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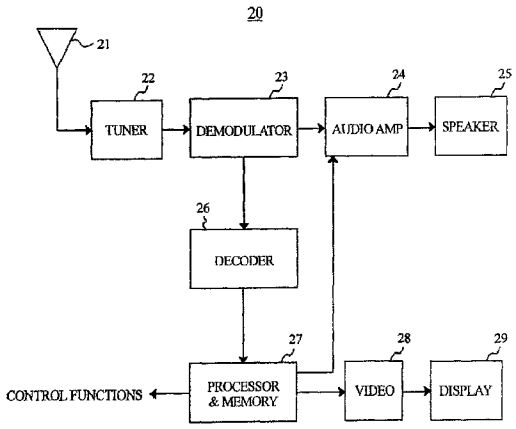

(57) Abstract: An apparatus (20) provides an emergency alert function that detects redundant notifications of emergency events. According to an exemplary embodiment, the apparatus (20) includes a signal receiving element (21) operative to receive first emergency alert signals representing a first notification of a first emergency event and second emergency alert signals representing a second notification of a second emergency event. A processor (27) enables an alert output responsive to the first emergency alert signals. The processor (27) suppresses the alert output responsive to the second emergency alert signals if at least two predetermined conditions are satisfied. The at least two predetermined conditions include the first emergency event being a same type of event as the second emergency event, and the first emergency event having an expiration time within a predetermined time period before or after an expiration time of the second emergency event.

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APPARATUS HAVING AN EMERGENCY ALERT FUNCTION CAPABLE OF DETECTING REDUNDANT NOTIFICATIONS

The present invention generally relates to apparatuses such as television signal receivers, radios or other apparatuses having an emergency alert function, and more particularly, to an apparatus and method for providing an emergency alert function that detects redundant notifications of emergency events.

Emergency events such as severe weather, natural disasters, fires, civil emergencies, war acts, toxic chemical spills, radiation leaks, or other such conditions can be devastating to unprepared individuals. With weather-related emergencies, authorities such as the National Weather Service (NWS) and the National Oceanographic and Atmospheric Administration (NOAA) are generally able to detect severe weather conditions prior to the general public. Through the use of modern weather detection devices, such as Doppler radar and weather satellites, the NWS and NOAA are able to issue early warnings of severe weather conditions which have saved many lives. However, for such warnings to be effective, they must be communicated to their intended recipients.

Certain apparatuses are capable of receiving emergency alert signals provided by sources such as the NWS and NOAA, and provide an emergency alert function using Specific Area Message Encoding (SAME) technology. Apparatuses using SAME technology typically require a user to perform a setup process for the emergency alert function by selecting items such as one or more channels which are monitored in order to receive emergency alert signals, one or more geographical locations of interest, and one or more types of emergency events which activate the emergency alert function. Once the setup process is complete, the emergency alert function may be activated when incoming emergency alert signals including SAME data indicate the occurrence of an emergency event which corresponds to the geographical location(s) and type(s) of emergency events selected by the user during the setup process. When the emergency alert function is activated, an alert output such as an audio and/or visual message may be provided to inform individuals of the emergency event.

With apparatuses having an emergency alert function using technology such as SAME technology, notifications of emergency events may be repeated multiple times. For example, a tropical storm watch may be issued 24 hours prior to its suspected landfall, but the storm may in fact linger for several days before making landfall. In such a case, multiple notifications of this same event may be repeatedly issued (e.g., every 6 hours, etc.). Similarly, notifications for the same event or similar events may be repeated multiple times if, for example, a user has set his/her apparatus to monitor multiple channels that are utilized by multiple transmitters. In such a case, since SAME transmitters may broadcast emergency alert signals at slightly different times, multiple notifications of the same event may be received by the apparatus. In such cases, multiple notifications of the same event or similar events may cause an alert output such as an alarm to be repeatedly triggered, potentially disrupting consumer's lives.

Accordingly, there is a need for an apparatus and method for providing an emergency alert function that avoids the foregoing problems, and thereby detects redundant notifications of emergency events. The present invention addresses these and/or other issues.

