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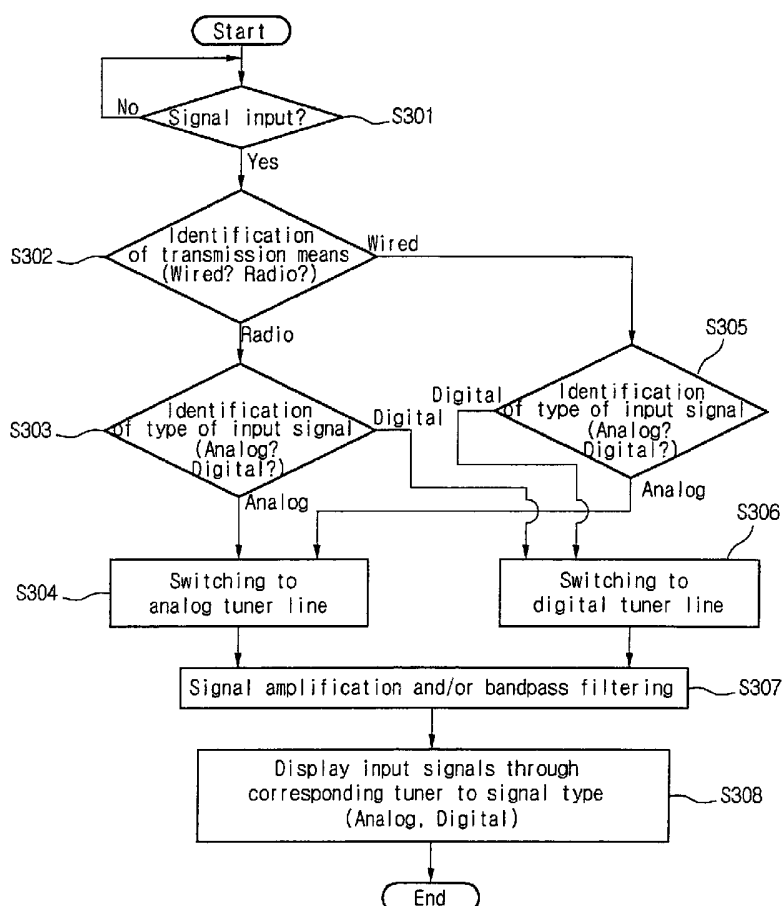
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[Continued on next page]

(54) Title: APPARATUS FOR DIVIDING SIGNAL AND METHOD THEREOF



(57) Abstract: Disclosed is an apparatus and method for distributing signals in a multimedia system. The apparatus for distributing signals comprises: a signal distributor for switching digital or analog signals being input through at least one transmission means out of radio antennas and wired cables, and amplifying and/or filtering a predetermined signals out of frequencies; a digital/analog tuners for tuning the distributed signals; and a display means connected to the tuners for displaying at least one of the tuned signals. When at least one signal is input through at least one of transmission means, a transmission means and the type of the input signal are identified in order to switch the signals to corresponding tuner lines according to the type of signal. Afterwards, the switched output signals are amplified and filtered, and output through the tuners. Finally, these output signals are displayed on the display means. Using the apparatus of the invention, users can receive all analog/digital skywave broadcastings, and analog/digital cable broadcastings, and selectively switch them to corresponding tuners, thereby watching more than one broadcasting they want.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

APPARATUS FOR DIVIDING SIGNAL AND METHOD THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to an apparatus and method for distributing signals, more particularly, a multimedia system with a PIP (Picture In Picture) function wherein analog or digital sky wave signals, and analog or digital cable signals are simultaneously received or discretely distributed, and amplified before being switched to respective tuners.

10 2. Discussion of the Background Art

In general, multimedia system has a PIP (Picture In Picture) function displaying two images on a single display device.

TV broadcastings of these days are largely divided into analog/digital sky wave broadcasting, and analog/digital cable broadcasting.

