Title: METHOD AND APPARATUS FOR REPRODUCING MULTI-STREAM

Abstract: A method and apparatus for simultaneously reproducing multiple audio/video streams, the apparatus including: a mixer to mix and to output main audio data and sub-audio data; and an audio controller to control the mixer such that when a sub-video data is expanded to a full screen, the sub-audio data is reproduced and the main audio is not reproduced. Furthermore, if the sub-video data is expanded to a full screen, an audio and a subtitle for only the sub-video data are reproduced, thereby preventing confusions that a user may experience.
Description

METHOD AND APPARATUS FOR REPRODUCING MULTI-STREAM

Technical Field

Aspects of the present invention relate to a method and apparatus for reproducing audio/video data, and more particularly, to a method and apparatus for reproducing simultaneous multi-stream audio/video data.

Background Art

Currently, an audio/video reproducing apparatus reproduces a main audio/video stream simultaneously with multiple sub-audio/video streams (for example a Blu-ray disc (BD) player and a high-definition (HD) digital video disk (DVD) player). FIG. 1 is a block diagram illustrating main video data 110 and sub-video data 120 reproduced on a screen 130 in a picture-in-picture (PIP) mode as one example of simultaneously reproducing multiple audio/video streams. When multiple videos are simultaneously reproduced, a method of processing an audio stream and a subtitle corresponding to each video stream must be considered.

FIG. 2 is a block diagram explaining an audio processing method when a conventional multi-stream reproducing apparatus simultaneously reproduces a main video data and a sub-video data. Referring to FIG. 2, main audio data 210, corresponding to the main video data, is decoded by a main audio decoder 230, converted by linear pulse code modulation (LPCM), and input to a mixer 250. Similarly, sub-audio data 220, corresponding to the sub-video data, is decoded by a sub-audio decoder 240, converted by LPCM, and then input to the mixer 250. The mixer mixes and outputs the decoded main audio data and the sub-audio data by using mixing information and/or mixing application programming interface (API) 260.

FIG. 3 is a schematic view explaining a subtitle processing method when a conventional multi-stream reproducing apparatus simultaneously reproduces a main video data and a sub-video data. Referring to FIG. 3, sub-video subtitle data 330 is added to main-video subtitle data 310 and 320, and displayed as a selectable subtitle list. If there is a user selection 340 of a subtitle, a selected subtitle is displayed on a screen.

FIG. 5 is a block diagram of an example of a multi-stream reproducing apparatus. Referring to FIG. 5, the multi-stream reproducing apparatus includes a reader 510, a demultiplexer (De-MUX) 520, a navigation engine 530, and a presentation engine 540. The reader 510 reads data from an optical storage medium 500, sends reproducing control information to the navigation engine 530, and sends a multi-stream to the presentation engine 540 through the De-MUX 520. The De-MUX 520 transmits each
stream to a corresponding decoder according to stream identification information included in a main audio/video stream and a sub-audio/video stream. Also, the De-MUX 520 may select a stream to be reproduced according to a user input or reproducing control information, and a plurality of De-MUXes may be provided according to a device. The navigation engine 530 controls the presentation engine 540 and the De-MUX 520 according to the reproducing control information and the user input. To decode and reproduce the multi-stream, the presentation engine 540 includes video decoders 541 and 542, audio decoders 230 and 240, and a subtitle decoder 543. Furthermore, the presentation engine includes a mixer 250 to mix audio signals decoded through the audio decoders 230 and 240 according to mixing information. The presentation engine 540 may further include a variety of decoders for decoding and reproducing additional data included in the optical storage medium 500.

FIG. 6 is a block diagram of a conventional mixer 250. Referring to FIG. 6, the mixer 250 includes gain controllers 651 and 653 and a pan controller 652. The main audio decoder 230 and the sub-audio decoder 240 respectively decode main audio data 610 and sub-audio data 630 encoded in various formats, convert the data 610 and 630 by LPCM, and output the data to the mixer 250. The sub-audio decoder 240 extracts mixing information from metadata included in the sub-audio data 630, and transmits to the pan controller 652. The pan controller 652 is a block to control channel mapping for mixing an audio stream of a plurality of channels. Gain controllers 651 and 653 are blocks to control a volume level of each channel.