In accordance with an aspect of the present invention, an apparatus having an emergency alert function is disclosed. According to an exemplary embodiment, the apparatus comprises means for receiving first emergency alert signals representing a first notification of a first emergency event and second emergency alert signals representing a second notification of a second emergency event. Processing means enable an alert output responsive to the first emergency alert signals. The processing means suppress the alert output responsive to the second emergency alert signals if at least two predetermined conditions are satisfied. The at least two predetermined conditions include the first emergency event being a same type of event as the second emergency event, and the first emergency event having an expiration time within a predetermined time period before or after an expiration time of the second emergency event.

In accordance with another aspect of the present invention, a method for providing an emergency alert function is disclosed. According to an exemplary embodiment, the method comprises steps of receiving first emergency alert signals

representing a first notification of a first emergency event, enabling an alert output responsive to the first emergency alert signals, receiving second emergency alert signals representing a second notification of a second emergency event, suppressing the alert output responsive to the second emergency alert signals if at least two predetermined conditions are satisfied, and wherein the at least two predetermined conditions include the first emergency event being a same type of event as the second emergency event, and the first emergency event having an expiration time within a predetermined time period before or after an expiration time of the second emergency event.

In accordance with yet another aspect of the present invention, a television signal receiver having an emergency alert function is disclosed. According to an exemplary embodiment, the television signal receiver comprises a signal receiving element operative to receive first emergency alert signals representing a first notification of a first emergency event and second emergency alert signals representing a second notification of a second emergency event. A processor is operatively coupled to the signal receiving element, and enables an alert output responsive to the first emergency alert signals. The processor suppresses the alert output responsive to the second emergency alert signals if at least two predetermined conditions are satisfied. The at least two predetermined conditions include the first emergency event being a same type of event as the second emergency event, and the first emergency event having an expiration time within a predetermined time period before or after an expiration time of the second emergency event.

The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an exemplary environment suitable for implementing the present invention;

FIG. 2 is a block diagram of an apparatus having an emergency alert function according to an exemplary embodiment of the present invention;

FIG. 3 is a flowchart illustrating exemplary steps for providing an emergency alert function;

FIG. 4 is a flowchart illustrating steps for detecting redundant notifications of emergency events according to an exemplary embodiment of the present invention; and

FIG. 5 is a flowchart illustrating steps for detecting redundant notifications of emergency events according to another exemplary embodiment of the present invention.

The exemplifications set out herein illustrate preferred embodiments of the invention, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

Referring now to the drawings, and more particularly to FIG. 1, an exemplary environment 100 suitable for implementing the present invention is shown. In FIG. 1, environment 100 comprises signal transmission means such as signal transmission source 10, dwelling means such as dwelling units 15 (i.e., 1, 2, 3 . . . N, where N may be any positive integer), and signal receiving means such as apparatuses 20.

In FIG. 1, dwelling units 15 may represent residences, businesses and/or other dwelling places located within a particular geographical location, such as but not limited to, a particular continent, country, region, state, area code, zip code, city, county, municipality, subdivision, and/or other definable geographical location. According to an exemplary embodiment, each of the dwelling units 15 is equipped with at least one apparatus 20 having an emergency alert function. Apparatus 20 may be embodied as any type of apparatus having an emergency alert function such as a television signal receiver, radio, or other apparatus. According to the present invention, the emergency alert function enables, among other things, apparatus 20 to receive emergency alert signals and provide one or more alert outputs to notify individuals of emergency events.

According to an exemplary embodiment, signal transmission source 10 transmits signals including audio, video and/or emergency alert signals which may be received by each apparatus 20. According to an exemplary embodiment, the emergency alert signals may be provided from an authority such as the NWS, and/or other authorities such as governmental entities or the like. Signal transmission source 10 may transmit the emergency alert signals in their original form as provided by the authority, or may append digital data representative of the emergency alert

signals to other data, or may modify the emergency alert signals in some manner appropriate for its specific transmission format needs. In response to the emergency alert signals, each apparatus 20 may provide one or more alert outputs to thereby notify individuals of the emergency event. Signal transmission source 10 may transmit signals to television signal receivers 20 via any wired or wireless link such as, but not limited to, terrestrial, cable, satellite, fiber optic, digital subscriber line (DSL), and/or any other type of broadcast and/or multicast means.

