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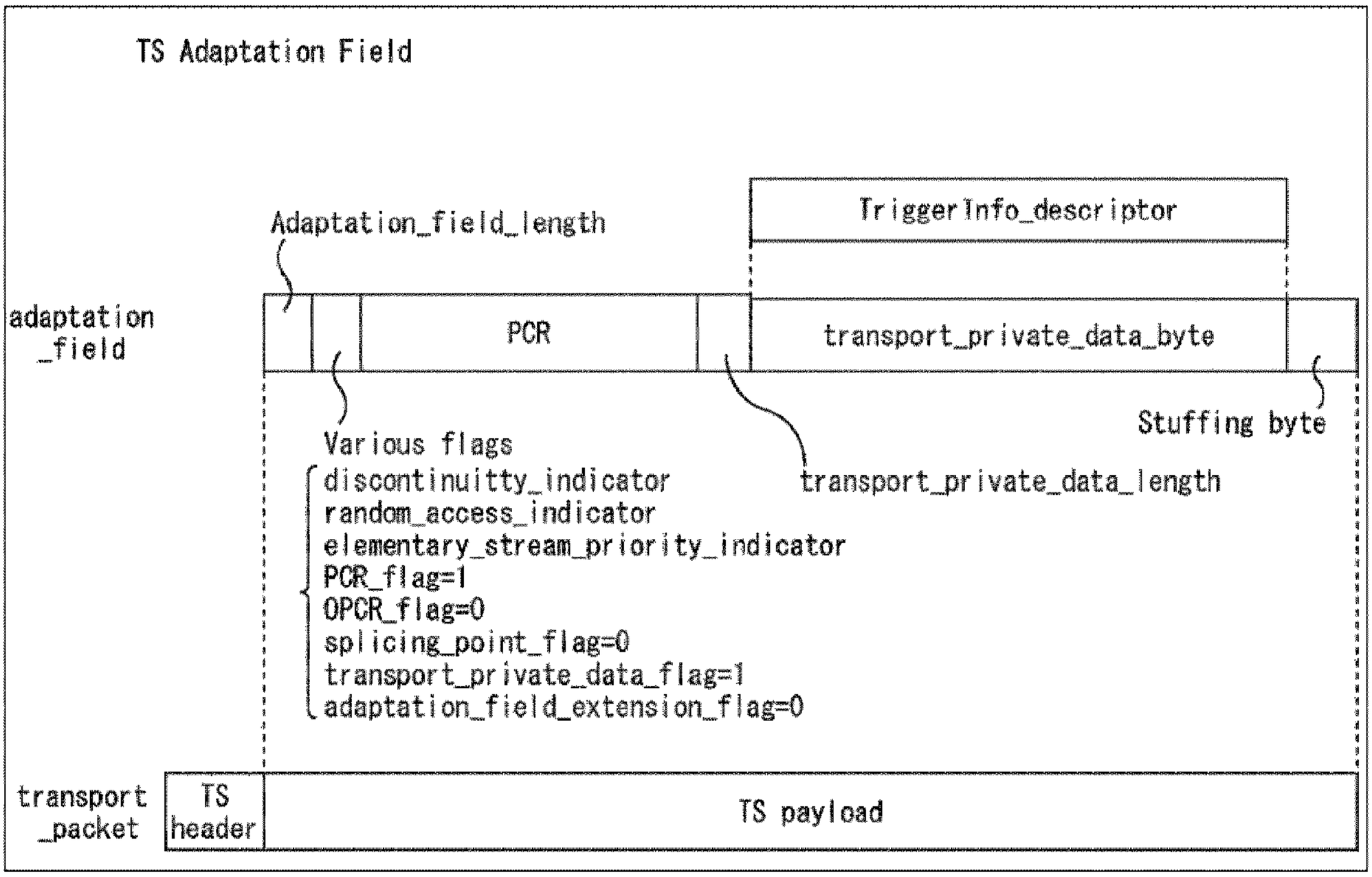
(54) Titre : APPAREIL RECEPTEUR, PROCEDE DE RECEPTION, APPAREIL EMETTEUR, PROCEDE D'EMISSION, PROGRAMME ET SYSTEME DE DIFFUSION

(54) Title: RECEPTION APPARATUS, RECEPTION METHOD, TRANSMISSION APPARATUS, TRANSMISSION METHOD, PROGRAM, AND BROADCASTING SYSTEM

[図6]




(57) Abrégé/Abstract:
The present invention relates to a receiver apparatus, a reception method, a transmitter apparatus, a transmission method, a program and a broadcast system that can achieve a service of data broadcast contents that can cooperate with the AV contents of

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(57) Abrégé(suite)/Abstract(continued):
programs without establishing, in the broadcast bands of digital television broadcasts, any bands that are used to broadcast the data broadcast contents. FIG. 6 shows the position where trigger information is stored in a PCR packet. The PCR packet is a packet in which the PCR is stored in the adaptation_field of a TS packet, while the trigger information (Trigger Info_descriptor) is stored in a transport_private_data_byte that follows the PCR. For example, the PCR packets, in each of which the trigger information is stored, are sequentially transmitted by a receiver and received by a broadcast station in a predetermined periodic manner. The present invention can be applied to a case where data broadcast is carried out in, for example, the United States of America.

[ABSTRACT]

The present invention relates to a reception apparatus, a reception method, a transmission apparatus, a transmission method, a program, and a broadcasting system by which a service of content for data broadcasting which can be interlocked with the progress of AV content of a program without providing a band for broadcasting content for data broadcasting in a broadcasting band of digital television broadcasting.

FIG. 6 indicates a position of a PCR packet at which trigger information is placed. The PCR packet is a TS packet in whose adaptation_field a PCR is placed, and the trigger information (TriggerInfo_descriptor) is placed into transport_private_data_byte next to the PCR. Then, the PCR packet in which the trigger information is placed is successively transmitted, for example, from the receiver side to and received by the broadcasting station side in a predetermined period. The present invention can be applied to a case in which data broadcasting is implemented, for example, in the United State.

SP311061

[DESCRIPTION]

[Title]

RECEPTION APPARATUS, RECEPTION METHOD, TRANSMISSION APPARATUS, TRANSMISSION METHOD, PROGRAM, AND BROADCASTING SYSTEM

[Technical Field]

[0001]

The present invention relates to a reception apparatus, a reception method, a transmission apparatus, a transmission method, a program, and a broadcasting system. Particularly, the present invention relates to a reception apparatus, a reception method, a transmission apparatus, a transmission method, a program, and a broadcasting system suitable for use in the case where content of data broadcasting is executed in an interlocking relationship with the progress of AV content which corresponds to a program, for example, in a digital television broadcast.

[Background Art]

[0002]

Conventionally, digitalization of television broadcasting has been promoted in Japan, and digital terrestrial broadcasting, digital BS broadcasting and so forth have become widespread. Further, in digital

television broadcasting such as digital terrestrial broadcasting, not only broadcasting of AV content which corresponds to a program but also data broadcasting have been implemented. With content of the data broadcasting, it is possible, for example, to display information relating to a program (AV content) being broadcast, to display information which does not relate to a program being broadcast (such as a notice of another program, a news, a weather forecast, traffic information or the like) or to cause an application which is interlocked with a program (AV content) being broadcast to be executed (refer to, for example, Patent Literature 1).

[0003]

It is to be noted that data broadcasting in Japan is implemented such that a band for data broadcasting is assured in advance in a broadcasting band of digital television broadcasting upon digitalization of television broadcasting and content for data broadcasting is broadcast using this band.

[0004]

Incidentally, in digital television broadcasting in the United States, broadcasting which corresponds to the data broadcasting in digital television broadcasting in Japan is not implemented as yet. In particular, in the

United States at present, a broadcasting band for digital television broadcasting is occupied by a band for video, a band for audio and a band for control information, and a band for broadcasting content for data broadcasting is not provided as illustrated in A of FIG. 1. Accordingly, in order to assure a band for broadcasting content for data broadcasting in the limited broadcasting band for digital television broadcasting, it is necessary to narrow the band for video and the band for audio as illustrated in B of FIG. 1.

[Citation List]

[Patent Literature]

[0005]

[PTL 1]

JP 2006-50237A

[Summary]

[Technical Problem]

[0006]

However, to narrow the band for video and the band for audio to assure a band for broadcasting content for data broadcasting leads to the deterioration of the picture quality and the sound quality of television broadcasting. Therefore, the narrowing cannot be considered realistic countermeasures.

[0007]

Further, in the United States, since a retransmission system of a digital television program in which a CATV (cable TV) network is used has widespread, such a problem as described below may possibly occur.

[0008]

FIG. 2 shows an example of a configuration of a retransmission system of a digital television program using a CATV network.

[0009]

This retransmission system is configured principally from a broadcasting apparatus 1, a CATV retransmission apparatus 2, a CATV network 3, a digital television receiver 4, a set-top box (STB) 5 and a television receiver 6.

[0010]

The broadcasting apparatus 1 provided in a broadcasting station or the like broadcasts a digital television broadcasting signal using a ground wave or a satellite wave. The CATV retransmission apparatus 2 provided in a cable TV station or the like receives a broadcasted digital television broadcast, removes unnecessary information and adds information unique to the CATV, and then retransmits a resulting signal to the

digital television receiver 4, set-top box 5 and so forth through the CATV network 3.

[0011]

The CATV retransmission apparatus 2 is configured from a tuner 11, a PID filter 12, a CATV original signal generation section 13, a multiplexing section 14 and a modulation section 15.

[0012]

The tuner 11 receives and demodulates a digital television broadcasting signal of each channel and outputs a resulting TS (transport stream) to the PID filter 12. The PID filter 12 removes a packet corresponding to a predetermined packet ID (packet which has no relation to AV content as a program) from the TS and outputs a resulting signal to the multiplexing section 14. The CATV original signal generation section 13 produces a packet in which information unique to the CATV station is placed and outputs the packet to the multiplexing section 14. The multiplexing section 14 multiplexes an output of the PID filter 12 and an output of the CATV original signal generation section 13 and outputs a resulting signal to the modulation section 15. The modulation section 15 modulates the output of the multiplexing section 14 in accordance with a modulation

method suitable for the CATV network 3 and retransmits the modulated signal to the digital television receiver 4, set-top box 5 and so forth through the CATV network 3.

[0013]

The digital television receiver 4 which is compatible with the CATV receives the TS of the retransmitted digital television broadcast through the CATV network 3 and decodes the received TS, and then displays a resulting video and outputs a resulting audio.

[0014]

The set-top box 5 which is compatible with the CATV receives the TS of the retransmitted digital television broadcast through the CATV network 3 and decodes the received TS, and then outputs a resulting video signal and audio signal to the television receiver 6 through a HDMI cable or the like. The television receiver 6 displays a video and outputs an audio based on the video signal and the audio signal inputted thereto from the set-top box 5 through the HDMI cable or the like.

[0015]

As described above, in the CATV retransmission apparatus 2, a packet corresponding to a predetermined packet ID (a packet which has no relation to AV content as a program) is removed from a TS of a digital

broadcasting signal by the PID filter 12. Accordingly, even if a band for broadcasting content for data broadcasting is assured in a broadcasting band as illustrated in B of FIG. 1, such a situation that a packet in which content for data broadcasting is placed is removed by the PID filter 12 may possibly occur.

[0016]

The present invention has been made in view of such a situation as described above and contemplates implementation of a service of content for data broadcasting which can be interlocked with the progress of a television program without providing a band for data broadcasting in a broadcasting band of digital television broadcasting.

[Solution to Problem]

[0017]

According to a first aspect of the present invention, there is provided a reception apparatus which receives AV content, including reception means for receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content, retaining means for retaining the application program, and control means for controlling a state of a

first application program retained by the retaining means in response to whether or not first said trigger information for designating a process relating to the first application program as a controlling target is received in synchronism with a reception timing determined in advance.

[0018]

The reception apparatus may be configured such that the control means erases the first application program from the retaining means in response to that the first trigger information is no more received in synchronism with the reception timing from a state in which the first trigger information is received in synchronism with the reception timing.

[0019]

The reception apparatus may be configured such that the control means ends the first application program being executed and erases the first application program from the retaining means in response to that the first trigger information is no more received in synchronism with the reception timing from the state in which the first trigger information is received in synchronism with the reception timing.

[0020]

The reception apparatus may be configured such that the control means controls a state of the first application program in response to whether or not the first trigger information is received in synchronism with the reception timing within a reception period based on the reception timing.

[0021]

The reception apparatus may be configured such that, in the case where the first trigger information is received in synchronism with the reception timing, the control means maintains, when the first trigger information same as the first trigger information received in synchronism with the reception timing in the preceding cycle is received, an execution state in the first application program being executed or maintains a retained state of the first application program retained in the retaining means, and controls, when the first trigger information including a trigger type different from that included in the first trigger information received in synchronism with the reception timing in the preceding cycle is received, start-up of the first application program, ignition of an event in the first application program being executed or ending of the first application program being executed based on the trigger

type included in the received first trigger information.

[0022]

The reception apparatus may be configured such that, in the case where the first application program is not retained in the retaining means, when the first trigger information is received, the control means controls the retaining means to retain the first application program based on a trigger type included in the first trigger information.