When a sub-audio/video stream is reproduced while a main audio/video stream is being reproduced (i.e., when two streams are simultaneously displayed on a screen in a PIP mode), the conventional reproducing apparatus decodes sub-audio data in a sub-audio/video stream, and mixes the main audio data 610 and the sub-audio data 630 by using mixing information in extracted metadata and/or a separate mixing API 260 to reproduce the mixed data. As described above with reference to FIG. 3, the sub-video subtitle 330 is reproduced during an effective period of the sub-audio/video stream by being processed as one of selectable subtitles, together with the main-video subtitles 310 and 320.

FIG. 4 is a view illustrating a sub-video data in the PIP mode 410 of FIG. 1 that is expanded to a full screen 420. In the case of an apparatus capable of simultaneously reproducing a main audio/video stream and a sub-audio/video stream, a user can input a command to expand the sub-video data to a full screen. However, even after the sub-video data is fully displayed on the screen, the apparatus continues to mix and to output a main audio and a sub-audio, and also continues to display a subtitle displayed in the PIP mode. As a result, a user may be confused because the user still hears multiple audio data or views a subtitle for a main video data even if the sub-video data
is being fully displayed on the screen.

Disclosure of Invention

Technical Solution

Aspects of the present invention provide a method and apparatus for reproducing multi-stream audio/video data that provides a user with an audio and a subtitle appropriate for a video being displayed on a screen without any separate manipulation of a user by automatically processing audio mixing and a subtitle when a sub-video data is expanded to a full screen.

Advantageous Effects

According to aspects of the present invention, when a sub-video data is expanded to a full screen, an audio stream and/or a subtitle for only the sub-video data are reproduced, thereby preventing confusion that a user may experience.

Description of Drawings

These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a block diagram illustrating a main video data and a sub-video data reproduced on a screen in a PIP mode;

FIG. 2 is a block diagram explaining a method of processing an audio stream when a conventional multi-stream reproducing apparatus simultaneously reproduces a main video data and a sub-video data;

FIG. 3 is a schematic view explaining a method of processing a subtitle when a conventional multi-stream reproducing apparatus simultaneously reproduces a main video data and a sub-video data;

FIG. 4 is a view illustrating an example of expanding a sub-video data in the PIP mode of FIG. 1 to a full screen;

FIG. 5 is a block diagram of a multi-stream reproducing apparatus;

FIG. 6 is a block diagram of a conventional mixer;

FIG. 7 is a block diagram of a multi-stream reproducing apparatus for processing main audio data and sub-audio data, according to an embodiment of the present invention;

FIG. 8 is a block diagram of a multi-stream reproducing apparatus for processing main audio data and sub-audio data, according to another embodiment of the present invention;

FIG. 9 is a block diagram of a multi-stream reproducing apparatus for processing a subtitle, according to an embodiment of the present invention;

FIG. 10 is a flowchart of a multi-stream reproducing method of processing an audio
stream and a subtitle, according to an embodiment of the present invention; and

FIG. 11 is a flowchart of a method of selecting a sub-video subtitle according to another embodiment of the present invention.

Best Mode

According to an aspect of the present invention, there is provided an apparatus to simultaneously reproduce multiple audio/video streams, the apparatus including: a mixer to mix and to output main audio data and sub-audio data; and an audio controller to control the mixer such that when a sub-video data is expanded to a full screen, the sub-audio data is reproduced and the main audio data is not reproduced.

The mixer may include one or more switches, wherein when a command to reproduce the sub-video data on the full screen is received, the audio controller may control the switches to prevent the main audio data from being output.

When a command to reproduce the sub-video data on the full screen is received, the audio controller may control the mixer to set a gain of the sub-audio to a maximum value.

When a command to reproduce the sub-video data on the full screen is received, the audio controller may control the mixer to set a gain of the main audio to a minimum value and set a gain of the sub-audio to a maximum value.

The apparatus may further include a navigation engine to control the reproducing of the multiple audio/video streams, wherein the audio controller is included in the navigation engine.

According to another aspect of the present invention, there is provided an apparatus to simultaneously reproduce multiple audio/video streams, the apparatus including: a navigation engine to control the reproducing of the multiple audio/video streams, wherein when the sub-video data is expanded to a full screen, the navigation engine controls the apparatus to reproduce a sub-video subtitle and to not reproduce a main video subtitle.