Referring to FIG. 2, a block diagram of an exemplary embodiment of apparatus 20 of FIG. 1 is shown. In FIG. 2, apparatus 20 comprises signal receiving means such as signal receiving element 21, tuning means such as tuner 22, demodulation means such as demodulator 23, audio amplification means such as audio amplifier 24, audio output means such as speaker 25, decoding means such as decoder 26, processing means and memory means such as processor and memory 27, video processing means such as video processor 28, and visual output means such as display 29. Some of the foregoing elements may for example be embodied using integrated circuits (ICs). For clarity of description, certain conventional elements associated with apparatus 20 such as certain control signals, power signals and/or other elements may not be shown in FIG. 2.

Signal receiving element 21 is operative to receive signals including audio, video and/or emergency alert signals from signal sources, such as signal transmission source 10 in FIG. 1. According to an exemplary embodiment, received audio signals may include digitally encoded emergency alert signals. According to another exemplary embodiment, emergency alert signals may be received as separate data packets in a digital transmission system. Signal receiving element 21 may be embodied as any signal receiving element such as an antenna, input terminal or other element.

Tuner 22 is operative to tune signals including audio, video and/or emergency alert signals. According to an exemplary embodiment, tuner 22 may be capable of tuning audio signals on at least the following designated NWS frequencies: 162.400 MHz, 162.425 MHz, 162.450 MHz, 162.475 MHz, 162.500 MHz, 162.525 MHz and 162.550 MHz. As previously indicated herein, such audio signals may include digitally encoded emergency alert signals. Tuner 22 may also tune other channels including those used in terrestrial, cable, satellite and/or other transmissions.

Demodulator 23 is operative to demodulate signals provided from tuner 22, and may demodulate signals in analog and/or digital transmission formats. According to an exemplary embodiment, demodulator 23 demodulates audio signals to thereby generate demodulated audio signals representing audio content such as an NWS audio message, a warning alert tone (e.g., siren, alarm, etc.) and/or other audio content. Audio amplifier 24 is operative to amplify the audio signals output from demodulator 23 responsive to one or more control signals provided from processor 27. Speaker 25 is operative to aurally output the amplified audio signals provided from audio amplifier 24.

Decoder 26 is operative to decode signals including audio, video and/or emergency alert signals. According to an exemplary embodiment, decoder 26 decodes audio signals to thereby extract digitally encoded frequency shift keyed (FSK) signals, which represent emergency alert signals indicating an emergency event. Decoder 27 may also perform other decoding functions, such as decoding data which represents emergency alert signals included in the vertical blanking interval (VBI) of an analog television signal.

According to an exemplary embodiment, the emergency alert signals include data comprising SAME data associated with the emergency event. SAME data comprises a digital code representing information such as the specific geographical location affected by the emergency event, the type of emergency event (e.g., tornado watch, radiological hazard warning, civil emergency, etc.), and the issue time and duration of the event notification. SAME data is used by the NWS and other authorities to improve the specificity of emergency alerts and to decrease the frequency of false alerts. Other data and information may also be included in the emergency alert signals according to the present invention.

Processor and memory 27 are operative to perform various processing and data storage functions of apparatus 20. According to an exemplary embodiment, processor 27 receives the emergency alert signals from decoder 26 and determines whether the emergency alert function of apparatus 20 is activated based on data included in the emergency alert signals. According to this exemplary embodiment, processor 27 compares data in the emergency alert signals to user setup data stored in memory 27 to determine whether the emergency alert function is activated. As will be described later herein, a setup process for the emergency alert function of

apparatus 20 allows a user to select items such as an applicable geographical location(s), and type(s) of emergency events (e.g., tornado watch, radiological hazard warning, civil emergency, etc.) which activate the emergency alert function.