[0023]

According to the first aspect of the present invention, there is provided a reception method for a reception apparatus which receives AV content, the reception method including steps to be executed by the reception apparatus and including a reception step of receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content, and a controlling step of controlling a state of a first application program retained by a retaining section for retaining the application program depending upon whether or not first said trigger information, which designates a process relating to the first application program as a controlling target, is received in

synchronism with a reception timing determined in advance.

[0024]

According to the first aspect of the present invention, there is further provided a program for controlling a reception apparatus which receives AV content, the program causing a computer of the reception apparatus to execute a process including a reception step of receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content, and a controlling step of controlling a state of a first application program retained by a retaining section for retaining the application program depending upon whether or not first said trigger information, which designates a process relating to the first application program as a controlling target, is received in synchronism with a reception timing determined in advance.

[0025]

According to the first aspect of the present invention, trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content is received. Then, the state of a first application program retained by the retaining means for

retaining the application program is controlled depending upon whether or not first said trigger information, which designates a process relating to the first application program as a controlling target, is received in synchronism with a reception timing determined in advance.

[0026]

According to a second aspect of the present invention, there is provided a transmission apparatus which transmits AV content, including transmission means for transmitting trigger information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[0027]

The transmission apparatus may be configured such that the transmission means transmits the trigger information in synchronism with the transmission timing at which the trigger information is received by the reception apparatus within a reception period based on the reception timing.

[0028]

The transmission apparatus may be configured such

that the transmission means transmits a plurality of pieces of the trigger information in synchronism with the transmission timing at which at least one of the plural pieces of the trigger information is received by the reception apparatus within the reception period.

[0029]

According to the second aspect of the present invention, there is provided a transmission method for a transmission apparatus which transmits AV content, the transmission method including steps to be executed by the transmission apparatus and including a transmission step of transmitting trigger information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[0030]

According to the second aspect of the present invention, there is further provided a program for controlling a transmission apparatus which transmits AV content, the program causing a computer of the transmission apparatus to execute a process including a transmission step of transmitting trigger information for

controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[0031]

According to the second aspect of the present invention, trigger information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content is transmitted in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[0032]

According to a third aspect of the present invention, there is provided a broadcasting system configured from a transmission apparatus which transmits AV content and a reception apparatus which receives the transmitted AV content, wherein the transmission apparatus includes transmission means for transmitting trigger information for controlling a process relating to an application program to be executed by the reception

apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus, and the reception apparatus includes reception means for receiving the trigger information for controlling a process relating to the application program to be executed in an interlocked relationship with the progress of the AV content, retaining means for retaining the application program, and control means for controlling a state of a first application program retained by the retaining means in response to whether or not first said trigger information for designating a process relating to the first application program as a controlling target is received in synchronism with a reception timing determined in advance.

[0033]

According to the third aspect of the present invention, the transmission apparatus transmits trigger information for controlling a process relating to an application program to be executed by the reception apparatus in an interlocked relationship with the progress of the AV content is transmitted in synchronism with a transmission timing corresponding to a reception

timing determined in advance by the reception apparatus. The reception apparatus receives the trigger information for controlling a process relating to the application program to be executed in an interlocked relationship with the progress of the AV content. Further, the reception apparatus controls the state of the first application program retained by the retaining means in response to whether or not first trigger information for designating a process relating to the first application program as a controlling target is received in synchronism with a reception timing determined in advance.

[Advantageous Effects of Invention]

[0034]

With the first aspect of the present invention, it is possible to start up an application program, ignite an event or end the application program or event in an interlocking relationship with the progress of AV content such as a television program.

[0035]

With the second aspect of the present invention, it is possible to control of start-up of an application program, ignition of an event or ending of the application program or event in an interlocking relationship with the progress of AV content such as a

television program without providing a band for data broadcasting in a broadcasting band of digital television broadcasting.

[0036]

With the third aspect of the present invention, it is possible to control an application program in an interlocked relationship with the progress of AV content such as a television program without providing a band for data broadcasting in a broadcasting band of digital television broadcasting.

[Brief Description of Drawings]

[0037]

[FIG. 1]

FIG. 1 is a view illustrating a broadcasting band of digital television broadcasting.

[FIG. 2]

FIG. 2 is a view showing an example of a configuration of an existing CATV retransmission system.

[FIG. 3]

FIG. 3 is a view showing an example of a configuration of a broadcasting system to which the present invention is applied.

[FIG. 4]

FIG. 4 is a block diagram showing an example of a

configuration of a reception apparatus to which the present invention is applied.

[FIG. 5]

FIG. 5 is a view illustrating a concept of transmission of trigger information included in a PCR packet of a TS.

[FIG. 6]

FIG. 6 is a view illustrating particular arrangement of a trigger information in a PCR packet.

[FIG. 7]

FIG. 7 is a view illustrating an example of items included in the trigger information.

[FIG. 8]

FIG. 8 is a view illustrating an example of trigger information transmitted and received in a predetermined period.

[FIG. 9]

FIG. 9 is a view illustrating another example of trigger information transmitted and received in a predetermined period.

[FIG. 10]

FIG. 10 is a view illustrating an example of a PMT.

[FIG. 11]

FIG. 11 is a flow chart illustrating a trigger

information dealing process.

[FIG. 12]

FIG. 12 is a view illustrating an example of a screen display image when an application for data broadcasting is executed.

[FIG. 13]

FIG. 13 is a view illustrating a further example of trigger information transmitted and received in a predetermined period.

[FIG. 14]

FIG. 14 is a block diagram showing an example of a configuration of a computer.

[Description of Embodiments]

[0038]

In the following, the best mode (hereinafter referred to as embodiment) for carrying out the invention is described in detail with reference to the drawings.

[0039]

<1. Embodiment>

[Example of the Configuration of the Broadcasting System]

FIG. 3 shows a broadcasting system of the present embodiment. This broadcasting system 30 implements, for example, in the United States at present, a service of content for data broadcasting which can be interlocked

with AV content of a program without providing a band for broadcasting content for data broadcasting in a broadcasting band of digital television broadcasting.

[0040]

This broadcasting system 30 is configured from a broadcasting apparatus 41 and a server 42 provided on the broadcasting station side, and a reception apparatus 60 provided on the receiver side.

[0041]

The broadcasting apparatus 41 is configured to transmit a digital television broadcasting signal. The broadcasting band of this digital television broadcasting signal is occupied by a band for video, a band for audio and a band for control information as illustrated in A of FIG. 1 and has no band provided therein for broadcasting content for data broadcasting.

[0042]

Further, the broadcasting apparatus 41 places trigger information into a packet (hereinafter referred to as PCR packet) including a PCR (Program Clock Reference) from among TS packets which configure a TS of a digital broadcasting signal and transmits the PCR packet in synchronism with a transmission timing determined in advance (transmission timing which is

generated, for example, at intervals of 10 seconds).

[0043]

Here, the trigger information is configured from information indicative of an execution timing of content for data broadcasting, information indicative of an acquisition destination of the content for data broadcasting, and so forth. The trigger information is hereinafter described in detail with reference to FIGS. 5 to 7.

[0044]

The server 42 supplies content for data broadcasting and so forth in accordance with a request from the reception apparatus 60 from which the server 42 is accessed through the Internet 50.

[0045]

The reception apparatus 60 receives a digital broadcasting signal transmitted thereto from the broadcasting apparatus 41, acquires a video and an audio of AV content corresponding to a television program, and outputs the video and the audio to a monitor (not shown). Further, the reception apparatus 60 accesses the server 42 through the Internet 50 to acquire content for data broadcasting.

[0046]

Furthermore, the reception apparatus 60 receives a trigger signal placed in a PCR packet in synchronism with a reception timing determined in advance and corresponding to a transmission timing from the broadcasting apparatus 41 (for example, a reception timing which is generated at intervals of, for example, 10 seconds). It is to be noted that the transmission timing from the broadcasting apparatus 41 is determined in response to a reception timing by the reception apparatus 60 so that the trigger information may be received at a reception timing by the reception apparatus 60. A process carried out based on received trigger information by the reception apparatus 60 is hereinafter described in detail with reference to FIGS. 8 to 10.

[0047]

It is to be noted that this reception apparatus 60 may exist as a sole unit or may be built, for example, in a television receiver, a video recorder or the like.

[0048]

[Example of the Configuration of the Reception Apparatus]

FIG. 4 shows an example of a configuration of the reception apparatus 60. The reception apparatus 60 is configured from a tuner 61, a demultiplexing section 62, an audio decoder 63, an audio outputting section 64, a

video decoder 65, a trigger detection section 66, a video outputting section 67, a control section 68, a memory 69, an operation section 70, a recording section 71, a communication I/F 72, and a browser 73.

[0049]

The tuner 61 receives and demodulates a digital television broadcasting signal corresponding to a channel selected by the user and outputs a resulting TS to the demultiplexing section 62. The communication I/F 72 demultiplexes the TS inputted thereto from the tuner 61 into an audio coded signal, a video coded signal and a control signal and outputs them to the audio decoder 63, video decoder 65 and control section 68, respectively.

[0050]

Further, the demultiplexing section 62 extracts a PCR packet including trigger information disposed in the TS and outputs the extracted PCR packet to the control section 68.

[0051]

The audio decoder 63 decodes the audio coded signal inputted thereto and outputs a resulting audio signal to the audio outputting section 64. The audio outputting section 64 outputs the audio signal inputted thereto to a succeeding stage (for example, to the monitor).

[0052]

The video decoder 65 decodes the video coded signal inputted thereto and outputs a resulting video signal to the trigger detection section 66 and the video outputting section 67.

[0053]

It is to be noted that, while it is described in the description of the present embodiment that the trigger information is placed in and transmitted together with a PCR packet of a TS by the broadcasting apparatus 41, the trigger signal may be, for example, embedded into and transmitted together with the video signal.

[0054]

In this instance, the trigger detection section 66 supervises the video signal inputted thereto to detect the trigger information embedded in the video signal.

[0055]

The video outputting section 67 outputs the video signal inputted thereto from the video decoder 65 to a succeeding stage (for example, to the monitor). Further, the video outputting section 67 synthesizes the video of content for data broadcasting inputted thereto from the browser 73 and the video signal inputted thereto from the video decoder 65 and outputs the synthesized signal to

the succeeding stage. It is to be noted that outputting from the audio outputting section 64 and the video outputting section 67 to the succeeding stages can be carried out using, for example, a HDMI (High-Definition Multimedia Interface) cable.

[0056]

The control section 68 executes a controlling program recorded in the memory 69 to control the entire reception apparatus 60. Further, the control section 68 controls, based on trigger information inputted thereto from the demultiplexing section 62 (or from the trigger detection section 66), acquisition, start-up, event ignition, ending, and so forth of an application program for implementing content for data broadcasting interlocked with a television program.

[0057]

In the memory 69, the controlling program which is executed by the control section 68 is recorded. This controlling program can be updated based on updating data acquired through a digital television broadcasting signal or through the Internet 50. The operation section 70 accepts various operations from the user and notifies the control section 68 of corresponding operation signals.

[0058]

The recording section 71 retains, in the case where an application for data broadcasting is distributed using a digital television broadcasting signal, the downloaded data broadcasting application into a recording medium built therein.

[0059]

The communication I/F 72 establishes a connection to the server 42 through the Internet 50 under the control of the browser 73. The browser 73 acquires an application program for data broadcasting (hereinafter referred to as data broadcasting application) from the server 42 through the communication I/F 72 and the Internet 50 under the control of the control section 68.

[0060]

[Details of the Trigger Information]

FIG. 5 illustrates a concept in the case where the tripper information is placed into a PCR packet of a TS and transmitted in synchronism with a transmission timing determined in advance (for example, at a transmission timing which is generated at intervals of 10 seconds). As illustrated in FIG. 5, the trigger information is not placed in all PCR packets but is placed in some PCR packet so that it is transmitted in synchronism with a transmission timing. Since the PCR packet usually passes

through such a PID filter 12 of the CATV retransmission apparatus 2 as shown in FIG. 2, the trigger information can be conveyed also to a reception apparatus (digital television receiver 4 of FIG. 2) which utilizes a CATV network.

[0061]

FIG. 6 indicates a position of a PCR packet at which the trigger information is placed. The PCR packet is a TS packet in whose adaptation_field a PCR is placed, and the trigger information (TriggerInfo_descriptor) is placed into transport_private_data_byte next to the PCR. It is to be noted that, when the trigger information is placed, transport_private_data_flag of Various_flags provided prior to the PCR is set to 1.

[0062]

FIG. 7 illustrates an example of items of information included in the trigger information.

[0063]

Trigger ID is information for identifying the trigger information. It is to be noted that, in the case where trigger information of the same substance is transmitted by a plural number of times, the trigger IDs of the trigger information are same as each other. Trigger type indicates which one of application start-up

(which indicates acquisition and start-up of the data broadcasting application), application ending (which indicates ending of a data broadcasting application being executed), application event (which indicates ignition of an event (updating of the display substance or the like) in the data broadcasting application being executed) and pre-cache (which indicates only acquisition of the data broadcasting application) the trigger information is.

[0064]

Application ID is information for identifying a data broadcasting application corresponding to the trigger information. Application type is information indicative of a type (for example, html, java or the like) of the data broadcasting application corresponding to the trigger information. Application URL (Uniform Resource Locator) is a URL of an acquisition destination (in the present case, the server 42) of a data broadcasting application in the case where the trigger type is application start-up or pre-cache. Accumulation application ID is described only in the case where immediate acquisition of a data broadcasting application is not carried out but a data broadcasting application accumulated already (acquired already) and to be started up in the case where the trigger type is application

start-up.