15 To receive those broadcasting to one single device, an appropriate tuner for each broadcasting should be installed. A currently developed product, for example, has a plurality of tuners corresponding to each broadcasting, every tuner being directly connected to the product. In other words, to receive all the above broadcastings, four tuners are needed. Therefore, there is a need to develop a multimedia system enabling users to selectively receive the broadcasting(s)
20 they want.

SUMMARY OF THE INVENTION

An object of the invention is to solve at least the above problems and/or disadvantages and to provide at least the advantages described hereinafter.

Accordingly, one object of the present invention is to solve the foregoing problems by
5 providing an apparatus and method for distributing signals, which enables users to watch desired broadcasting(s) by receiving all analog/digital sky wave broadcastings and analog/digital cable broadcastings, and then selectively applying them to a tuner.

The foregoing and other objects and advantages are realized by providing an apparatus for distributing signals, including: a signal distributor for switching digital or analog signals being
10 input through at least one transmission means out of radio antennas and wired cables, and amplifying and/or filtering a predetermined signals out of frequencies; a digital/analog tuners for tuning the distributed signals; and a display means connected to the tuners for displaying at least one of the tuned signals. Here, when at least one signal is input through at least one of transmission means, a transmission means and the type of the input signal are identified in order
15 to switch the signals to corresponding tuner lines according to the type of signal.

The switched output signals are amplified and filtered, and output through the tuners. Later, at least one of the output signals is displayed on the display means.

Another aspect of the invention provides an apparatus for distributing signals, including: a switching unit for switching different signals being input through at least one transmission
20 means to corresponding signal lines under control of a controller; an amplifier unit for

amplifying broadcasting signals being output through the switching unit; a filter unit for allowing output signals from the amplifier unit out of a specific frequencies to pass, and outputting the signals; a tuner unit for tuning different output broadcasting signals from the filter unit; and a display means connected to the tuners, displaying at least one of the tuned signals.

5 Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objects and advantages of the invention may be realized and attained as particularly pointed out in the appended claims.

10

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail with reference to the following drawings in which like reference numerals refer to like elements wherein:

Fig. 1 is a schematic block diagram of an apparatus for distributing signals in a multimedia
15 system according to the present invention;

Fig. 2 is a flow chart briefly describing a method for distributing signals in a multimedia system according to the present invention; and

Fig. 3 is a detailed flow chart explaining a method for distributing signals in a multimedia system according to the present invention.

20

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The following detailed description will present an apparatus and method for distributing signals in a multimedia system according to a preferred embodiment of the invention in reference to the accompanying drawings.

5 Fig. 1 is a schematic block diagram of an apparatus for distributing signals in a multimedia system according to the present invention.

Referring to Fig. 1, a signal distributor 100 of the multimedia system of the invention includes a switching unit 110, an amplifier unit 120, and a bandpass filter unit 130.

The switching unit 110 includes a first switch 111, a second switch 112, a third switch 113
10 and a fourth switch 114, which are operated under control of a controller 10, selectively transmitting analog/digital sky wave broadcastings and analog/digital cable broadcastings that are input from an antenna 1 or cable 2 to an analog tuner 3 and a digital tuner 4. More particularly, the first switch 111 is connected to a line connecting the antenna 1 with the analog tuner 3, to be able to switch a broadcasting signal being input from the antenna 1 to the analog
15 tuner 3. The second switch 112 is connected to a line connecting the antenna 1 with the digital tuner 4, to be able to switch a broadcasting signal being input from the antenna 1 to the digital tuner 4. The third switch 113 is connected to a line connecting the cable 2 with the digital tuner 4, to be able to switch a broadcasting signal being input from the cable 2 to the digital tuner 4. Lastly, the fourth switch 114 is connected to a line connecting the cable 2 with the
20 analog tuner 3, to be able to switch a broadcasting signal being input from the cable 2 to the

analog tuner 3. As for the first to fourth switches 111 ~ 114, pin diodes, high-frequency relays, or transistors can be utilized.

On the other hand, as transmitted signals from transmission means 1 and 2 are distributed and switched to corresponding tuner lines, the switching unit 110 can share a switching means
5 with the transmission means 1 and 2 for each of the transmitted signals, according to a same type of signal (analog or digital).