The apparatus may further include a selector to select a stream to be reproduced from among the multiple audio/video streams, wherein when a command to reproduce the sub-video data on the full screen is received, the navigation engine controls the selector to select a sub-video subtitle.

The navigation engine may control the selector to select a sub-video subtitle including language information corresponding to a language of a previously reproduced main-video subtitle, a sub-video subtitle including language information corresponding to a default language, or a first sub-video subtitle for the sub-video data from among a plurality of sub-video subtitles.

According to another aspect of the present invention, there is provided a method of simultaneously reproducing multiple audio/video streams, the method including: re-
producing a main video data and a sub-video data from the multiple audio/video streams; and controlling a mixer to reproduce a sub-audio and to not reproduce a main audio if the sub-video data is expanded to a full screen.

According to another aspect of the present invention, there is provided a method of simultaneously reproducing multiple audio/video streams, the method including: reproducing a main video data and a sub-video data from the multiple audio/video streams; and reproducing a sub-video subtitle and not reproducing a main video subtitle if the sub-video data is expanded to a full screen.

Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

Mode for Invention

Reference will now be made in detail to the present embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

A multi-stream reproducing apparatus, according to an embodiment of the present invention, includes a navigation engine, a presentation engine, and/or an audio mixer that are improved as compared to those of a conventional reproducing apparatus. Therefore, such improved components of the multi-stream reproducing apparatus will be mainly described.

A reproducing apparatus according to an embodiment of the present invention includes a navigation engine to control reproduction of multiple audio-video streams, and a mixer to reproduce only sub-audio data without reproducing main audio data under the control of the navigation engine when a sub-video data is expanded to a full screen. Accordingly, a user is prevented from hearing the main audio data while viewing only the sub-video data. Furthermore, when the sub-video data is expanded to a full screen while multi-stream audio/video data including subtitle data is being reproduced, the navigation engine controls the reproducing apparatus so as to reproduce only a sub-video subtitle without reproducing a main-video subtitle. Accordingly, confusions that may be caused by a wrong subtitle are prevented.

FIG. 7 is a block diagram of a multi-stream reproducing apparatus for processing main audio data and sub-audio data, according to an embodiment of the present invention. Referring to FIG. 7, the multi-stream reproducing apparatus includes a navigation engine 750 to control reproduction of multiple audio/video streams, and a presentation engine (not shown) including an audio mixer 760 and decoders for reproducing multi-stream audio/video data. Main audio data 710 is decoded through a main audio decoder 720 in the presentation engine, and sub-audio data 730 is decoded
through a sub-audio decoder 740 in the presentation engine. The main audio data 710 and the sub-audio data 730 are then output to the audio mixer 760. The audio mixer 760 includes a switch unit 700 controlled by an audio controller (not shown). In an implementation example of the audio controller shown in FIG. 7, the navigation engine 750 also functions as the audio controller. The switch unit 700 includes a first switch 701 located at an output terminal of the main audio decoder 720, and a second switch 702 located at an output terminal of mixing information.

[38] When the navigation engine 750 receives user input for full-screen reproduction of the sub-video data (i.e., when the sub-video data is expanded to a full screen), the navigation engine 750 controls the switch unit 700 such that the first and second switches 701 and 702 are switched OFF to thereby block output of the main audio data 710. Also, the navigation engine 750 controls a gain controller 790 of the sub-audio data 730 to set a volume level of a sub-audio signal to a maximum level, so that only the sub-audio signal is reproduced as a final audio output. However, it is understood that according to other aspects, the volume level of the sub-audio signal is controlled by a user or is set to a default level different from a maximum level.

[39] FIG. 8 is a block diagram of a multi-stream reproducing apparatus for processing main audio data and sub-audio data, according to another embodiment of the present invention. Referring to FIG. 8, main audio data 810 is decoded through a main audio decoder 820 in a presentation engine (not shown), and sub-audio data 830 is decoded through a sub-audio decoder 840 in the presentation engine. The main audio data 810 and the sub-audio data 830 are then output to an audio mixer 860. The audio mixer 860 includes gain controllers 880 and 890 that are controlled by an audio controller (not shown). In FIG. 8, the navigation engine 850 also functions as the audio controller as an implementation example of the audio controller for controlling the gain controllers 880 and 890.