[0065]

Automatic start-up flag is described in the case where the trigger type is application start-up and is set to on or off. When the automatic start-up flag is on, automatic start-up (wherein a data broadcasting application is started up automatically) is applied. When the automatic start-up flag is off, manual start-up (wherein the user is urged to carry out an operation input and the data broadcasting application is started up in response to such an operation input).

[0066]

Name of application is a name of a data broadcasting application to be presented to the user in the case where the automatic start-up flag is manual start-up or in a like case. Event ID is information for identifying, in the case where the trigger type is application event, the event. It is to be noted that the trigger information does not always include all items described above but includes only those of the items which are required at the timing.

[0067]

FIG. 8 illustrates an example of processing carried out by the reception apparatus 60 based on trigger

information received in synchronism with a reception timing determined in advance from the broadcasting apparatus 41.

[0068]

It is to be noted that, in FIG. 8, for example, the reception apparatus 60 receives trigger information transmitted in synchronism with a transmission timing tn' (n = 1, 2, 3, 4, …) from the broadcasting apparatus 41 in synchronism with a reception timing tn corresponding to the transmission timing tn'.

[0069]

Here, in the case where a reaching time period after trigger information is transmitted in synchronism with the transmission timing tn' from the broadcasting apparatus 41 until it is received in synchronism with the reception timing tn by the reception apparatus 60 is represented by a, the reception timing tn is a timing when the reaching time a elapses after the transmission timing tn'.

[0070]

Further, description is given assuming that, in FIG. 8, the transmission timing tn' and the reception timing tn are generated in a predetermined period (for example, after every 10 seconds).

[0071]

It is to be noted that the transmission timing tn' and the reception timing tn may be any timings without being restricted by the predetermined period. In other words, for example, the reception timings tn may be such that a reception timing t2 is generated after 5 seconds from a reception timing t1; a reception timing t3 is generated after 7 seconds from the reception timing t2; and a reception timing t4 is generated after 9 seconds from the reception timing t3. This similarly applies also to the transmission timing tn'.

[0072]

Referring to FIG. 8, trigger information 81a is transmitted in synchronism with the transmission timing t1' from the broadcasting apparatus 41 and is received in synchronism with the reception timing t1 by the reception apparatus 60. The trigger information 81a includes, in addition to a trigger ID and so forth, at least an application ID for identifying the data broadcasting application App1, a trigger type indicative of application start-up and an automatic start-up flag indicative of automatic start-up.

[0073]

Trigger information 81b is information same as the

trigger information 81a and is transmitted in synchronism with the transmission timing t2' from the broadcasting apparatus 41 and received in synchronism with the reception timing t2 by the reception apparatus 60.

[0074]

Further, in FIG. 8, trigger information 82a is transmitted in synchronism with the transmission timing t3' from the broadcasting apparatus 41 and received in synchronism with the reception timing t3 by the reception apparatus 60. The trigger information 82a includes, in addition to a trigger ID and so forth, at least an application ID for identifying a data broadcasting application App2, a trigger type indicative of application start-up and an automatic start-up flag indicative of automatic start-up.

[0075]

Trigger information 82b is information same as the trigger information 82a and is transmitted in synchronism with the transmission timing t4' from the broadcasting apparatus 41 and received in synchronism with the reception timing t4 by the reception apparatus 60.

[0076]

Further, in FIG. 8, trigger information 83 is transmitted in synchronism with the transmission timing

t3' from the broadcasting apparatus 41 and received in synchronism with the reception timing t3 by the reception apparatus 60. The trigger information 83 includes, in addition to a trigger ID and so forth, at least an application ID for identifying a data broadcasting application App1 and a trigger type indicative of application ending.

[0077]

For example, the broadcasting apparatus 41 transmits the trigger information 81a placed in a PCR packet in synchronism with the transmission timing t1'. On the other hand, the reception apparatus 60 receives the trigger information 81a from the broadcasting apparatus 41 in synchronism with the reception timing t1. Then, the trigger information 81a received by the reception apparatus 60 is inputted to the control section 68 through the tuner 61 and the demultiplexing section 62.

[0078]

The control section 68 controls the browser 73 based on the trigger information 81a inputted thereto to start up the data broadcasting application App1 designated by the application ID included in the trigger information 81a.

[0079]

Further, for example, the broadcasting apparatus 41 transmits the trigger information 81b placed in a PCR packet in synchronism with the transmission timing t2'. On the other hand, the reception apparatus 60 receives the trigger information 81b from the broadcasting apparatus 41 in synchronism with the reception timing t2. Then, in the reception apparatus 60, the received trigger information 81b is inputted to the control section 68 through the tuner 61 and the demultiplexing section 62.

[0080]

The control section 68 controls, in the case where the trigger information 81b inputted thereto designates the data broadcasting application App1 started up already, such that the data broadcasting application App1 started up based on the trigger information 81a continues to operate as it is.

[0081]

In particular, for example, in the case where the reception apparatus 60 receives, at the reception timing tn, trigger information (in the present case, the trigger information 81b) having the substance same as that of the trigger information (in the present case, the trigger information 81a) received at the reception timing tn-1 in the preceding cycle, the reception apparatus 60 does not

carry out a process based on the trigger information received at the reception timing tn.

[0082]

In particular, for example, in the reception apparatus 60, if the data broadcasting application App1 is retained in the memory (not shown) built in the browser 73, then the control section 68 controls so as to maintain the retained state. Or, for example, when the data broadcasting application App1 is being executed by the browser 73, the control section 68 controls so as to maintain the executed state.

[0083]

It is to be noted that, in the case where the reception apparatus 60 cannot receive the trigger information 81a in synchronism with the reception timing t1, when the trigger information 81b is received at the reception timing t2, the control section 68 controls the browser 73 based on the trigger information 81b to start up the data broadcasting application App1 designated by the trigger information 81b.

[0084]

Further, for example, the broadcasting apparatus 41 transmits the trigger information 82a and the trigger information 83 placed in a PCR packet in synchronism with

the transmission timing t3'. On the other hand, the reception apparatus 60 receives the trigger information 82a and the trigger information 83 from the broadcasting apparatus 41 in synchronism with the reception timing t3. Then, the trigger information 82a and the trigger information 83 received by the reception apparatus 60 are inputted to the control section 68 through the tuner 61 and the demultiplexing section 62.

[0085]

The control section 68 ends (stops) the data broadcasting application App1 during operation based on the trigger information 83 inputted thereto. Further, the control section 68 controls the browser 73 based on the trigger information 82a inputted thereto to start up the data broadcasting application App2 designated by the application ID included in the trigger information 82a.

[0086]

In particular, for example, in the case where the reception apparatus 60 receives, at the reception timing tn, trigger information (in the present case, the trigger information 83 or the trigger information 82a) having the substance different from that of the trigger information (in the present case, the trigger information 81b) received at the reception timing tn-1 in the preceding

cycle, the reception apparatus 60 carries out processing based on the trigger information received at the reception timing tn.

[0087]

Further, for example, the broadcasting apparatus 41 transmits the trigger information 82b placed in the PCR packet in synchronism with the transmission timing t4'. On the other hand, the reception apparatus 60 receives the trigger information 82b from the broadcasting apparatus 41 in synchronism with the reception timing t4. Then, the trigger information 82b received by the reception apparatus 60 is inputted to the control section 68 through the tuner 61 and the demultiplexing section 62.

[0088]

The control section 68 controls, in the case where the trigger information 82b inputted thereto designates the data broadcasting application App2 started up already, the data broadcasting application App2 designated by the trigger information 82B to operate as it is.

[0089]

It is to be noted that, in the case where the reception apparatus 60 cannot receive the trigger information 82a in synchronism with the reception timing t3, when it receives the trigger information 82b at the

reception timing t4, the control section 68 controls the browser 73 based on the trigger information 82b to start up the data broadcasting application App2 designated by the trigger information 82b.

[0090]

Incidentally, in FIG. 8, in the case where the reception apparatus 60 continues to receive trigger information (the trigger information 81a and 81b), which designates the data broadcasting application App1, in synchronism with the reception timings t1 and t2, it waits to receive the trigger information 83 in synchronism with the reception timing t3 to end the data broadcasting application App1.

[0091]

Or, for example, in the case where the reception apparatus 60 continues to receive the trigger information (trigger information 81a and 81b), which designates the data broadcasting application App1, in synchronism with the reception timings t1 and t2, the reception apparatus 60 may end the data broadcasting application App1 in response to that the trigger information which designates the data broadcasting application App1 is not received any more in synchronism with the reception timing t3 as illustrated in FIG. 9.

[0092]

In the case where such control as illustrated in FIG. 9 is used, different from the case in which such control as illustrated in FIG. 8 is used, the reception apparatus 60 can end the data broadcasting application App1 at the reception timing t3 without waiting that the trigger information 83 is received. It is to be noted that, after the data broadcasting application App1 is ended, the data broadcasting application App1 may be erased from the reception apparatus 60 so that it may not be started up again.

[0093]

Further, since the reception apparatus 60 receives trigger information in synchronism with the reception timing tn, only it is necessary for the reception apparatus 60 to supervise the PCR packet received in synchronism with the reception timing tn to decide whether or not trigger information is included in the PCR packet. Therefore, for example, different from the case wherein trigger information is suitably placed into and transmitted together with a PCR packet, the necessity to always supervise a received PCR packet to detect whether or not trigger information is placed in the received PCR packet is eliminated.

[0094]

Incidentally, in the case where the broadcasting apparatus 41 transmits trigger information in synchronism with the transmission timing tn', such a situation that trigger information from the broadcasting apparatus 41 cannot be received in synchronism with the reception timing tn possibly occurs.

[0095]

In this instance, the reception apparatus 60 decides that trigger information is not received in synchronism with the reception timing tn, and such a situation that the reception apparatus 60 fails to acquire trigger information from the broadcasting apparatus 41 may possibly occur.

[0096]

Accordingly, in the case where the reception apparatus 60 receives trigger information from the broadcasting apparatus 41 within a reception period determined based on the reception timing tn, preferably it is decided that trigger information is received in synchronism with the reception timing tn.

[0097]

It is to be noted that, as the reception period, for example, a period from $\Delta t_1$ seconds before the

reception timing tn to $\Delta t_2$ seconds after the reception timing tn, a period from $\Delta t_1$ seconds before the reception timing tn to the reception timing tn, a period from the reception timing tn to $\Delta t_2$ seconds after the reception timing tn and so forth can be adopted.

[0098]

In this instance, even if the reception apparatus 60 does not receive trigger information at the reception timing tn, if it receives trigger information within the perception period, then since it is decided that trigger signal is received at the reception timing tn, failure to acquire trigger information from the broadcasting apparatus 41 can be prevented.

[0099]

Further, the broadcasting apparatus 41 may not transmit trigger information only once in synchronism with the transmission timing tn' but may transmit the same trigger information successively by a plural number of times so that the reception apparatus 60 can receive the trigger information at the reception timing tn with a higher degree of accuracy. By this, a plurality of pieces of trigger information which are same as each other are successively transferred to the reception apparatus 60, for example, in synchronism with the transmission timing

tn'.

[0100]

Therefore, since the reception apparatus 60 can improve the accuracy of acquisition of trigger information at the reception timing tn, it becomes possible to prevent failure in acquisition of trigger information.

[0101]

Here, it seems a possible idea not to place and transmit trigger information into and together with a PCR packet but to place trigger information into an AIT (Application Information Table) and periodically transmit the trigger information from the broadcasting apparatus 41.

[0102]

However, in this instance, an ES (elementary stream) for transmitting the AIT must be provided separately in the TS. Further, for example, the AIT is configured such that it is disposed in a PMT (Program Map Table) as illustrated in FIG. 10.

[0103]

Accordingly, for example, in the case where trigger information is placed into and transmitted together with an AIT, the reception apparatus 60 must carry out such a

complicated process as to extract the AIT from a PMT included in the TS and further extract the trigger information from the extracted AIT.

[0104]

In contrast, in the present embodiment, since trigger information is included into and transmitted together with a PCR packet, there is no necessity to separately provide an ES for transmitting an AIT in a TS. Further, since, in the present embodiment, trigger information is included not into an AIT but into and transmitted together with a PCR packet, only it is necessary for the reception apparatus 60 to extract the trigger information from a PCR packet included in the TS.

[0105]

[Description of the Operation]

Now, a trigger information dealing process carried out by the reception apparatus 60 is described.

[0106]

FIG. 11 is a flow chart illustrating the trigger information dealing process. The trigger information dealing process is repetitively executed when the user is viewing a television program, namely, while a digital television broadcasting signal is received.

[0107]

It is to be noted that, for the convenience of description, it is assumed that, in the trigger information dealing process, one piece of trigger information (information which designates one data broadcasting application) is transmitted from the broadcasting apparatus 41 at a transmission timing tn'.

[0108]

At step S1, the control section 68 decides, based on an input from the demultiplexing section 62, whether or not a PCR packet which includes trigger information is received in synchronism with a reception timing tn determined in advance. Then, in the case where a PCR packet which includes trigger information is not received in synchronism with the reception timing tn, the processing is advanced to step S2.