When the emergency alert function of apparatus 20 is activated, processor 27 outputs one or more control signals which enable various operations. According to an exemplary embodiment, such control signals enable one or more alert outputs (e.g., aural and/or visual) to thereby notify individuals of the emergency event. Such control signals may also enable other operations of apparatus 20, such as causing it to be switched from an off/standby mode to an on mode.

Processor 27 is also operative to enable other operations associated with the emergency alert function of apparatus 20. According to the present invention, processor 27 is operative to detect redundant notifications of emergency events, and suppress an alert output such as an audible alarm if a redundant notification is detected. According to an exemplary embodiment, processor 27 determines a notification to be redundant if at least two predetermined conditions are satisfied. There may be multiple combinations of these two predetermined conditions according to the present invention. For example, according to one exemplary embodiment, the two predetermined conditions may include a first emergency event being a same type of event as a second emergency event, and the first emergency event having an expiration time within a predetermined time period before or after an expiration time of the second emergency event. Other predetermined conditions may also be taken into consideration in determining whether a notification is redundant. Further details regarding these aspects of the present invention will be provided later herein.

Video processor 28 is operative to process signals including video signals. According to an exemplary embodiment, such video signals may include embedded messages such as NWS text messages and/or other messages that provide details regarding emergency events. Video processor 28 may include closed caption circuitry which enables closed caption displays.

Display 29 is operative to provide visual displays. According to an exemplary embodiment, display 29 may provide visual displays including the aforementioned messages that provide details regarding emergency events. Display 29 may also include a viewable display panel having one or more indicator elements such as light emitting diodes (LEDs), liquid crystal display (LCD) elements, liquid quartz display

(LQD) elements, and/or other elements. Such indicator elements may include highlighted indicators, such as monochrome and/or colored indicators, plasma display indicators, and/or conventional lights used as consumer electronic product indicators, and may for example reside apart from apparatus 20, such as on a portable (e.g., non-tethered) lighted panel designed for a wall and/or desk display. This may also allow various LED, LCD, LQD, plasma and/or cathode ray tube (CRT) devices to incorporate indicator elements for the emergency alert function as the total visual data field or a portion thereof. For example, the indicator elements may be highlighted as a portion of the visual data being displayed on an LCD panel playing recorded video content, such as content from a digital versatile disk (DVD) or the like.

Turning now to FIG. 3, a flowchart 300 illustrating exemplary steps for providing an emergency alert function is shown. For purposes of example and explanation, the steps of FIG. 3 will be described with reference to apparatus 20 of FIG. 2. The steps of FIG. 3 are merely exemplary, and are not intended to limit the present invention in any manner.

At step 310, a setup process for the emergency alert function of apparatus 20 is performed. According to an exemplary embodiment, a user performs this setup process by providing inputs to apparatus 20 (e.g., using a remote control device not shown) responsive to an on-screen menu displayed via display 29. According to an exemplary embodiment, the user may select at least the following items during the setup process at step 310:

A. Enable/Disable - The user may select whether to enable or disable the emergency alert function.

B. Monitoring Channel(s) - The user may select one or more channels that are monitored in order to receive emergency alert signals. For example, the user may select channels corresponding to one or more of the following NWS transmission frequencies: 162.400 MHz, 162.425 MHz, 162.450 MHz, 162.475 MHz, 162.500 MHz, 162.525 MHz and 162.550 MHz. Channels may be manually selected by the user, or may be selected using an auto-tune mode which automatically tunes all of the channels associated with the emergency alert function to thereby identify one or more channels that provide the highest signal strength.

C. Geographical Locations - The user may select one or more geographical locations of interest. For example, the user may select a particular continent, country, region, state, area code, zip code, city, county, municipality, subdivision, and/or other definable geographical location. Such geographical location(s) may be represented by location codes, such as Federal Information Processing Standard (FIPS) location codes.

D. Event Types - The user may select one or more types of emergency events which activate the emergency alert function. For example, the user may designate that events such as civil emergencies, radiological hazard warnings, and/or tornado warnings activate the emergency alert function, but that events such as a thunderstorm watch does not, etc. The user may also select whether the conventional warning audio tone provided by the NWS and/or other alert mechanism activates the emergency alert function. According to the present invention, different severity or alert levels (e.g., statement, watch, warning, etc.) may represent different "events." For example, a thunderstorm watch may be considered a different event from a thunderstorm warning.