[40] The navigation engine 850 controls each of the gain controllers 880 and 890 (i.e., a gain controller 880 for a main audio signal, and a gain controller 890 for a sub-audio signal). Specifically, when the navigation engine 850 receives a command to reproduce sub-video data on a full screen, the navigation engine 850 controls the gain controllers 880 and 890 in the mixer 860 so as to set a gain of the main audio data 810 to a minimum value (0), and set a gain of the sub-audio data 830 to a maximum value. Consequently, only the sub-audio data 830 is reproduced as a final audio output.

[41] FIG. 9 is a block diagram of a multi-stream reproducing apparatus for processing a subtitle, according to an embodiment of the present invention. Referring to FIG. 9, the multi-stream reproducing apparatus includes a reader 910, a navigation engine 920, a de-multiplexer (De-MUX) 930, and a presentation engine 940. Like in a conventional multi-stream reproducing apparatus, multi-stream audio/video data recorded on an
optical storage medium 900 is read by the reader 910, and is transmitted to the
navigation engine 920 that controls reproduction of an audio/video stream, and to the
De-MUX 930 that selects a stream to be reproduced from among multiple audio/video
streams. However, when receiving a command to reproduce a sub-video data on a full
screen, the navigation engine 920 controls the De-MUX 930 to select a subtitle for the
sub-video data. Specifically, when the navigation engine 920 determines that a subtitle
stream for a main video data is still being reproduced with reference to a subtitle,
which was reproduced before the conversion to the full screen, the navigation engine
920 controls the De-MUX 930 to select the subtitle for the sub-video data to be
displayed on the full screen. Then, the subtitle for the sub-video data is decoded
through a subtitle decoder 941 in the presentation engine 940 so that the subtitle for the
sub-video data is reproduced.

FIG. 10 is a flowchart of a multi-stream reproducing method for processing audio
data and a subtitle, according to an embodiment of the present invention. Referring to
FIG. 10, when a command to reproduce a sub-video data on a full screen is received in
operation 1001, it is determined whether the sub-video data is being reproduced in
operation 1002. If it is determined that the sub-video data is being reproduced
(operation 1002), a size of the sub-video data is changed to a full screen size the sub-
video data is reproduced accordingly in operation 1003. If audio output control is
required, only a sub-audio is reproduced without reproducing a main audio in
operation 1004. To this end, switches that are included at output terminals of mixing
information and a main audio decoder in a mixer are switched OFF to block the output
of main audio data. In this case, the mixer may be controlled to set a gain of the sub-
audio data to a maximum level in operation 1004. Alternately, as another method
of outputting only the sub-audio data, the mixer may be controlled to set a gain of the
main audio to a minimum level, and to set a gain of the sub-audio to a maximum level
in operation 1004. In the case of an embodiment in which a sub-video subtitle for the
sub-video data being reproduced on the full screen is to be reproduced without re-
producing a main-video subtitle, it is determined first whether a subtitle is being re-
produced in operation 1005. If it is determined that the subtitle is being reproduced
(operation 1005), it is determined whether a main-video subtitle is being reproduced in
operation 1006. If it is determined that the main-video subtitle is being reproduced
(operation 1006), a De-MUX is controlled to select the sub-video subtitle stream rather
than the main-video subtitle in operation 1007.

FIG. 11 is a flowchart of a method of selecting a subtitle for a sub-video data,
according to another embodiment of the present invention. Referring to FIGs. 9 and 11,
when a sub-video data is reproduced on a full screen, a navigation engine 920 deter-
mines whether a sub-video subtitle stream for the corresponding sub-video data
exists in operation 1101. If the sub-video subtitle stream for the sub-video data being reproduced on the full screen exists in operation 1102, if there is one subtitle stream, the subtitle stream is selected and reproduced. If there is a plurality of subtitle streams, one of the subtitle streams is selected and reproduced in operations 1103 to 1106. The priority in selecting a subtitle is as follows, although aspects of the present invention are not limited thereto. If a sub-video subtitle, corresponding to language information of a main-video subtitle that was reproduced before the sub-video data was expanded to a full screen, exists from among a plurality of sub-video subtitles in operation 1103 (i.e., if there is a sub-video subtitle of the same language as that of the main-video subtitle), the corresponding sub-video subtitle is selected and reproduced in operation 1106. That is, the sub-video subtitle of the same language as that of the previously reproduced subtitle is output. If a sub-video subtitle stream of the same language as that of the previously reproduced main-video subtitle does not exist (operation 1103), a user determines whether a sub-video subtitle stream of a language set in a reproducing apparatus exists in operation 1104. If the sub-video subtitle stream does not exist (operation 1104), the first one of reproducible sub-video subtitle streams is selected in operation 1105. The navigation engine 920 controls the De-MUX 930 to select the subtitle stream selected in the aforementioned manner and sends the subtitle stream to the subtitle decoder 941 of the presentation engine 940.