[0109]

At step S2, in the case where a data broadcasting application retained already exists in (a memory not shown and built in) the browser 73, the control section 68 erases the retained data broadcasting application and returns the processing to step S1 so that the processes beginning with step S1 are carried out similarly.

[0110]

On the other hand, in the case where a PCR packet

which includes trigger information is received in synchronism with the reception timing tn at step S1, the processing advances to step S3.

[0111]

At step S3, the control section 68 extracts the trigger information from the received PCR packet. Then, in the case where a data broadcasting application acquired from the server 42 or the like and retained already in the browser 73 exists, the control section 68 decides whether or not the extracted trigger information includes an application ID for identifying the data broadcasting application retained already in the browser 73.

[0112]

It is to be noted that, in the case where there is no data broadcasting application retained already in the browser 73 at step S3, processes at step S4 and step S5 are skipped to advance the processing to step S6.

[0113]

In the case where it is decided at step S3 that the extracted trigger information includes an application ID for identifying the data broadcasting application retained already in the browser 73, the processing advances to step S4.

[0114]

At step S4, the control section 68 decides, based on the trigger information, whether or not processes after step S6 have been executed already in accordance with the trigger information. In particular, for example, in the case where trigger information which includes a trigger type same as that included in trigger information received at the reception timing tn-1 in the preceding cycle is received, the control section 68 decides that the processes after step S6 have been executed already.

[0115]

Further, for example, in the case where trigger information which includes a trigger type different from that included in the trigger information received at the reception timing tn-1 in the preceding cycle is received, the control section 68 decides that the processes after step S6 have not yet been executed.

[0116]

In the case where it is decided that the processes after step S6 have been executed already, a state (for example, an execution state or a retention state) of the data broadcasting application retained already in the browser 73 is maintained, and the processing is returned to step S1 so that the processes beginning with step S1

are repetitively carried out similarly. On the contrary, in the case where it is decided that the processes after step S6 have not been executed for the trigger information, the processing is advanced to step S6.

[0117]

On the other hand, in the case where it is decided at step S3 that the extracted trigger information does not include an application ID for identifying the data broadcasting application retained already in the browser 73, the processing advances to step S5.

[0118]

At step S5, the control section 68 erases the data broadcasting application retained already in the browser 73.

[0119]

In particular, for example, in the case where the data broadcasting application is pre-cached already (retained already) in the browser 73 through a process at step S17 hereinafter described, the control section 68 erases the data broadcasting application pre-cached in the browser 73.

[0120]

Further, for example, where the data broadcasting application retained already in the browser 73 is

operating, the control section 68 ends and erases the data broadcasting application from the browser 73. It is to be noted that, in the case where the data broadcasting application retained already in the browser 73 is operating, the control section 68 may carry out ending of the data broadcasting application but may not carry out a process for erasing the data broadcasting application from the browser 73.

[0121]

Thereafter, the processing is advanced from step S5 to step S6, and, at step S6, the control section 68 decides which one of application start-up, application ending and pre-cache the trigger type of the trigger information is.

[0122]

In the case where it is decided at step S6 that the trigger type of the trigger information is application start-up, the processing is advanced to step S7. At step S7, the control section 68 decides whether or not an accumulation application ID is designated by the trigger information and a data broadcasting application corresponding to the designated ID is accumulated already in the recording section 71. In the case where it is decided here that the dealing data broadcasting

application is not accumulated, the processing advances to step S8. At step S8, the control section 68 controls the browser 73 to access the server 42 corresponding to the application URL of the trigger information to acquire the data broadcasting application corresponding to (designated by) the application ID of the trigger information and then retain the acquired data broadcasting application into the memory built in the browser 73. Here, in the case where, at step S17 hereinafter described, the pertaining data broadcasting application is acquired and pre-cached already from the server 42 corresponding to the URL described above by the browser 73 (the data broadcasting application is retained already in the memory built in the browser 73), the process at step S8 is skipped to advance the processing to step S10.

[0123]

On the contrary, in the case where it is decided at step S7 that the accumulation application ID is designated by the trigger information and besides the data broadcasting application corresponding to the designated ID is accumulated already in the recording section 71, the processing is advanced to step S9. At step S9, the control section 68 controls the browser 73

to read out the data broadcasting application corresponding to the accumulation application ID of the trigger information from the recording section 71 and then retain the read out data broadcasting application into the memory of the browser 73. Thereafter, the processing advances to step S10.

[0124]

At step S10, the control section 68 decides whether or not the automatic start-up flag of the trigger information is automatic start-up.

[0125]

In the case where it is decided at step S10 that the automatic start-up flag of the trigger information is not automatic start-up (namely, is manual start-up), the processing is advanced to step S11. At step S11, the browser 73 causes the display apparatus to display, for example, a screen image of "execute (name of application)?" or the like under the control of the control section 68 to urge the user to carry out a start-up operation of the data broadcasting application. In the case where it is decided at step S12 that a start-up operation is inputted by the user in response to the urging display, the processing is advanced to step 14. At step S14, the browser 73 starts up the data broadcasting

application retained already at step S8, step S9 or step S17 under the control of the control section 68. Thereafter, the processing is returned to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0126]

It is to be noted that, in the case where, after the urging display at step S11, it is decided at step 12 that a start-up operation from the user is not inputted and it is decided at step S13 that a predetermined time period elapses while a start-up operation from the user is not inputted, the processing returns to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0127]

It is to be noted that, in the case where it is decided at step S10 that the automatic start-up flag of the trigger information is automatic start-up, the processing is advanced to step S14. At step S14, the browser 73 starts up the data broadcasting application retained already at step S8, step S9 or step S17 under the control of the control section 68. Thereafter, the processing returns to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0128]

In the case where it is decided at step S6 that the trigger type of the trigger information is application event, the processing is advanced to step S15. At step S15, only in the case where the application ID of the trigger information and the application ID of the operating data broadcasting application coincide with each other, the control section 68 controls the browser 73 to ignite (execute) an event corresponding to the event ID of the trigger information in the operating application. Thereafter, the processing returns to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0129]

In the case where it is decided at step S6 that the trigger type of the trigger information is application ending, the processing is advanced to step S16. At step S16, only in the case where the application ID of the trigger information and the application ID of the operating data broadcasting application coincide with each other, the control section 68 controls the browser 73 to end the operating data broadcasting application. It is to be noted that, after the operating data broadcasting application is ended, the data broadcasting

application may be erased from the browser 73. Thereafter, the processing returns to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0130]

In the case where it is decided at step S6 that the trigger type of the trigger information is pre-cache, the processing is advanced to step S17. At step S17, the control section 68 controls the browser 73 to access the server 42 corresponding to the application URL of the trigger information to acquire the data broadcasting application corresponding to the application ID of the trigger information and store the acquired application into the storage section such as a memory or the like included in the browser 73. Thereafter, the processing returns to step S1 so that the processes beginning with step S1 are carried out repetitively.

[0131]

If the trigger type is pre-cache as at step S17, then the corresponding data broadcasting application can be acquired before broadcasting time of a television program which is desired to be interlocked. Consequently, the corresponding data broadcasting application can be executed at the same time with starting of the television program desired to be interlocked. Further, also an

effect can be expected that access concentration upon the server 42 is dispersed. The description of the trigger information dealing process ends therewith.

[0132]

As described above, according to the trigger information dealing process, in the case where it is decided at step S3 that the extracted trigger information does not include an application ID for identifying a data broadcasting application retained already in the browser 73, the control section 68 erases the data broadcasting application retained already in the browser 73 at step S5.

[0133]

Accordingly, with the present trigger information dealing process, the data broadcasting application retained already in the browser 73 can be erased without waiting that trigger information which indicates erasure of the data broadcasting application retained already in the browser 73 is received.

[0134]

[Example of a Screen Display Image When the Data Broadcasting Application Is Executed]

FIG. 12 illustrates a transition of the screen image when, in the case where the automatic start-up flag of trigger information is off (manual start-up), a data

broadcasting application is executed in an interlocked relationship with the progress of a television program.

[0135]

If trigger information wherein the trigger type is application start-up and the automatic start-up flag is off (manual start-up) is received, then a corresponding data broadcasting application is acquired. Then, a display image which urges the user to carry out a start-up operation of the data broadcasting application is displayed in a superposed relationship with a video of a television program. If the user inputs a start-up operation in response to the urge, then the data broadcasting application is started up, and the screen display image becomes a synthesized video of the video corresponding to the data broadcasting application and the video of the television program.

[0136]

If trigger information wherein the trigger type is application event is received in the state in which the data broadcasting application is executed, then an event corresponding to the event ID of the trigger information is ignited in the data broadcasting application being executed. Consequently, from within the screen display image, the video in a region corresponding to the data

broadcasting application is changed to a video corresponding to the event ID of the trigger information.

[0137]

Thereafter, if trigger information wherein the trigger type is application ending is received or if the trigger information which designates the operating data broadcasting application is not received any more, then the data broadcasting application being executed is ended and the video of the television program is displayed over the overall screen.

[0138]

As described above, according to the broadcasting system 30 to which the present invention is applied, trigger information relating to data broadcasting is placed into a PCR packet or embedded into a video signal and transmitted together with the PCR packet or video signal, and a data broadcasting application is supplied from a server through the Internet. Therefore, a service of data broadcasting content which can be interlocked with a television program can be implemented without providing a band for data broadcasting in a broadcasting band of digital television broadcasting.

[0139]

Further, also in the case where a digital

television program is retransmitted through a CATV network, a communication satellite network or the like, a service of data broadcasting content which can be interlocked with a television program can be implemented.

[0140]

In the embodiment described above, the trigger information is information for controlling a process relating to one data broadcasting application (for example, the trigger information 81a of FIG. 8 or the like). However, the trigger information is not limited to this.

[0141]

In particular, for example, trigger information 101 for controlling a process relating to a plurality of data broadcasting applications App1, App2 and App3 or trigger information 102 for controlling a process relating to a plurality of data broadcasting applications App1 and App2 as illustrated in FIG. 13 may be used.

[0142]

Incidentally, while the series of processes described above can be executed by hardware, it may otherwise be executed by software. In the case where the series of processes is executed by software, a program which constructs the software is installed from a program

recording medium into a computer incorporated in hardware for exclusive use or, for example, a personal computer for universal use which can execute various functions by installing various programs or the like.

[0143]

[Example of the Configuration of the Computer]

FIG. 14 is a block diagram showing an example of a hardware configuration of a computer which executes the series of processes described hereinabove in accordance with a program.

[0144]

In the present computer 100, a CPU (Central Processing Unit) 101, a ROM (Read Only Memory) 102 and a RAM (Random Access Memory) 103 are connected to each other by a bus 104.

[0145]

Further, an input/output interface 105 is connected to the bus 104. To the input/output interface 105, an inputting section 106 configured from a keyboard, a mouse, a microphone and so forth, an outputting section 107 configured from a display unit, a speaker and so forth, a storage section 108 configured from a hard disk, a nonvolatile memory and so forth, a communication section 109 configured from a network interface and so forth, and

a drive 110 for driving a removable medium 111 such as a magnetic disk, an optical disk, a magneto-optical disk or a semiconductor memory are connected.

[0146]

In the computer configured in such a manner as described above, the CPU 101 carries out the series of processes described hereinabove, for example, by loading the program stored in the storage section 108 into the RAM 103 through the input/output interface 105 and the bus 104 and executing the program.

[0147]

It is to be noted that the program which is executed by the computer may be a program by which the processes are executed in a time series in the order as described in the present specification or may be a program by which the processes are executed in parallel or at a necessary timing such as when the program is called.

[0148]

Further, the program may be processed by a single computer or may be processed in a distributed manner by a plurality of computers. Further, the program may be transferred to and executed by a computer at a remote place.

[0149]

Further, in the present specification, the term system is used to represent an entire apparatus composed of a plurality of devices.

[0150]

It is to be noted that the embodiment of the present invention is not limited to the embodiment described hereinabove but can be changed in various manners without departing from the subject matter of the present invention.

[Reference Signs List]

[0151]

30 Broadcasting system

41 Broadcasting apparatus

42 Server

60 Reception apparatus

61 Tuner

62 Demultiplexing section

63 Audio decoder

64 Audio outputting section

65 Video decoder

66 Trigger detection section

67 Video outputting section

68 Control section

69 Memory

70 Operation section

71 Recording section

72 Communication I/F

73 Browser

[CLAIMS]

[Claim 1]

A reception apparatus which receives AV content, comprising:

reception means for receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content;

retaining means for retaining the application program; and

control means for controlling a state of a first application program retained by the retaining means in response to whether or not first said trigger information for designating a process relating to the first application program as a controlling target is received in synchronism with a reception timing determined in advance.

[Claim 2]

The reception apparatus according to claim 1, wherein the control means erases the first application program from the retaining means in response to that the first trigger information is no more received in synchronism with the reception timing from a state in which the first trigger information is received in

synchronism with the reception timing.

[Claim 3]

The reception apparatus according to claim 2, wherein the control means ends the first application program being executed and erases the first application program from the retaining means in response to that the first trigger information is no more received in synchronism with the reception timing from the state in which the first trigger information is received in synchronism with the reception timing.

[Claim 4]

The reception apparatus according to any one of claims 1 to 3, wherein the control means controls a state of the first application program in response to whether or not the first trigger information is received in synchronism with the reception timing within a reception period based on the reception timing.

