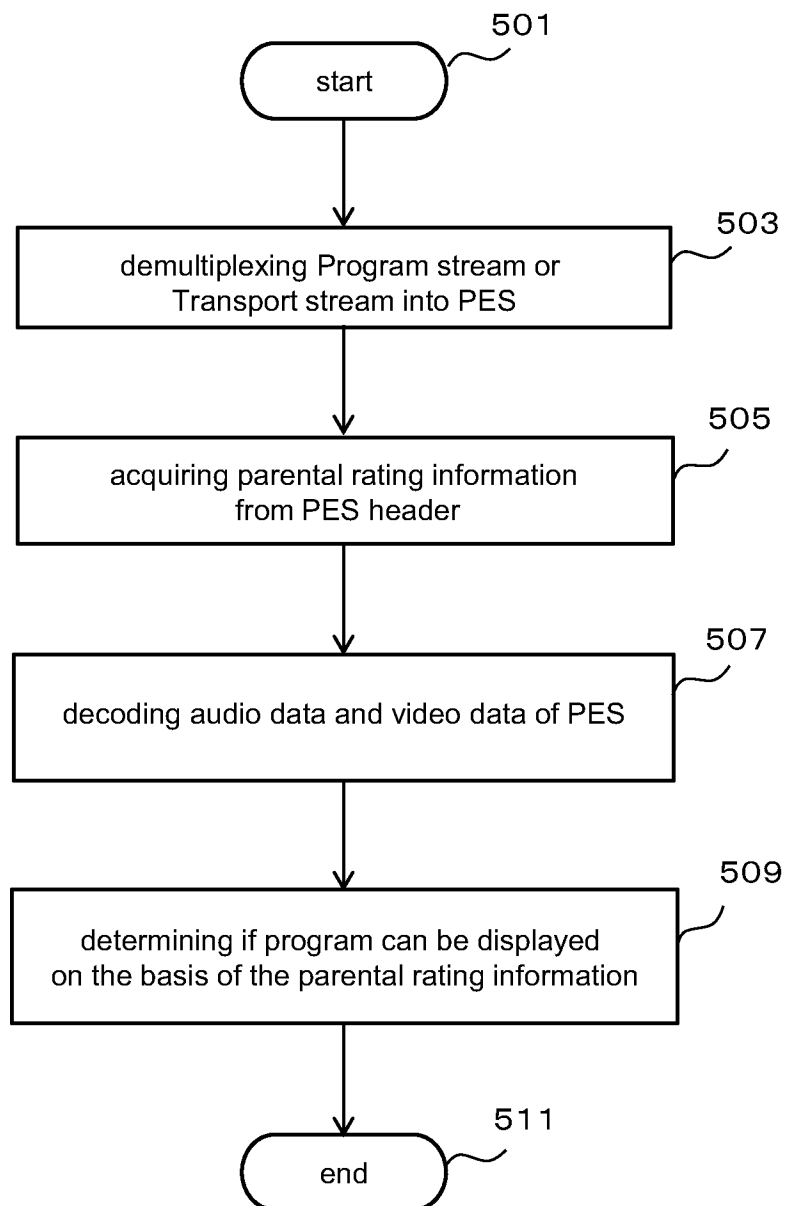
```
                          ┌──────────────┐  401
                          │    start     │╱
                          └──────┬───────┘
                                 │
                                 ▼
        ┌──────────────────────────────────────────┐  403
        │  receive video data and audio data of a   │╱
        │                 program                    │
        └───────────────────┬──────────────────────┘
                            │
                            ▼
        ┌──────────────────────────────────────────┐  405
        │       encoding video data and audio data   │╱
        │            into elementary stream          │
        └───────────────────┬──────────────────────┘
                            │
                            ▼
        ┌──────────────────────────────────────────┐  407
        │   Defining parental rating information in PES│╱
        │  header upon packetizing elementary stream │
        │                 into PES                   │
        └───────────────────┬──────────────────────┘
                            │
                            ▼
        ┌──────────────────────────────────────────┐  409
        │     multiplexing PES into at least one of  │╱
        │   Program stream and Transport stream      │
        └───────────────────┬──────────────────────┘
                            │
                            ▼
                   ┌──────────────┐  411
                   │     end      │╱
                   └──────────────┘
```

FIG. 5

A. CLASSIFICATION OF SUBJECT MATTER

H04N 7/24(2011.01)i

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)

H04N7/-; H04N5/-

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

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

WPI, EPODOC, CNPAT, CNKI: TECHNICOLOR CHINA TECHNOLOGY , THOMSON LICENSING, YANG Qing lei, transport stream, program stream, packetized elementary stream, PES, parental rating, parental control, encod+, decod +, header

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2731346 A2 (CISCO TECHNOLOGY, INC.) 14 May 2014 (2014-05-14) description, paragraphs [0007], [0015], [0016], [0027]-[0042] and figures 1-6	1-8
A	CN 1166226 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. ET AL.) 26 November 1997 (1997-11-26) the whole document	1-8
A	CN 102742242 A (TELEFON AB L.M. ERICSSON) 17 October 2012 (2012-10-17) the whole document	1-8
A	US 2003142962 A1 (KABUSHIKI KAISHA TOSHIBA) 31 July 2003 (2003-07-31) the whole document	1-8
A	US 2009086811 A1 (DUCHARME, PAUL) 02 April 2009 (2009-04-02) the whole document	1-8
A	EP 2071576 A1 (THOMSON LICENSING) 17 June 2009 (2009-06-17) the whole document	1-8

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

*	Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent but published on or after the international filing date	"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
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"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	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 June 2015	**25 June 2015**

Name and mailing address of the ISA/CN	Authorized officer
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Form PCT/ISA/210 (second sheet) (July 2009)

C.   DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2357820 A1 (THOMSON LICENSING) 17 August 2011 (2011-08-17) the whole document	1-8

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
EP	2731346	A2	14 May 2014	US	2012159530	A1	21 June 2012
				WO	2012083035	A2	21 June 2012
				CN	103299650	A	11 September 2013
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				WO	2011016766	A1	10 February 2011
				EP	2462733	A1	13 June 2012
				KR	20120052965	A	24 May 2012
				EP	2462733	A4	30 April 2014
				JP	2013501971	A	17 January 2013
				US	2011035768	A1	10 February 2011
US	2003142962	A1	31 July 2003	JP	2003228920	A	15 August 2003
US	2009086811	A1	02 April 2009	None			
EP	2071576	A1	17 June 2009	US	8639083	B2	28 January 2014
				EP	2071575	A1	17 June 2009
				US	2009220210	A1	03 September 2009
				US	8194591	B2	05 June 2012
				US	2009225698	A1	10 September 2009
EP	2357820	A1	17 August 2011	None			