It is understood that aspects of the present invention are not limited to audio/video data reproduced from an optical storage medium. That is, the audio/video data may be streamed to the reproducing apparatus from other sources, such as wirelessly through a network or satellite transmission, or through a coaxial cable.

Aspects of the present invention can also be embodied as computer-readable codes on a computer-readable recording medium. Also, codes and code segments to accomplish the present invention can be easily construed by programmers skilled in the art to which the present invention pertains. The computer-readable recording medium is any data storage device that can store data which can be thereafter read by a computer system or computer code processing apparatus. Examples of the computer-readable recording medium include read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes, floppy disks, and optical data storage devices. The computer-readable recording medium can also be distributed over network-coupled computer systems so that the computer-readable code is stored and executed in a distributed fashion.

Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.
Claims

1. An apparatus to simultaneously reproduce multiple audio/video streams, the apparatus comprising:
   a mixer to mix and to output main audio data and sub-audio data; and
   an audio controller to control the mixer such that when a sub-video data is expanded to a full screen, the sub-audio data is reproduced and the main audio data is not reproduced.

2. The apparatus as claimed in claim 1, wherein:
   the mixer comprises a main audio switch provided at an output terminal of the main audio data; and
   the audio controller controls the main audio switch to prevent the main audio data from being output when a command to reproduce the sub-video data on the full screen is received.

3. The apparatus as claimed in claim 1, wherein:
   the mixer comprises switches provided at output terminals of a main audio decoder and mixing information; and
   the audio controller controls the switches to prevent the main audio data from being output when a command to reproduce the sub-video data on the full screen is received.

4. The apparatus as claimed in claim 2, wherein the audio controller controls the mixer to set a gain of the sub-audio data to a maximum value when the command to reproduce the sub-video data on the full screen is received.

5. The apparatus as claimed in claim 1, wherein the audio controller controls the mixer to set a gain of the main audio data to a minimum value when a command to reproduce the sub-video data on the full screen is received.

6. The apparatus as claimed in claim 5, wherein the audio controller controls the mixer to set a gain of the sub-audio data to a maximum value when the command to reproduce the sub-video data on the full screen is received.

7. The apparatus as claimed in claim 1, further comprising a navigation engine to control a reproduction of the multiple audio/video streams, wherein the navigation engine comprises the audio controller.

8. The apparatus as claimed in claim 7, wherein the navigation engine controls the apparatus to reproduce a sub-video subtitle and to not reproduce a main video subtitle when a command to reproduce the sub-video data on the full screen is received.

9. An apparatus to simultaneously reproduce multiple audio/video streams, the apparatus comprising:
a navigation engine to control a reproduction of the multiple audio/video streams, and to control the apparatus to reproduce a sub-video subtitle and to not reproduce a main video subtitle when a sub-video data is expanded to a full screen.

[10] 10. The apparatus as claimed in claim 9, further comprising a selector to select a subtitle to be reproduced from among a plurality of subtitles, wherein the navigation engine controls the selector to select the sub-video subtitle when a command to reproduce the sub-video data on the full screen is received.

[11] 11. The apparatus as claimed in claim 10, wherein the navigation engine controls the selector to select a sub-video subtitle including language information corresponding to a language of a previously reproduced main video subtitle, a sub-video subtitle including language information corresponding a default language, or a first sub-video subtitle for the sub-video data from among a plurality of sub-video subtitles.

[12] 12. A method of simultaneously reproducing multiple audio/video streams, the method comprising:
reproducing a main video data and a sub-video data from the multiple audio/video streams; and
controlling a mixer to reproduce sub-audio data and to not reproduce main audio data if the sub-video data is expanded to a full screen.