E. Alert Outputs - The user may select one or more alert outputs to be provided when the emergency alert function is activated. According to an exemplary embodiment, the user may select visual and/or aural outputs to be provided for each type of emergency event that activates the emergency alert function. For example, the user may select to display a visual message (e.g., an NWS text message as a closed caption display) and/or tune apparatus 20 to a specific channel. The user may also for example select to aurally output a warning tone (e.g., alarm, siren, etc.) and/or an audio message (e.g., NWS audio message), and the desired volume of each. Other types of alert outputs may also be provided according to the present invention.

According to the present invention, other menu selections may also be provided at step 310 and/or some of the menu selections described above may be omitted. Data corresponding to the user's selections during the setup process of step 310 is stored in memory 27.

At step 320, apparatus 20 monitors the channel(s) selected by the user during the setup process of step 310 (i.e., item B) for emergency alert signals. According to an exemplary embodiment, tuner 22 monitors the selected channel(s) and thereby receives incoming emergency alert signals. According to the present invention, apparatus 20 is capable of monitoring channels and receiving emergency alert signals during all modes of operation, including for example when apparatus 20 is turned on, turned off, and/or during playback of recorded audio and/or video content.

At step 330, a determination is made as to whether the emergency alert function of apparatus 20 is activated. According to an exemplary embodiment, processor 27 makes this determination by comparing data included in the incoming emergency alert signals to data stored in memory 27. As previously indicated herein, the emergency alert signals may include data such as SAME data which represents information including the type of emergency event (e.g., tornado watch, radiological hazard warning, civil emergency, etc.) and the specific geographical location(s) affected by the emergency event. According to an exemplary embodiment, processor 27 compares this SAME data to corresponding user setup data (i.e., items C and D of step 310) stored in memory 27 to thereby determine whether the emergency alert function is activated. In this manner, the emergency alert function of apparatus 20 is activated when the emergency event indicated by the emergency alert signals corresponds to: (1) any geographical location(s) selected by the user at item C of step 310 and (2) any event type(s) selected by the user at item D of step 310.

If the determination at step 330 is negative, process flow loops back to step 320 where tuner 22 continues to monitor the selected channel(s). Alternatively, if the determination at step 330 is positive, process flow advances to step 340 where apparatus 20 provides one or more alert outputs to thereby notify individuals of the emergency event.

According to an exemplary embodiment, processor 27 enables the one or more alert outputs at step 340 in accordance with the user's selections during the setup process of step 310 (i.e., item E), and such alert outputs may be aural and/or visual in nature. For example, aural outputs such as a warning tone (e.g., siren, alarm, etc.) and/or an NWS audio message may be provided at step 340 via speaker 25, and the volume of such aural outputs may be controlled in accordance with the

volume level set by the user during the setup process of step 310. Visual outputs may also be provided at step 340 via display 29 to notify individuals of the emergency event. According to an exemplary embodiment, an auxiliary information display such as an NWS text message (e.g., as a closed caption display) and/or a video output from a specific channel may be provided at step 340 via display 29 under the control of processor 27.

According to another exemplary embodiment, the alert output(s) provided at step 340 may be based on the severity or alert level of the particular emergency event. For example, emergency events may be classified in one of three different alert level categories, such as statement, watch, and warning. With such a classification scheme, the alert output for an emergency event at a level 1 or advisory level may be provided by an unobtrusive notification means such as a blinking LED since it is the least severe type of emergency event. The alert output for an emergency event at a level 2 or watch level may have some type of audio component (e.g., radio message). The alert output for an emergency event at a level 3 or warning level may be provided by a siren or other type of alarm since it is the most severe type of emergency event. Other types of aural and/or visual alert outputs than those expressly described herein may also be provided according to the present invention.