[Claim 5]

The reception apparatus according to any one of claims 1 to 3, wherein, in the case where the first trigger information is received in synchronism with the reception timing, the control means:

maintains, when the first trigger information same as the first trigger information received in synchronism

with the reception timing in the preceding cycle is received, an execution state in the first application program being executed or maintains a retained state of the first application program retained in the retaining means; and

controls, when the first trigger information including a trigger type different from that included in the first trigger information received in synchronism with the reception timing in the preceding cycle is received, start-up of the first application program, ignition of an event in the first application program being executed or ending of the first application program being executed based on the trigger type included in the received first trigger information.

[Claim 6]

The reception apparatus according to any one of claims 1 to 3, wherein, in the case where the first application program is not retained in the retaining means, when the first trigger information is received, the control means controls the retaining means to retain the first application program based on a trigger type included in the first trigger information.

[Claim 7]

A reception method for a reception apparatus which

receives AV content, the reception method comprising steps to be executed by the reception apparatus and including:

a reception step of receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content; and

a controlling step of controlling a state of a first application program retained by a retaining section for retaining the application program depending upon whether or not first said trigger information, which designates a process relating to the first application program as a controlling target, is received in synchronism with a reception timing determined in advance.

[Claim 8]

A program for controlling a reception apparatus which receives AV content, the program causing a computer of the reception apparatus to execute a process comprising:

a reception step of receiving trigger information for controlling a process relating to an application program to be executed in an interlocked relationship with the progress of the AV content; and

a controlling step of controlling a state of a

first application program retained by a retaining section for retaining the application program depending upon whether or not first said trigger information, which designates a process relating to the first application program as a controlling target, is received in synchronism with a reception timing determined in advance.

[Claim 9]

A transmission apparatus which transmits AV content, comprising:

transmission means for transmitting trigger information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[Claim 10]

The transmission apparatus according to claim 9, wherein the transmission means transmits the trigger information in synchronism with the transmission timing at which the trigger information is received by the reception apparatus within a reception period based on the reception timing.

[Claim 11]

The transmission apparatus according to claim 10, wherein the transmission means transmits a plurality of pieces of the trigger information in synchronism with the transmission timing at which at least one of the plural pieces of the trigger information is received by the reception apparatus within the reception period.

[Claim 12]

A transmission method for a transmission apparatus which transmits AV content, the transmission method comprising steps to be executed by the transmission apparatus and including:

a transmission step of transmitting trigger information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[Claim 13]

A program for controlling a transmission apparatus which transmits AV content, the program causing a computer of the transmission apparatus to execute a process comprising:

a transmission step of transmitting trigger

information for controlling a process relating to an application program to be executed by a reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus.

[Claim 14]

A broadcasting system configured from a transmission apparatus which transmits AV content and a reception apparatus which receives the transmitted AV content, wherein

the transmission apparatus includes:

transmission means for transmitting trigger information for controlling a process relating to an application program to be executed by the reception apparatus in an interlocked relationship with the progress of the AV content in synchronism with a transmission timing corresponding to a reception timing determined in advance by the reception apparatus; and

the reception apparatus includes:

reception means for receiving the trigger information for controlling a process relating to the application program to be executed in an interlocked relationship with the progress of the AV content;

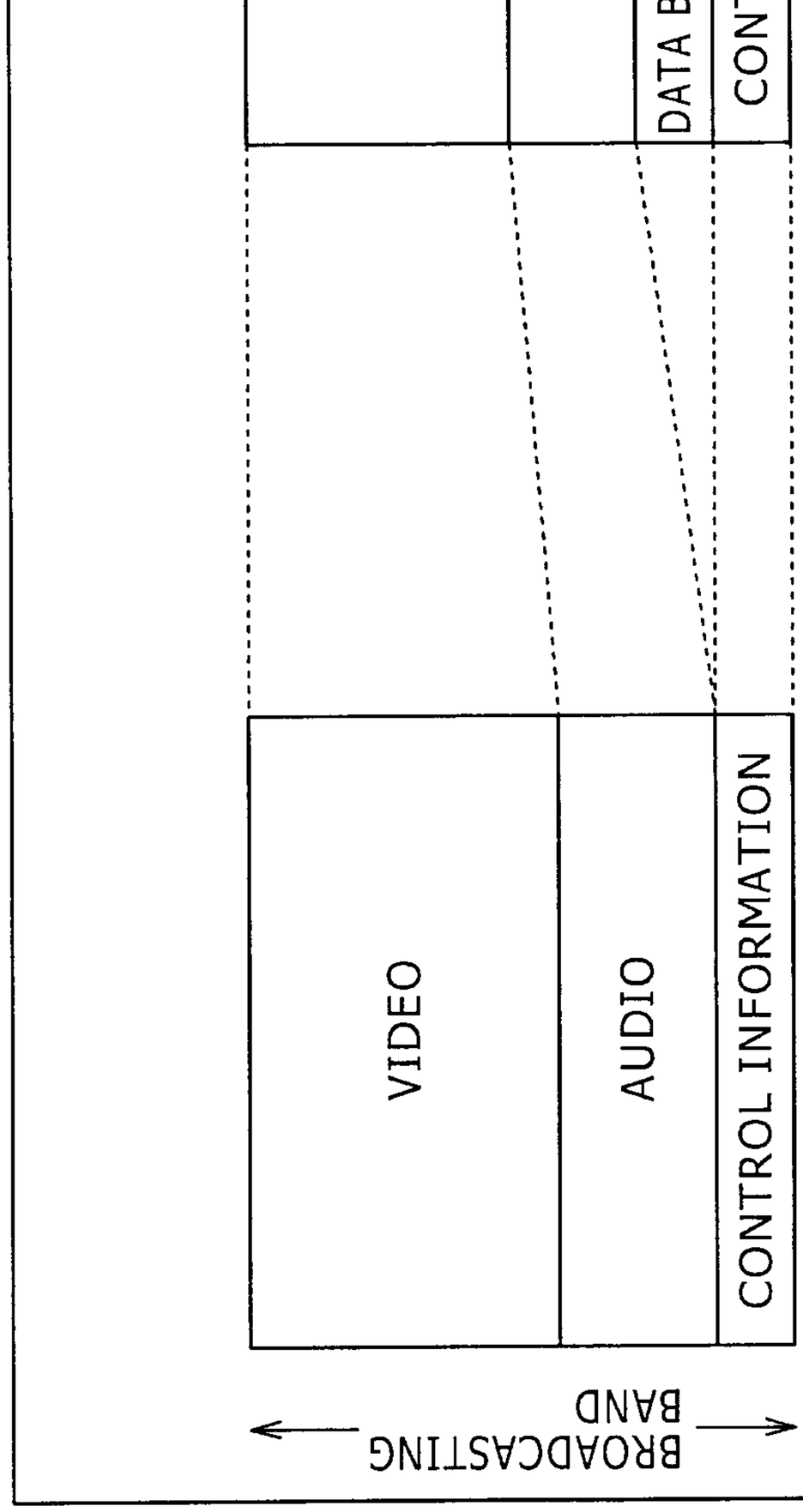
retaining means for retaining the application program; and

control means for controlling a state of a first application program retained by the retaining means in response to whether or not first said trigger information for designating a process relating to the first application program as a controlling target is received in synchronism with a reception timing determined in advance.