Since the above switching operation upon analog or digital signals is controlled by the controller, so the number of switches can be reduced.

The amplifier unit 120 includes a first amplifier 121 and a second amplifier 122, amplifying
10 a broadcasting signal output through the switching unit 110 to compensate distribution loss.

Here, the first amplifier 121 is connected to a front end of the analog tuner 3 to amplify an input broadcasting signal into the analog tuner 3. Similarly, the second amplifier 122 is connected to a front end of the digital tuner 4 to amplify an input broadcasting signal into the digital tuner 4.

15 The bandpass filter unit 130 allows output signals from the amplifier unit 120 out of a specific frequencies to pass (i.e. 40MHz ~ 850MHz), and includes a first bandpass filter 131 and a second bandpass filter 132. The first bandpass filter 131 is connected between the first amplifier 121 and the analog tuner 3. The second bandpass filter 132 is connected between the second amplifier 122 and the digital tuner 4.

Referring to Fig. 1, an operation of a signal distributor in a multimedia system is now described in more details.

At first, when a user wants to watch an analog broadcasting in skywave mode, the controller in the system turns on the first switch 111. Then analog skywave broadcasting signals provided from the antenna 1 through the first switch 111 are sent to the analog tuner 3 via the first amplifier 121 and the first bandpass filter 131.

In contrast, when the user wants to watch a digital broadcasting in skywave mode, the controller in the system turns on the second switch 112. Then digital skywave broadcasting signals provided from the antenna 1 through the second switch 112 are sent to the digital tuner 4 via the second amplifier 122 and the second bandpass filter 132.

In addition, when the user wants to watch a digital cable broadcasting, the controller in the system turns on the third switch 113. Then digital cable broadcasting signals provided from the cable 2 through the third switch 113 are sent to the digital tuner 4 via the second amplifier 122 and the second bandpass filter 132.

Lastly, when the user wants to watch an analog cable broadcasting, the controller in the system turns on the fourth switch 114. Then analog cable broadcasting signals provided from the cable 2 through the fourth switch 114 are sent to the analog tuner 3 via the first amplifier 121 and the first bandpass filter 131.

Meanwhile, if the user wants to watch both analog skywave broadcasting and digital cable broadcasting at the same time, the controller in the system turns on the first switch 111 and the

third switch 113. Then analog skywave broadcasting signals provided from the antenna 1 through the first switch 111 are sent to the analog tuner via the first amplifier 121 and the first bandpass filter 131, and simultaneously digital cable broadcasting signals provided from the cable 2 through the third switch 113 are sent to the digital tuner via the second amplifier 122
5 and the second bandpass filter 132.

On the contrary, if the user wants to watch both digital skywave broadcasting and analog cable broadcasting at the same time, the controller in the system turns on the second switch 112 and the fourth switch 114. Then digital skywave broadcasting signals provided from the antenna 1 through the second switch 112 are sent to the digital tuner via the second amplifier
10 122 and the second bandpass filter 132, and simultaneously analog cable broadcasting signals provided from the cable 2 through the fourth switch 114 are sent to the analog tuner via the first amplifier 121 and the first bandpass filter 131.

Further, if the user wants to watch both analog skywave broadcasting and digital skywave broadcasting at the same time, the controller in the system turns on the first switch 111 and the
15 second switch 112. Then analog skywave broadcasting signals provided from the antenna 1 through the first switch 111 are sent to the analog tuner 3 via the first amplifier 121 and the first bandpass filter 131, and simultaneously digital skywave broadcasting signals provided from the antenna 1 through the second switch 112 are sent to the digital tuner 4 via the second amplifier 122 and the second bandpass filter 132.

Meanwhile, if the user wants to watch both analog cable broadcasting and digital cable broadcasting at the same time, the controller in the system turns on the third switch 113 and the fourth switch 114. Then digital cable broadcasting signals provided from the cable 2 through the third switch 113 are sent to the digital tuner via the second amplifier 122 and the second bandpass filter 132, and simultaneously analog cable broadcasting signals provided from the cable 2 through the fourth switch 114 are sent to the analog tuner 3 via the first amplifier 121 and the first bandpass filter 131.