Turning now to FIG. 4, a flowchart 400 illustrating steps for detecting redundant notifications of emergency events according to an exemplary embodiment of the present invention is shown. For purposes of example and explanation, the steps of FIG. 4 will also be described with reference to apparatus 20 of FIG. 2. In FIG. 4, it is assumed that the emergency alert function of apparatus 20 has already been activated (see step 330 of FIG. 3) in response to first emergency alert signals indicating a first emergency event E1 of type T1 that affects one or more geographical locations L1i (where "i" is a positive integer value). Moreover, it is assumed that the notification for event E1 was issued at time I1 and has duration H1. The expiration time F1 for event E1 may be calculated from issue time I1 and duration H1 (i.e., I1+H1). It is further assumed in FIG. 4 that the user has previously selected apparatus 20 to provide alert outputs in the form of an audible alarm and a visual text message (see item E of step 310 of FIG. 3) when the emergency alert function is activated. Accordingly, it is assumed in FIG. 4 that the user has previously

received these aural and visual alert outputs for event E1. The steps of FIG. 4 are merely exemplary, and are not intended to limit the present invention in any manner.

At step 402, processor 27 detects if second emergency alert signals for a second emergency event E2 are received. Step 402 of FIG. 4 is repeatedly performed until processor 27 detects reception of second emergency alert signals for event E2 of type T2 that affects one or more geographical locations L2i (where "i" is a positive integer value). Moreover, any notification for event E2 is assumed to be issued at time I2 and has duration H2. Accordingly, the expiration time F2 for event E2 may be calculated by processor 27 from issue time I2 and duration H2 (i.e., I2+H2).

Once processor 27 detects reception of second emergency alert signals for event E2 at step 402, process flow advances to step 404 where processor 27 determines whether event E2 is the same type of event as event E1. That is, processor 27 determines at step 404 whether T1 is the same as T2. If the determination at step 404 is positive, process flow advances to step 406 where processor 27 then determines whether event E1 and event E2 affect all of the same geographical locations. That is, processor 27 determines at step 406 whether all locations L1i are the same as all locations L2i.

If the determination at step 406 is positive, process flow advances to step 408 where processor 27 determines that event E2 is an update to event E1. From step 408, process flow advances to step 410 where processor 27 suppresses the alarm alert output of apparatus 20. Then, at step 412, processor 27 causes a text message for event E1 to be replaced with a text message for event E2. In this manner, the user simply receives an updated text message for event E2 at step 412 since it is deemed an update to event E1.

Referring back to step 406, if processor 27 determines that event E1 and event E2 do not affect all of the same geographical locations (i.e., all locations L1i are not the same as all locations L2i), then process flow advances to step 414 where processor 27 determines whether the expiration time F1 of event E1 is within a predetermined time period "t" before or after an expiration time F2 of event E2. That is, processor 27 determines at step 414 whether F1 equals F2 plus or minus predetermined time period "t" where "t" may be set as a matter of design choice (e.g., 30 minutes, etc.).

If the determination at step 414 is positive, process flow advances to step 416 where processor 27 determines that event E2 is the same event as event E1. From step 416, process flow advances to step 418 where processor 27 determines whether the second emergency alert signals detected at step 402 activate the emergency alert function of apparatus 20. Details regarding activation of the emergency alert function of apparatus 20 have been previously provided herein with reference to step 330 of FIG. 3. Accordingly, processor 27 determines at step 418 if the emergency event E2 indicated by the second emergency alert signals detected at step 402 corresponds to: (1) any geographical location(s) selected by the user at item C of step 310 and (2) any event type(s) selected by the user at item D of step 310.

If the determination at step 418 is positive, process flow advances to step 420 where processor 27 suppresses the alarm alert output of apparatus 20. From step 420, or if the determination at step 418 is negative, process flow advances to step 422 where processor 27 causes locations L1i and L2i to be combined into the text message for event E1. Also at step 422, processor 27 resets the duration for event E1 to H2.