[13] 13. The method as claimed in claim 12, wherein the controlling of the mixer comprises controlling a main audio switch, provided at an output terminal of the main audio data, to prevent the main audio data from being output when a command to reproduce the sub-video data on the full screen is received.

[14] 14. The method as claimed in claim 12, wherein the controlling of the mixer comprises controlling switches provided at output terminals of a main audio decoder and mixing information to prevent the main audio data from being output when a command to reproduce the sub-video data on the full screen is received.

[15] 15. The method as claimed in claim 13, wherein the controlling of the mixer further comprises controlling the mixer to set a gain of the sub-audio data to a maximum value when the command to reproduce the sub-video data on the full screen is received.

[16] 16. The method as claimed in claim 12, wherein the controlling of the mixer comprises controlling the mixer to set a gain of the main audio data to a minimum value when a command to reproduce the sub-video data on the full screen is received.
17. The method as claimed in claim 16, wherein the controlling of the mixer further comprises controlling the mixer to set a gain of the sub-audio data to a maximum value when the command to reproduce the sub-video data on the full screen is received.

18. The method as claimed in claim 12, further comprising reproducing a sub-video subtitle and not reproducing a main video subtitle when a command to reproduce the sub-video data on the full screen is received.

19. A method of simultaneously reproducing multiple audio/video streams, the method comprising:
   reproducing a main video data and a sub-video data from the multiple audio/video streams; and
   reproducing a sub-video subtitle and not reproducing a main video subtitle if the sub-video data is expanded to a full screen.

20. The method as claimed in claim 19, wherein the reproducing of the sub-video subtitle comprises controlling a de-multiplexer to select the sub-video subtitle to be reproduced from among a plurality of subtitles.

21. The method as claimed in claim 20, wherein the selecting of the sub-video subtitle comprises:
   selecting a sub-video subtitle including language information corresponding to a language of a previously reproduced main-video subtitle, a sub-video subtitle including language information corresponding a default language, or a first sub-video subtitle from among a plurality of sub-video subtitles.

22. A computer readable recording medium encoded with the method of claim 12 and implemented by a computer.

23. A computer readable recording medium encoded with the method of claim 19 and implemented by a computer.
FIG. 11

START

1101

NAVIGATE SUB-VIDEO SUBTITLE STREAM OF SUB-VIDEO BEING REPRODUCED ON FULL SCREEN

1102

SUB-VIDEO SUBTITLE STREAM EXISTS?

1103

DOES SUB-VIDEO SUBTITLE STREAM CORRESPONDING TO LANGUAGE OF PREVIOUSLY REPRODUCED MAIN SUBTITLE EXISTS?

1104

DOES SUB-VIDEO SUBTITLE STREAM CORRESPONDING TO LANGUAGE SET BY USER EXISTS?

1105

SELECT FIRST STREAM OF REPRODUCIBLE SUB-VIDEO SUBTITLE STREAMS

1106

SELECT CORRESPONDING SUB-VIDEO SUBTITLE STREAM

END
INTERNATIONAL SEARCH REPORT

PCT/KR2008/001533

A. CLASSIFICATION OF SUBJECT MATTER

H04N 5/60(2006.01)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)

IPC 8 H04N

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

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS(KIPO internal) multiple stream, main video, main audio, sub video, sub audio, mixer, reproducing,

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No</th>
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<td>US 2005/0063675 A1 (PARK et al) 24 Mar 2005 See abstract, Fig 1-5, Claims 1-5, 10</td>
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<td>A</td>
<td>WO 2006/093218 A1 (IWASE et al) 08 Sep 2006 See abstract, Fig 5, 27, Claims 1-3</td>
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<td>A</td>
<td>EP 1284060 (MISHRA et al) 19 Feb 2003 See abstract, Claim 1</td>
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☐ Further documents are listed in the continuation of Box C  
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* Special categories of cited documents
"A" document defining the general state of the art which is not considered to be of particular relevance
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"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
18 JUNE 2008 (18 06 2008)

Date of mailing of the international search report
18 JUNE 2008 (18.06.2008)

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
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Authorized officer
KU, Dae Sung

Facsimile No  82-42-472-7140
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Form PCT/ISA/210 (second sheet) (April 2007)
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