Fig. 2 is a flow chart briefly describing a method for distributing signals in a multimedia system according to the present invention.

As depicted in the drawing, more than one signal, namely digital and/or analog signals are input through at least one of transmission means, skywave and/or cable (S201).

Then, the transmission means (radio skywave/wired cable) and/or type (analog/digital) of the input signals are identified (S202).

The input signals are switched to corresponding tuner lines according to the type of the signal (e.g. analog signals → analog tuner, digital signals → digital tuner) (S203).

These switched output signals are amplified and/or filtered by the amplifying means and the bandpass filter (S204).

Lastly, the amplified and/or filtered signals are output through tuner corresponding to signal type, and at least one of those signals is selectively displayed (S205).

Fig. 3 is a detailed flow chart explaining a method for distributing signals in a multimedia system according to the present invention.

As Fig. 3 illustrates, at least one signal, that is, digital and/or analog signals are input through at least one of transmission means such as skywave and/or cable (S301).

5 Then, the transmission means (radio skywave/wired cable) and/or type (analog/digital) of the input signals are identified (S302).

At this time, the type of each signal should be known in all cases, namely radio and wired transmissions (S303 and S305).

10 These switched output signals are amplified and/or filtered by the amplifying means and the bandpass filter (S307).

Lastly, the amplified and/or filtered signals are output through a tuner, and at least one of those signals is selectively displayed (S308).

In conclusion, using the multimedia system of the invention, users are now able to watch analog/digital skywave broadcastings and analog/digital cable broadcastings at the same time
15 or selectively on a display means 20.

According to the apparatus and method for distributing signals in the multimedia system of the invention, users can receive all of the broadcastings, i.e. analog/digital skywave broadcastings and analog/digital cable broadcastings, and selectively switch their desired broadcasting(s) to a tuner.

While the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

5 The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. In the claims, means-plus-function clauses
10 are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures.

WHAT IS CLAIMED IS:

1. An apparatus for distributing signals, comprising:

a signal distributor for switching at least one of signals being output from at least one
5 transmission means, and performing at least one of amplifying the output signal and
filtering a predetermined signal;

tuners for tuning a corresponding signal out of the distributed signals; and

a display means connected to the tuners, for displaying at least one of the tuned
signals.

10

2. The apparatus according to claim 1, wherein the transmission means
comprises at least one of radio antennas and wired cables.

3. The apparatus according to claim 1, wherein the signals being output from
15 each of the transmission means comprise at least one of analog and digital signals.

4. The apparatus according to claim 1, wherein the tuners comprise an analog
tuner for tuning analog broadcasting signals, and a digital tuner for tuning digital
broadcasting signals.

20

5. An apparatus for distributing signals, comprising:

a switching unit for switching at least one of signals being output through at least one

5 transmission means to corresponding signal lines under control of a controller;

an amplifier unit for amplifying broadcasting signals being output through the
switching unit;

a filter unit for allowing output signals from the amplifier unit out of a specific
frequencies to pass a predetermined band signals ;

10 a tuner unit for tuning at least one of the output broadcasting signals from the filter
unit; and

a display means connected to the tuners, for displaying at least one of the tuned
signals.

15 6. The apparatus according to claim 5, wherein the switching unit is comprised of
at least two switches for distributing at least one of the signals transmitted by the
transmission means, and for switching the distributed signals to corresponding tuner lines.

7. The apparatus according to claim 6, wherein the switching unit shares a switching means for a same type of signals with respect to each of transmitted signals from the transmission means.

5 8. The apparatus according to claim 5, wherein the transmission means comprises a first transmission means into which signals are input through a radio antenna, and a second transmission means into which signals are input through a wired cable.