Referring back to steps 404 and 414, if the determinations at either of these steps are negative, process flow advances to step 424 where processor 27 determines that event E2 is not the same as event E1. From step 424, process flow then advances to step 426 where processor 27 determines whether the second emergency alert signals detected at step 402 activate the emergency alert function of apparatus 20. Details regarding activation of the emergency alert function of apparatus 20 have been previously provided herein with reference to step 330 of FIG. 3, and step 418 of FIG. 4. If the determination at step 426 is positive, process flow advances to step 428 where processor 27 enables the alarm and text message alert outputs of apparatus 20 for event E2. In this manner, the user will again receive aural and visual notification since event E2 is deemed a different event than event E1. Conversely, if the determination at step 426 is negative, process flow advances to step 430 where processor 27 purges the second emergency alert signals for event E2 from apparatus 20.

Turning now to FIG. 5, a flowchart 500 illustrating steps for detecting redundant notifications of emergency events according to another exemplary

embodiment of the present invention is shown. Flowchart 500 of FIG. 5 is substantially similar to flowchart 400 of FIG. 4. In particular, steps 402 to 412 and steps 416 to 430 of FIG. 4 are identical to steps 502 to 512 and steps 516 to 530 of FIG. 5, respectively. Accordingly, for clarity of description these identical steps will not be described again. In FIG. 5, steps 513 and 514 are new and represent additional predetermined conditions that may be used to detect redundant notifications according to the present invention.

As indicated in FIG. 5, step 513 is performed by processor 27 to determine whether the notification for event E1 is issued within a predetermined time period "t" before or after the notification for event E2. That is, processor 27 determines at step 513 whether the issue time I1 for event E1 equals the issue time I2 for event E2 plus or minus predetermined time period "t" where "t" may be set as a matter of design choice (e.g., 30 minutes, etc.). Such notifications may be issued from multiple sources.

If the determination at step 513 is positive, process flow advances to step 514 where processor 27 determines whether the duration H1 of event E1 is the same as the duration H2 of event E2. That is, processor 27 determines at step 514 whether H1 equals H2. If the determination at step 514 is positive, process flow advances to step 516, which is identical to step 416 previously described herein. If the determination at step 513 or step 514 is negative, process flow advances to step 524, which is identical to step 424 previously described herein.

In practicing the present invention, it is noted that aspects of FIGS. 4 and 5 may be combined in any suitable manner when determining whether a notification is redundant. For example, the predetermined conditions represented in steps 404, 406 and 414 of FIG. 4 may be combined in any desired manner with the predetermined conditions represented in steps 513 and 514 of FIG. 5.

Moreover, aspects of FIGS. 4 and 5 may also be combined with another exemplary embodiment of the present invention in which an alert output is suppressed based on a user's input acknowledging receipt of a prior notification. According to this exemplary embodiment, it is assumed that the emergency alert function of apparatus 20 is activated in response to first emergency alert signals representing a first notification of a first emergency event E1. Accordingly, processor 27 enables an alert output such as an audible alarm or siren in response to the first

emergency alert signals. A user may then acknowledge receipt of this alert output by providing a predetermined input to apparatus 20. For example, the user may press a predetermined key on a remote control device (not shown in FIGS.) for apparatus 20, press a predetermined key on apparatus 20 itself, press a touch screen of apparatus 20, provide a voice command, and/or other means. Once the user provides the predetermined input to apparatus 20 to acknowledge receipt of the first notification, processor 27 suppresses one or more alert outputs for a redundant notification of the same event type for a predetermined period of time. Moreover, processor 27 may suppress the alert output(s) in this manner even if other predetermined conditions such as those represented in steps 406 and 414 of FIG. 4 and/or steps 513 and 514 of FIG. 5 have not been satisfied.

According to yet another exemplary embodiment of the present invention, data associated with events in which alert outputs have been suppressed, or combined with other messages, may be stored in memory 27 and retrieved by processor 27 for display via display 29 in response to a user input. In this manner, users may view information relating to such events in which alert outputs have been suppressed, or combined with other messages.

As described herein, the present invention provides an apparatus and method for providing an emergency alert function that detects redundant notifications of emergency events. The present invention may be applicable to various apparatuses, either with or without an integrated display device. Accordingly, the phrase "television signal receiver" as used herein may refer to systems or apparatuses capable of receiving and processing television signals including, but not limited to, television sets, computers or monitors that include an integrated display device, and systems or apparatuses such as set-top boxes, video cassette recorders (VCRs), DVD players, video game boxes, personal video recorders (PVRs), computers or other apparatuses that may not include an integrated display device.