SP311061



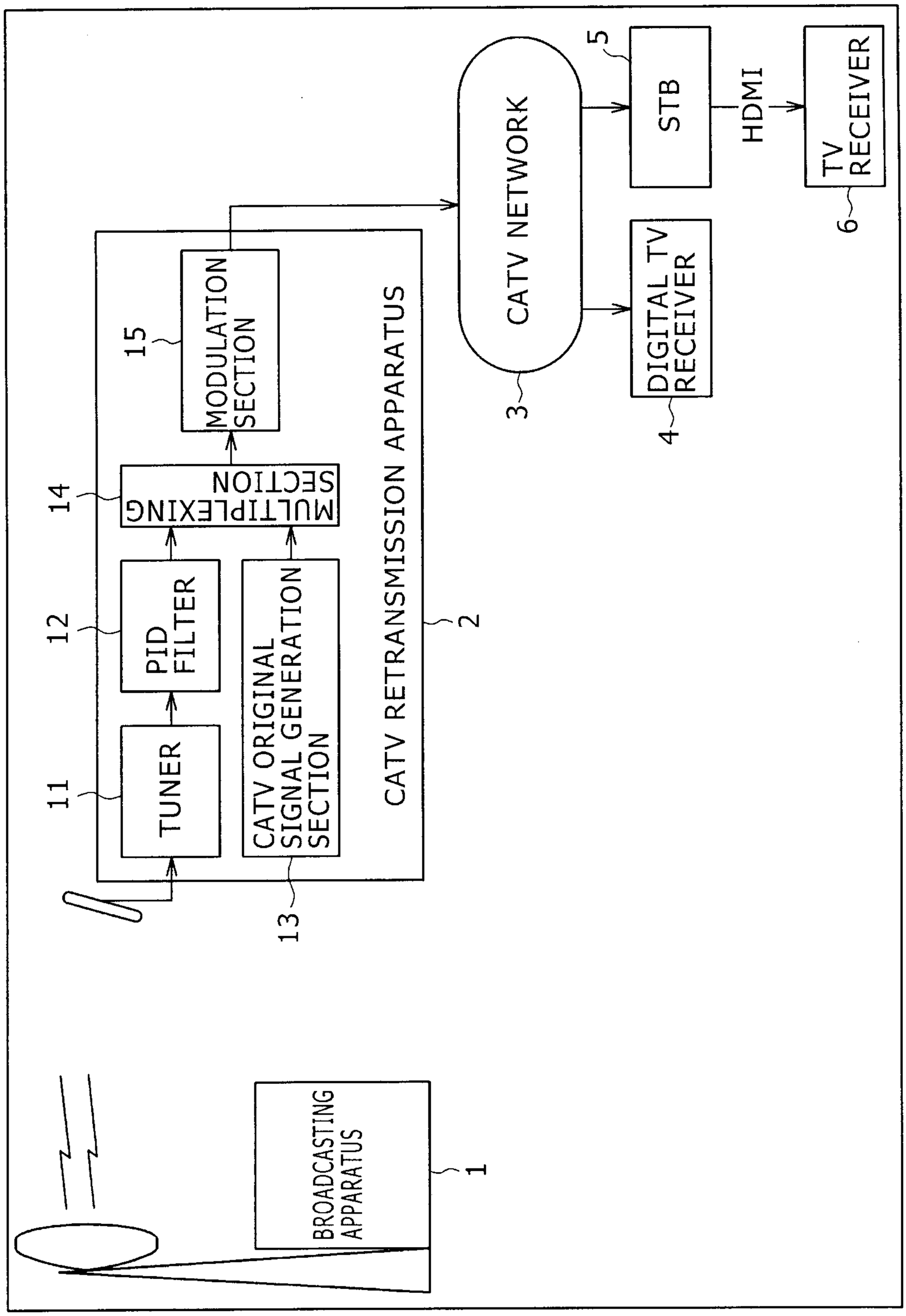
FIG. 1



SP311061



FIG. 2



SP311061



FIG.3

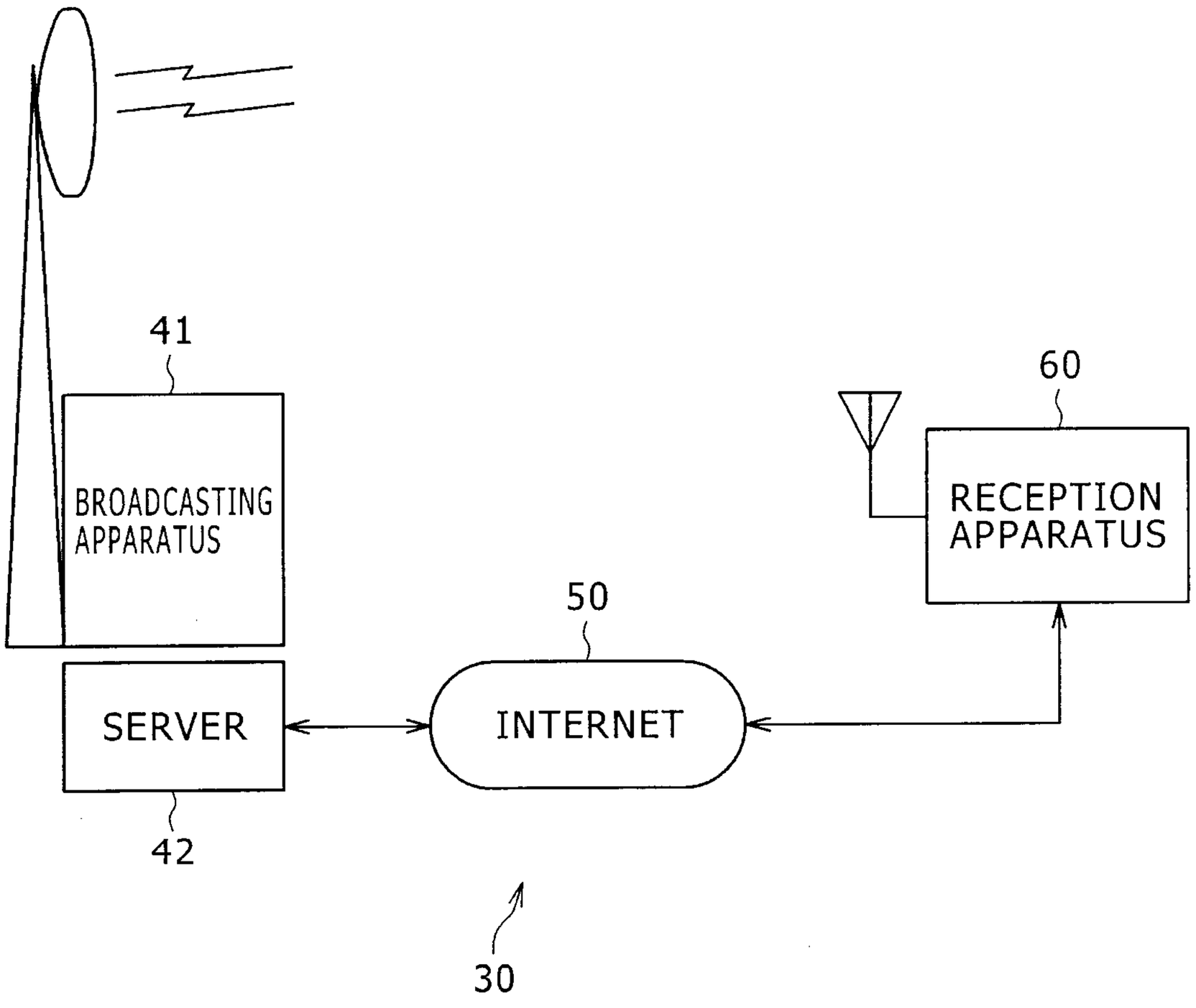


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FIG. 4

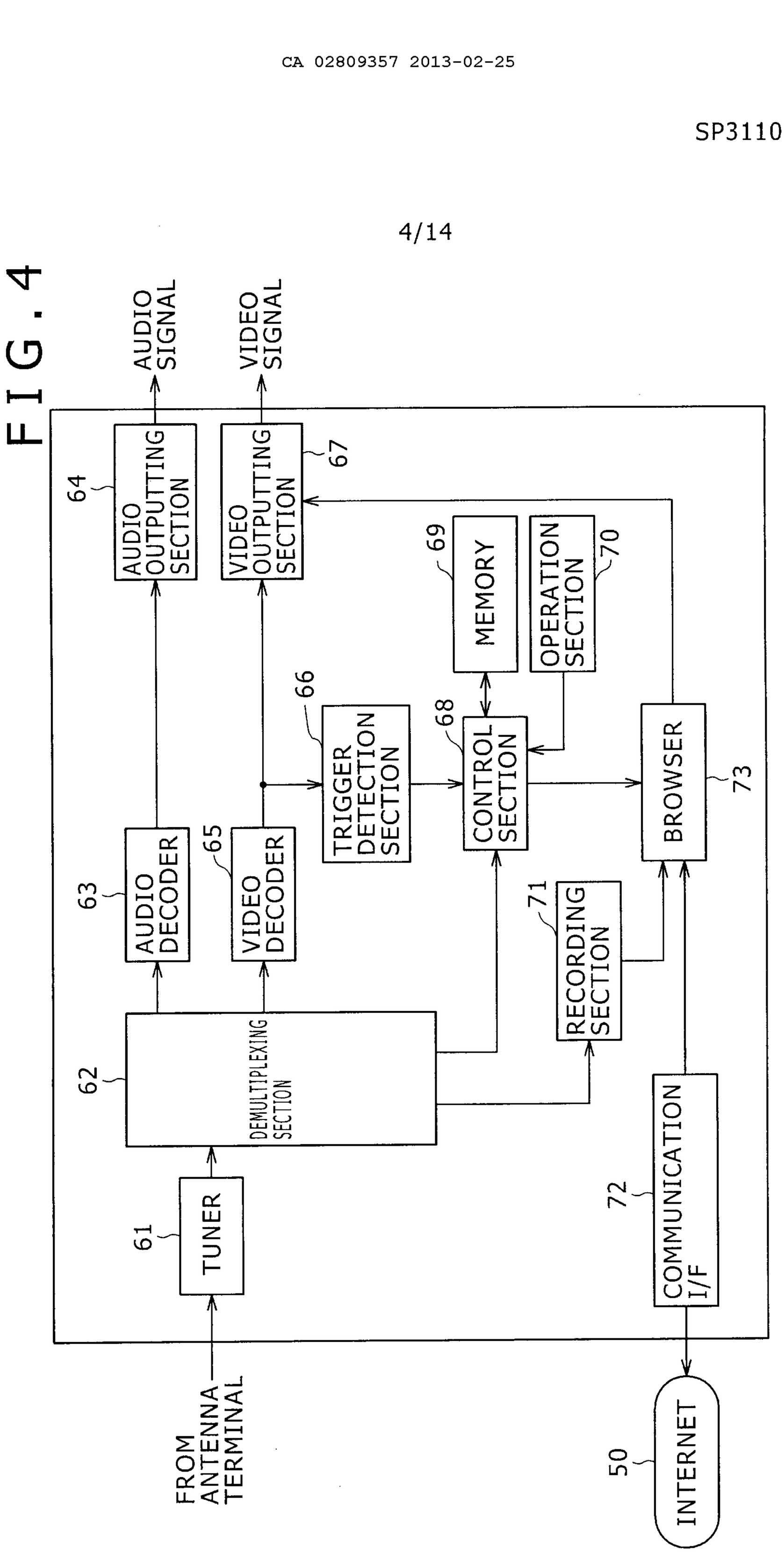

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FIG.5

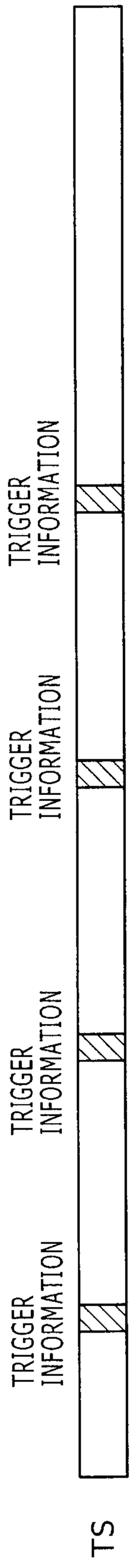

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FIG. 6

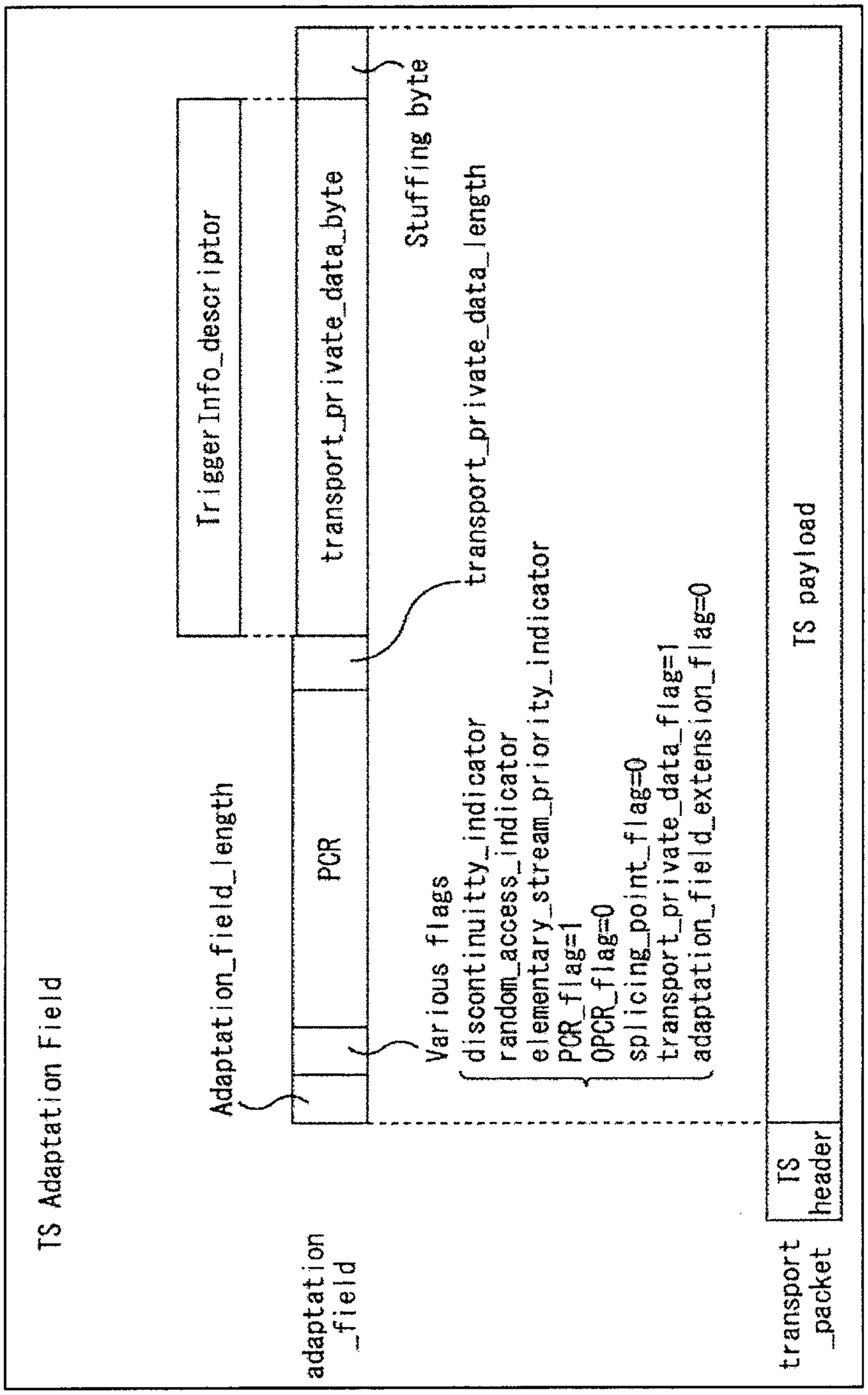

FIG.7

| ITEM | EXPLANATION |
|---|---|
| TRIGGER ID | INFORMATION FOR IDENTIFYING TRIGGER INFORMATION |
| TRIGGER TYPE | FOUR TYPES OF APPLICATION START-UP, APPLICATION ENDING, APPLICATION EVENT AND PRE-CACHE |
| APPLICATION ID | INFORMATION FOR IDENTIFYING APPLICATION |
| APPLICATION TYPE | INFORMATION INDICATIVE OF TYPE (html, java OR THE LIKE) OF APPLICATION |
| APPLICATION URL | URL OF SERVER FROM WHICH APPLICATION IS TO BE ACQUIRED WHERE TRIGGER TYPE IS APPLICATION START-UP OR PRE-CACHE |
| ACCUMULATION APPLICATION ID | INFORMATION FOR IDENTIFYING DLED APPLICATION TO BE STARTED UP WHERE TRIGGER TYPE IS APPLICATION START-UP |
| AUTOMATIC START-UP FLAG | INFORMATION INDICATIVE OF WHETHER AUTOMATIC START-UP OR MANUAL START-UP IS TO BE APPLIED WHERE TRIGGER TYPE IS APPLICATION START-UP |
| NAME OF APPLICATION | NAME OF APPLICATION TO BE PRESENTED TO USER |
| EVENT ID | INFORMATION FOR IDENTIFYING EVENT WHERE TRIGGER TYPE IS APPLICATION EVENT |