9. The apparatus according to claim 8, wherein the switching unit comprises:
10 a first switch connected to a line that connects an antenna with an analog tuner line, for switching analog broadcasting signals being input by the antenna, the first transmission means, to the analog tuner;

a second switch connected to a line that connects the antenna to a digital tuner, for switching digital broadcasting signals being input by the antenna to the digital tuner;

15 a third switch connected to a line that connects the cable to the digital tuner, for switching digital broadcasting signals being input by the cable to the digital tuner; and

a fourth switch connected to a line that connects the cable to the analog tuner line, for switching analog broadcasting signals being input by the cable to the analog tuner.

10. The apparatus according to claim 9, wherein the controller in the system turns on the first switch and the third switch if a user wants to watch an analog skywave broadcasting and a digital cable broadcasting at the same time.

5 11. The apparatus according to claim 9, wherein the controller in the system turns on the second switch and the fourth switch if a user wants to watch a digital skywave broadcasting and an analog cable broadcasting at the same time.

10 12. The apparatus according to claim 9, wherein the controller in the system turns on the third switch and the fourth switch if a user wants to watch an analog cable broadcasting and a digital cable broadcasting at the same time.

13. The apparatus according to claim 9, wherein the controller in the system turns on the first switch and the second switch if a user wants to watch an analog skywave broadcasting and a digital skywave broadcasting at the same time.

15 14. The apparatus according to claim 5, wherein at least one of pin diodes, high frequency relays and transistors is used for the switching unit.

15. The apparatus according to claim 5, wherein the amplifier unit comprises:

a first amplifier connected to the analog tuner, for amplifying broadcasting signals being input to the analog tuner; and

a second amplifier connected to the digital tuner, for amplifying broadcasting signals being input to the digital tuner.

5

16. The apparatus according to claim 5, wherein the bandpass filter unit comprises:

a first bandpass filter connected between the first amplifier and the analog tuner; and

a second bandpass filter connected between the second amplifier and the digital tuner.

10

17. A method for distributing signals, the method comprising the steps of:

receiving at least one input signals provided through at least one of transmission means;

identifying at least one of transmission means and type of the input signals;

15 switching the identified signals to corresponding tuner lines according to the type of signal;

performing at least one of amplifying and filtering the switched output signals; and

displaying at least one of output signals from the tuner.

18. The method according to claim 17, wherein the at least one of transmission means are comprised of at least one of radio antennas and wired cables.

19. The method according to claim 17, wherein a plurality of input signals are
5 provided through each transmission means, and each of the input signals comprises at least one of digital and analog signals.

20. The method according to claim 17, wherein switching the input signals
provided by each transmission means according to the type of signal means switching analog
10 signals to an analog tuner line, and switching digital signals to a digital tuner line.