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FIG. 8

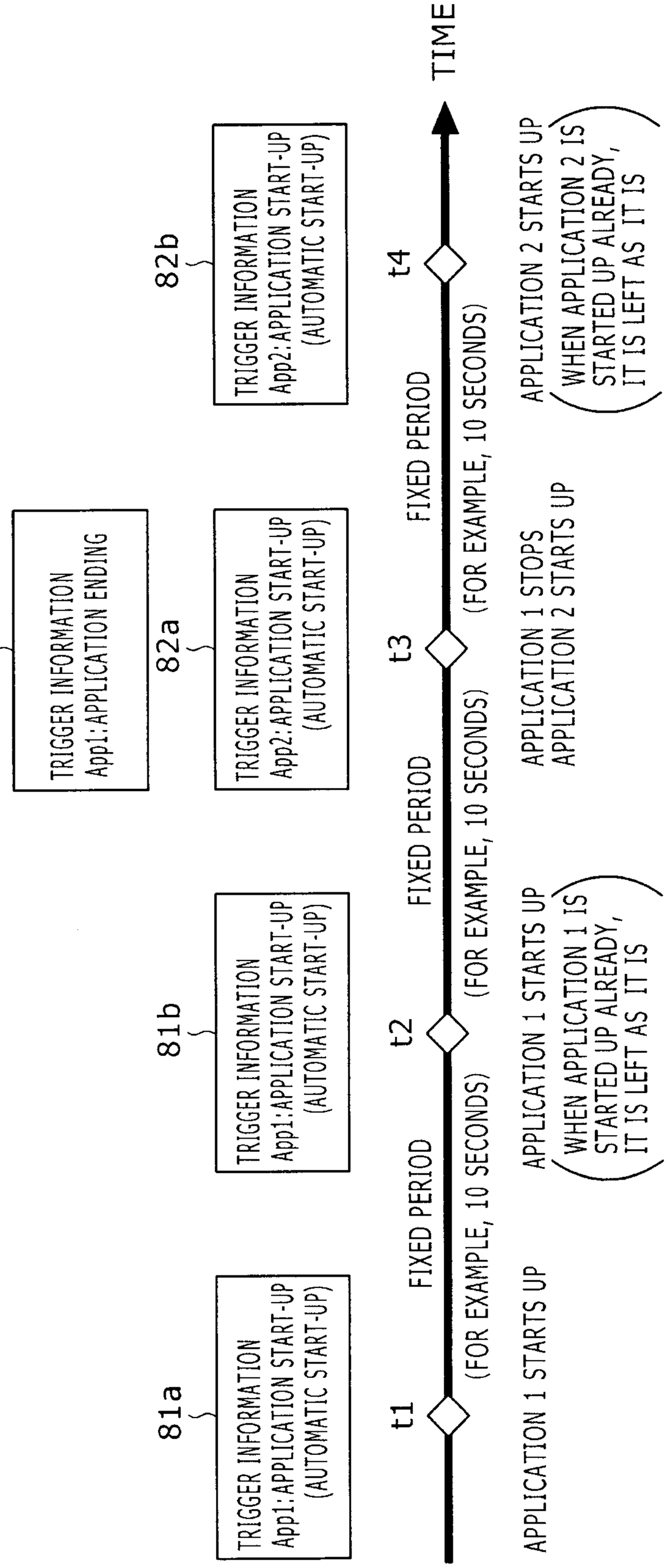

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FIG. 9

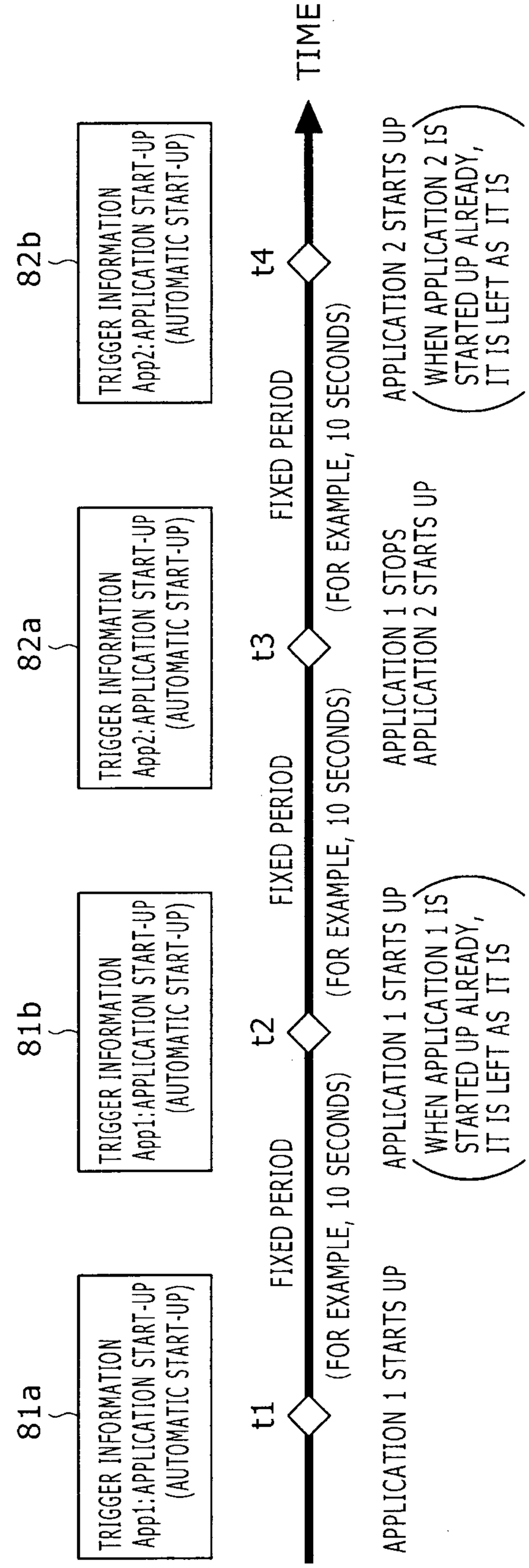

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FIG.10

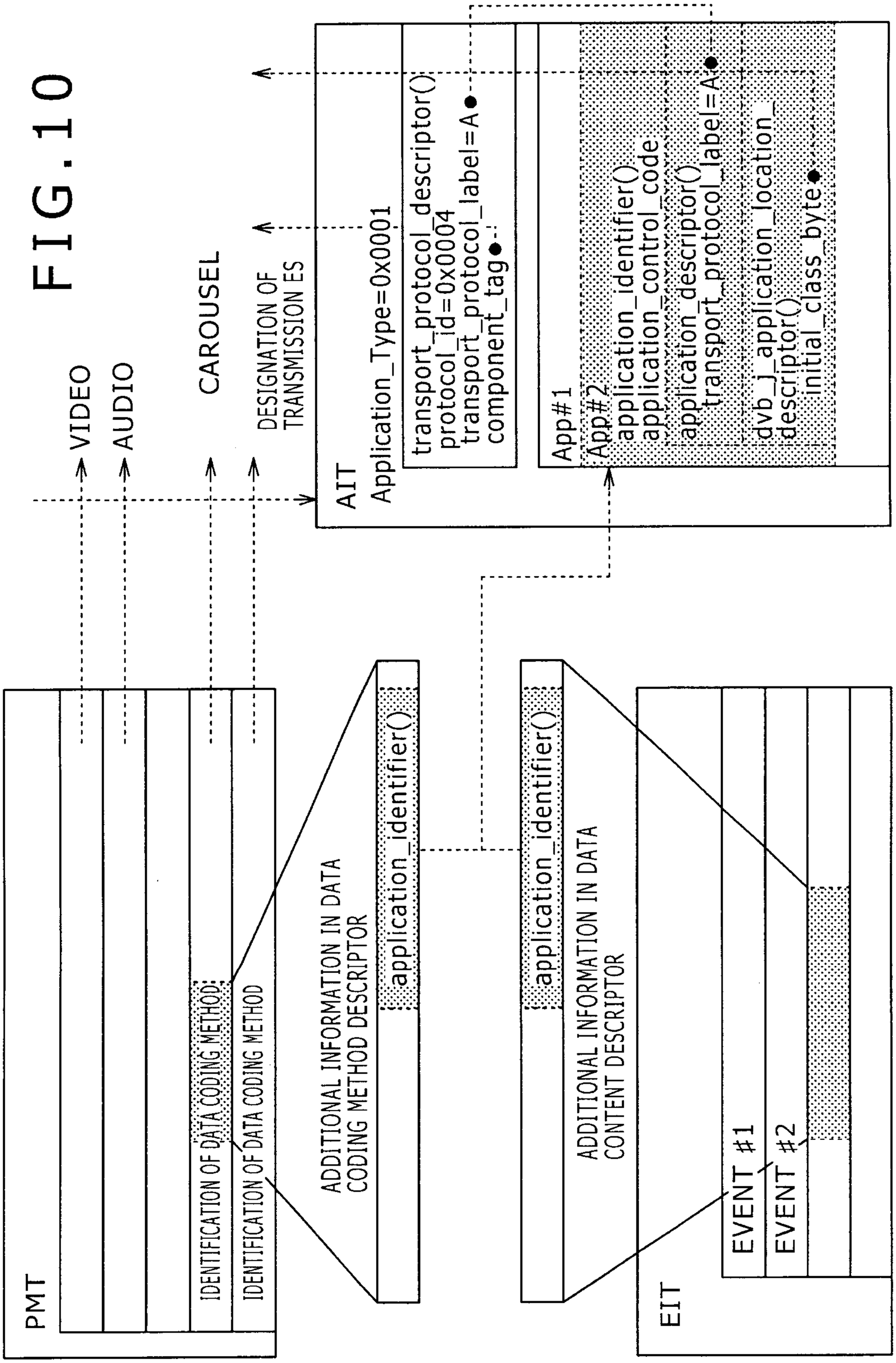

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FIG.11

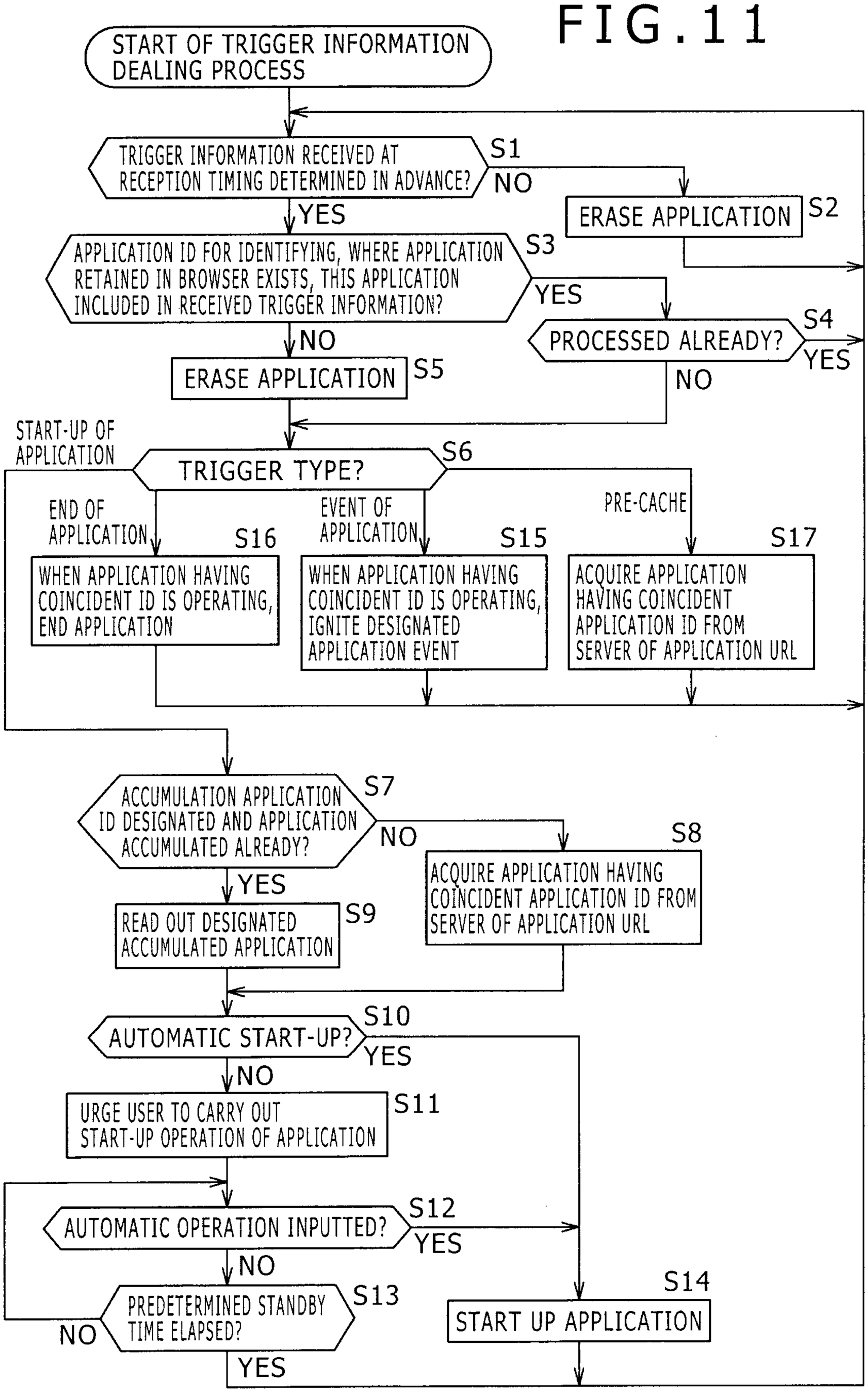

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FIG.12

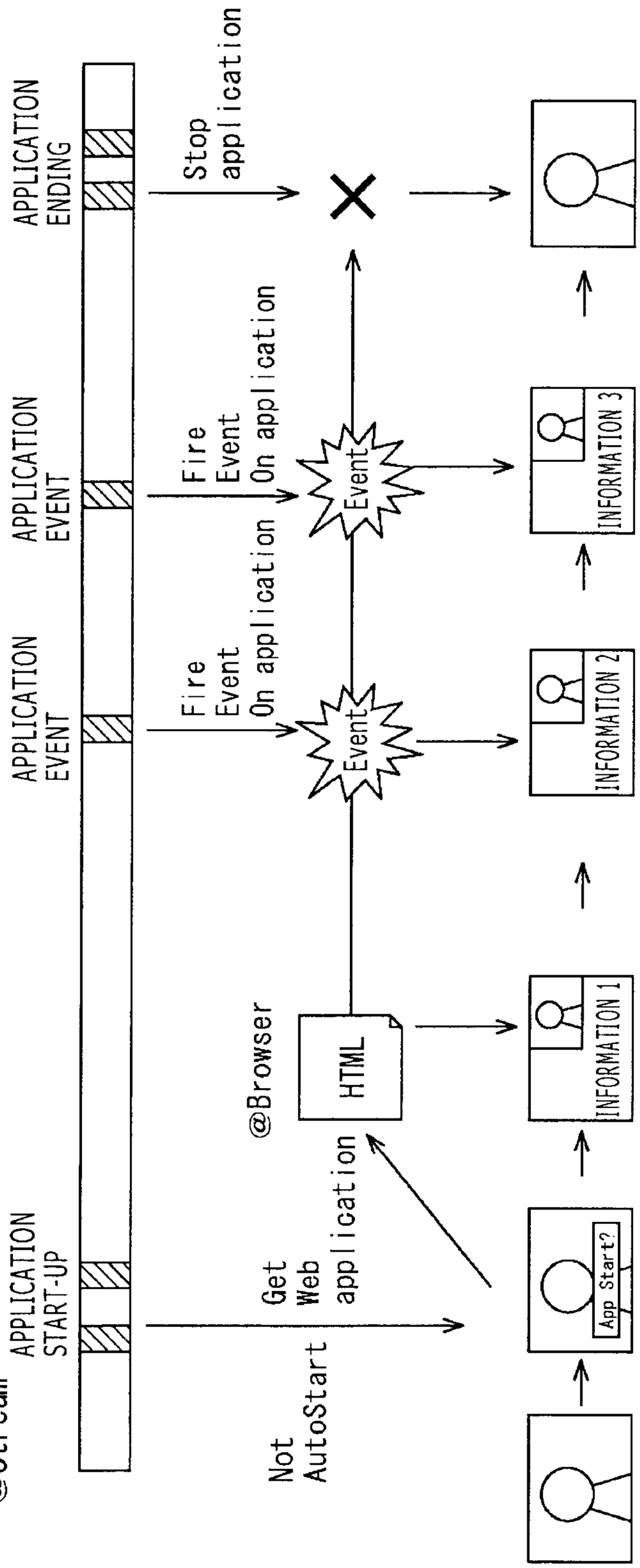

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FIG. 13

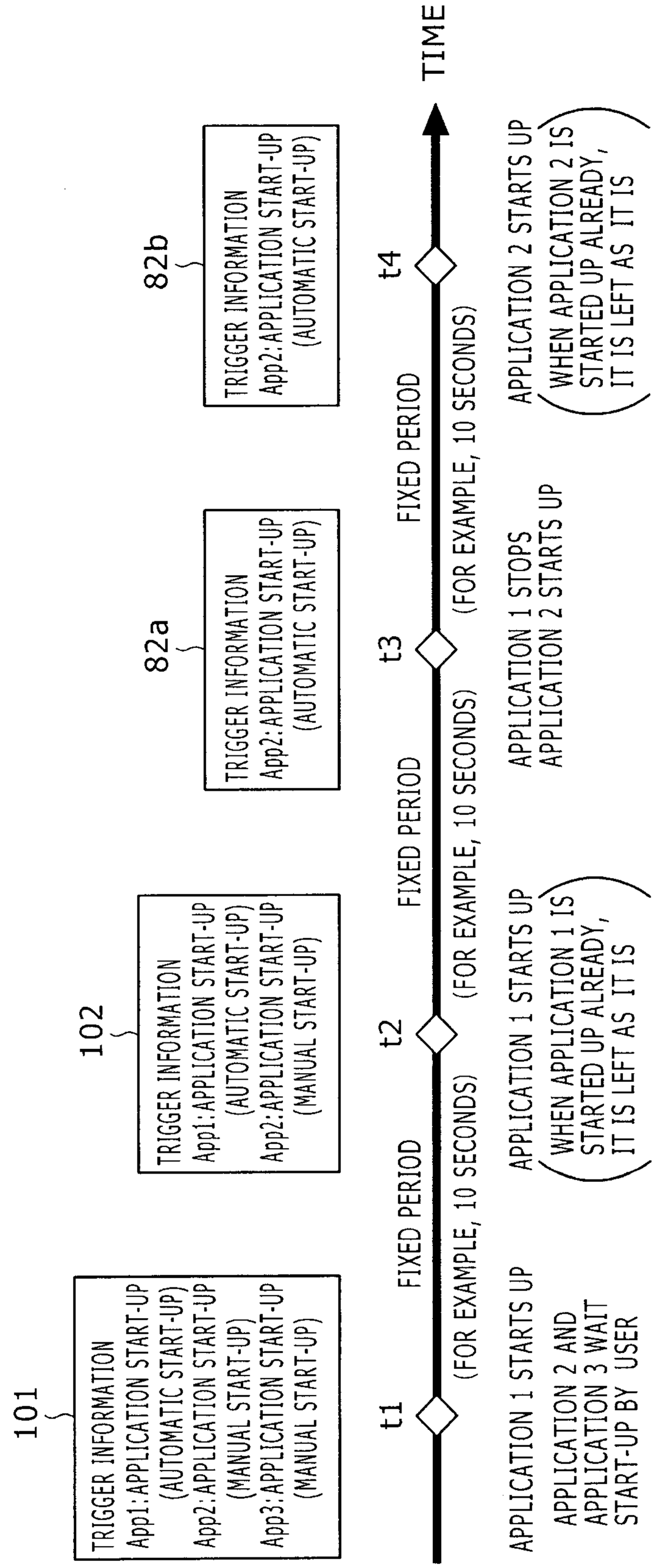

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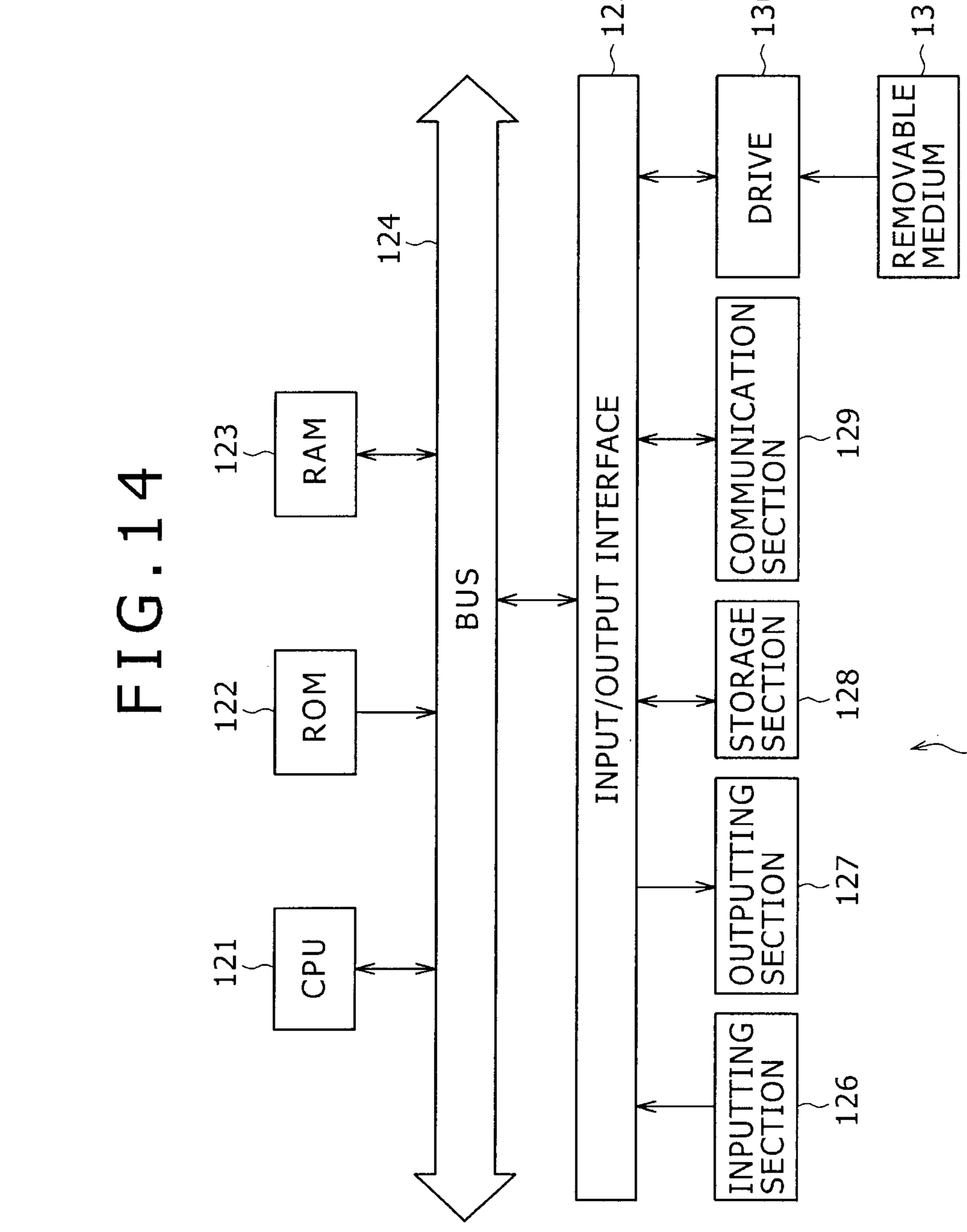
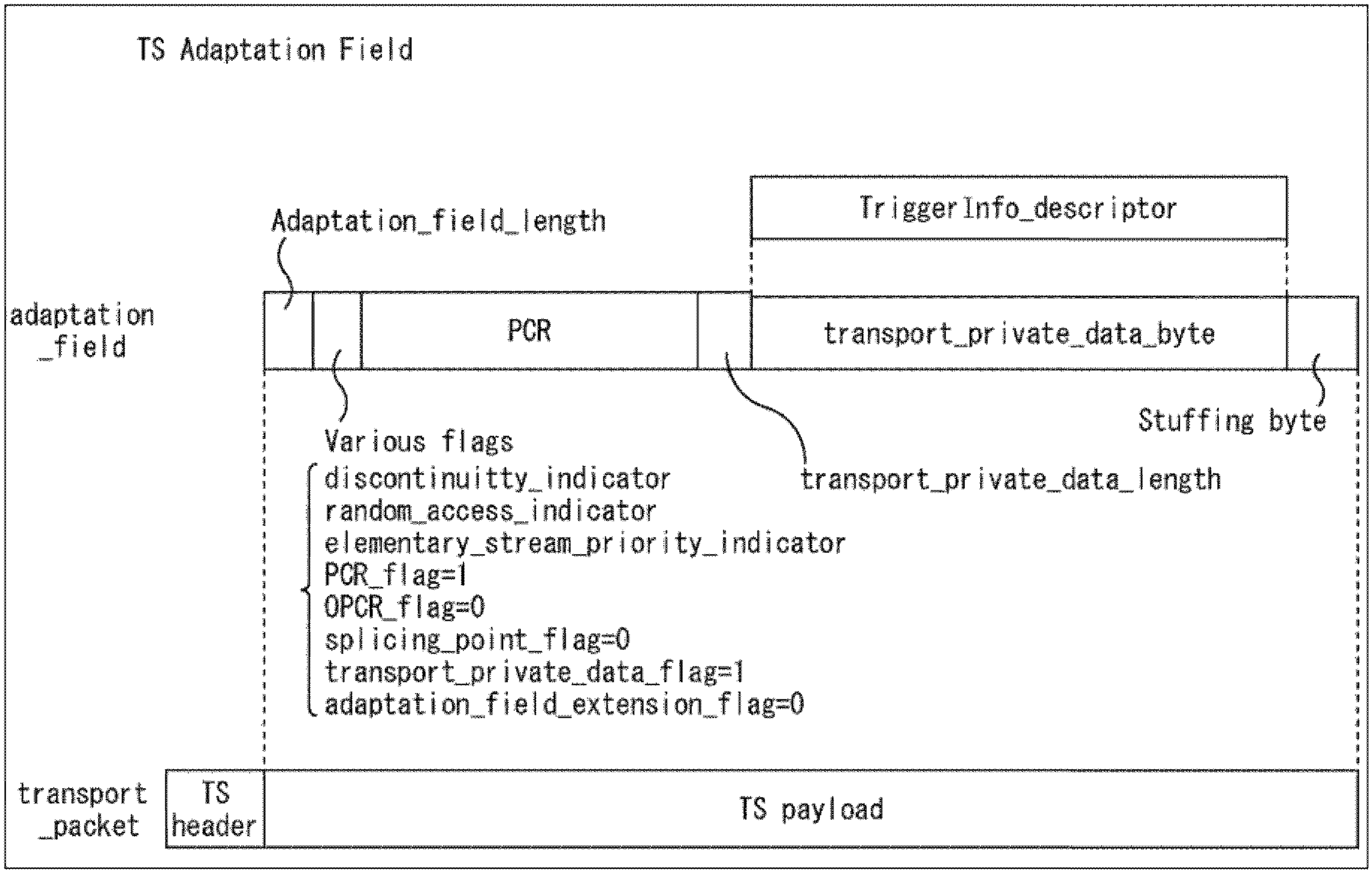
FIG. 14



[図6]


TS Adaptation Field
Adaptation_field_length
TriggerInfo_descriptor
adaptation
_field
PCR
transport_private_data_byte
Stuffing byte
Various flags
discontinuitty_indicator
random_access_indicator
elementary_stream_priority_indicator
PCR_flag=1
OPCR_flag=0
splicing_point_flag=0
transport_private_data_flag=1
adaptation_field_extension_flag=0
transport_private_data_length
transport
_packet
TS
header
TS payload