Fig. 1

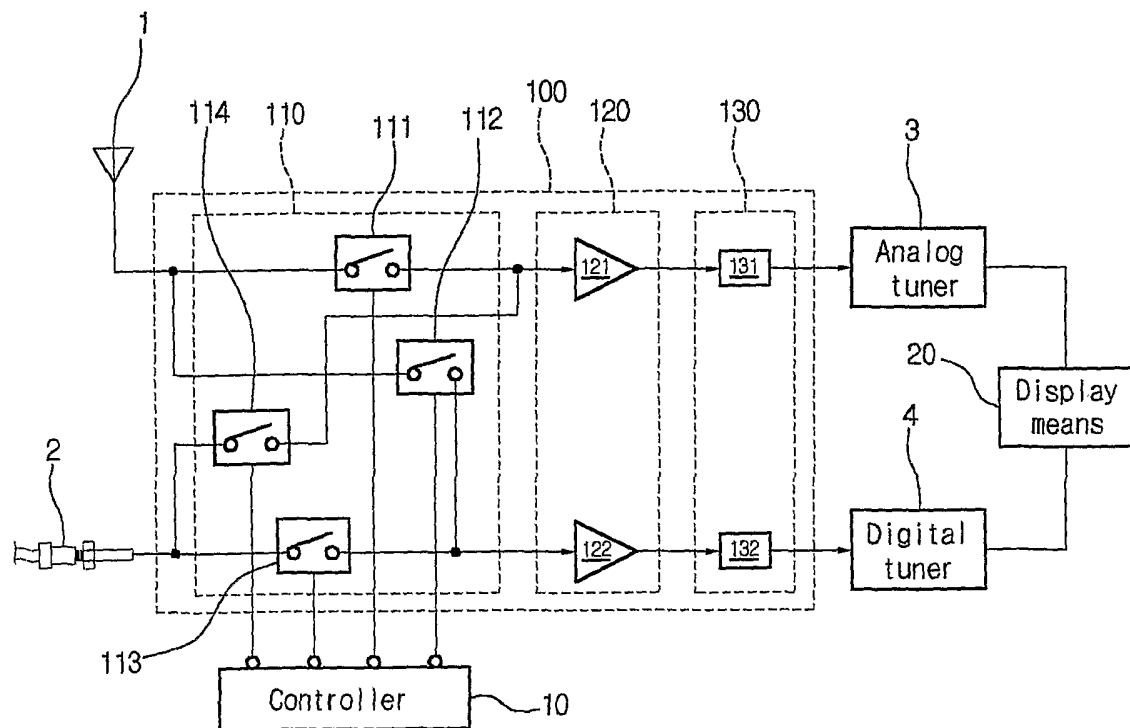


Fig.2

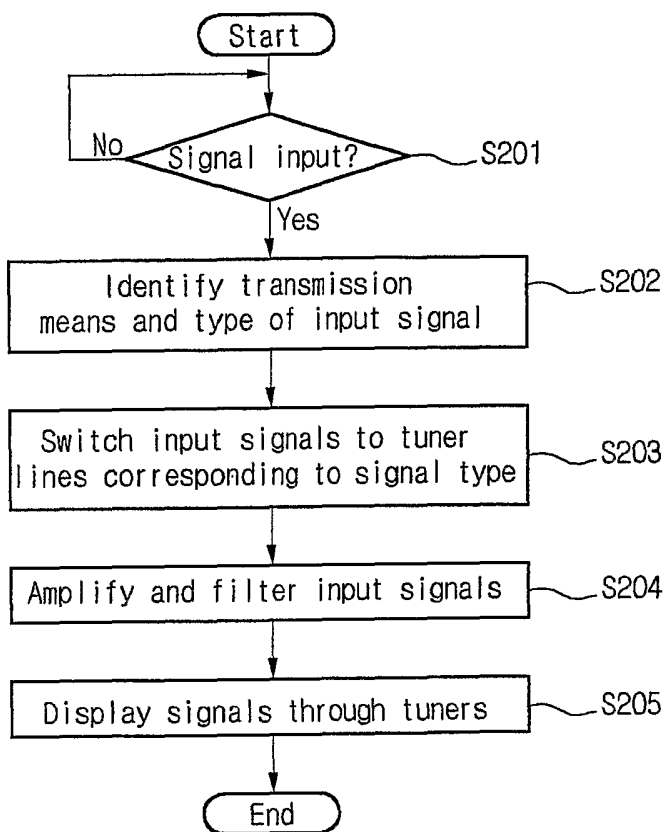
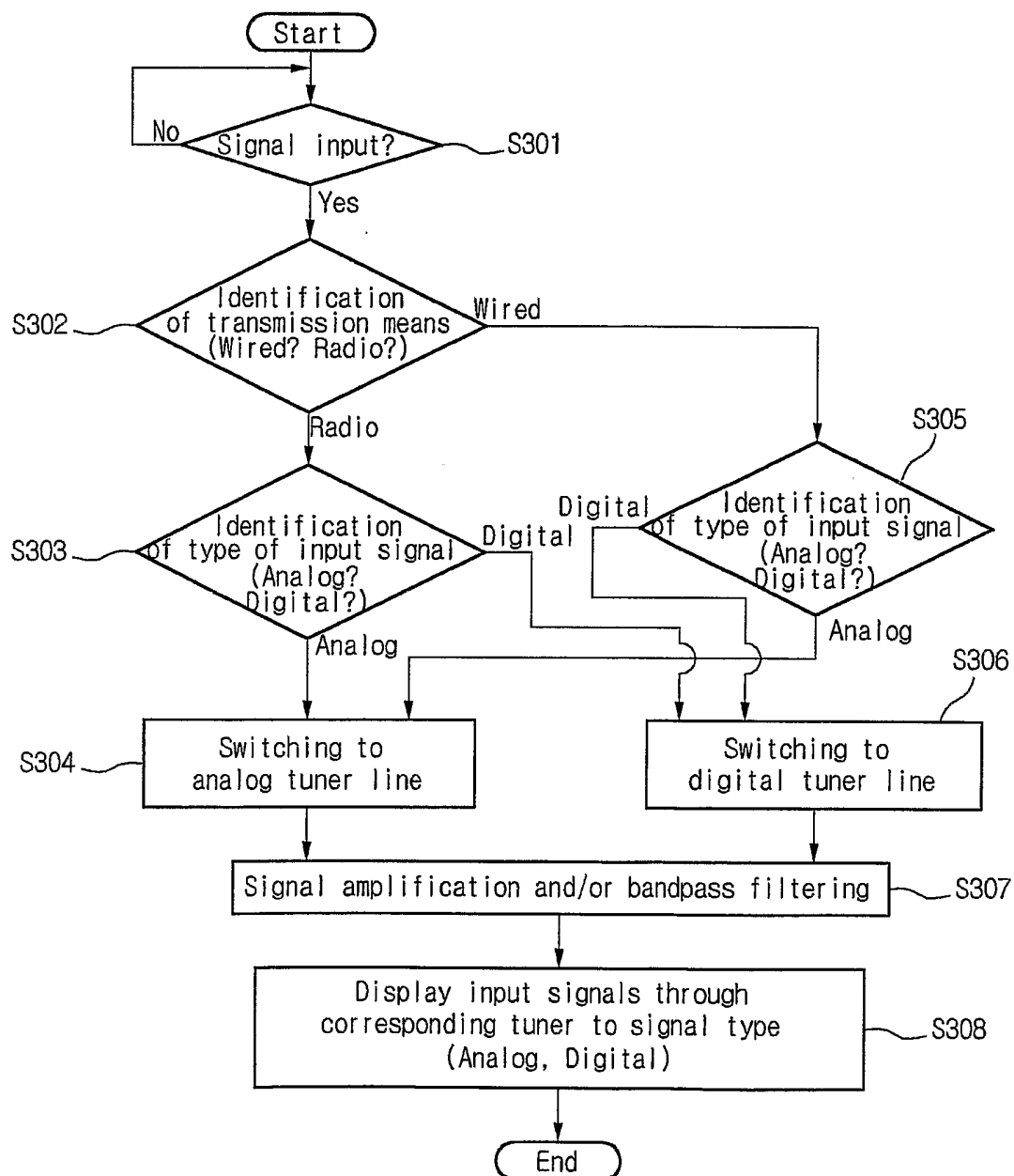


Fig.3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR03/01667

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04N 5/455

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)

H04N 5/455, 5/50

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

Korean patents and applications since 1975

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)

NPS : "tuner, switch, terrestrial, cable, antenna"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 0126458 Y1 (DAEWOO ELECTRONICS. CO., LTD.) 15. DECEMBER.1998. * the whole document *	1-3, 5-8,, 14-19
Y		4, 9-13,20
Y	KR 0217277 Y1 (SAMSUNG ELECTRICITY CO.,LTD.) 08. JANUARY. 2001 * the whole document *	4, 9-13,20
A	US 5,774,194(DEUTSCHE THOMSON-BRANDT GMBH)30.JUNE. 1998 * the whole document *	1-20
A	US 6,137,546(SONY CO.) 24.OCTOBER.2000 column 3, lines 49-64 Fig 3.	1-20
A	US 6,016,170(ALPS ELECTRIC CO., LTD.) 18. JANUARY. 2000 * the whole document *	1-20

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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