While this invention has been described as having a preferred design, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known

or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

CLAIMS

1. An apparatus (20) having an emergency alert function, comprising:

means (21) for receiving first emergency alert signals representing a first notification of a first emergency event and second emergency alert signals representing a second notification of a second emergency event;

processing means (27) for enabling an alert output responsive to said first emergency alert signals;

said processing means (27) suppressing said alert output responsive to said second emergency alert signals if at least two predetermined conditions are satisfied; and

wherein said at least two predetermined conditions include said first emergency event being a same type of event as said second emergency event, and said first emergency event having an expiration time within a predetermined time period before or after an expiration time of said second emergency event.

2. The apparatus (20) of claim 1, wherein said at least two predetermined conditions further include said first notification being issued within a predetermined time period before or after said second notification.

3. The apparatus (20) of claim 1, wherein said at least two predetermined conditions further include said first emergency event and said second emergency event affecting at least one identical geographical location.

4. The apparatus (20) of claim 1, wherein said processing means (27) suppresses said alert output responsive to said second emergency alert signals without said at least two predetermined conditions being satisfied if said first emergency event is a same type of event as said second emergency event and a user provides a predetermined input to acknowledge receipt of said first notification.

5. The apparatus (20) of claim 1, wherein said alert output includes an audible alarm.

6. A method (300, 400) for providing an emergency alert function, comprising:

receiving first emergency alert signals representing a first notification of a first emergency event (320);

enabling an alert output responsive to said first emergency alert signals (340);

receiving second emergency alert signals representing a second notification of a second emergency event (402);

suppressing said alert output responsive to said second emergency alert signals if at least two predetermined conditions are satisfied (420); and

wherein said at least two predetermined conditions include said first emergency event being a same type of event as said second emergency event, and said first emergency event having an expiration time within a predetermined time period before or after an expiration time of said second emergency event.

7. The method (300, 400) of claim 6, wherein said at least two predetermined conditions further include said first notification being issued within a predetermined time period before or after said second notification (513).

8. The method (300, 400) of claim 6, wherein said at least two predetermined conditions further include said first emergency event and said second emergency event affecting at least one identical geographical location (406).

9. The method (300, 400) of claim 6, further comprised of suppressing said alert output responsive to said second emergency alert signals without said at least two predetermined conditions being satisfied if said first emergency event is a same type of event as said second emergency event and a user provides a predetermined input to acknowledge receipt of said first notification.

10. The method (300, 400) of claim 6, wherein said alert output includes an audible alarm.

11. A television signal receiver (20) having an emergency alert function, comprising:

a signal receiving element (21) operative to receive first emergency alert signals representing a first notification of a first emergency event and second emergency alert signals representing a second notification of a second emergency event;

a processor (27) operatively coupled to said signal receiving element (21), said processor (27) enabling an alert output responsive to said first emergency alert signals;

said processor (27) suppressing said alert output responsive to said second emergency alert signals if at least two predetermined conditions are satisfied; and

wherein said at least two predetermined conditions include said first emergency event being a same type of event as said second emergency event, and said first emergency event having an expiration time within a predetermined time period before or after an expiration time of said second emergency event.

12. The television signal receiver (20) of claim 11, wherein said at least two predetermined conditions further include said first notification being issued within a predetermined time period before or after said second notification.

13. The television signal receiver (20) of claim 11, wherein said at least two predetermined conditions further include said first emergency event and said second emergency event affecting at least one identical geographical location.

14. The television signal receiver (20) of claim 11, wherein said processor (27) suppresses said alert output responsive to said second emergency alert signals without said at least two predetermined conditions being satisfied if said first emergency event is a same type of event as said second emergency event and a user provides a predetermined input to acknowledge receipt of said first notification.

15. The television signal receiver (20) of claim 11, wherein said alert output includes an audible alarm.

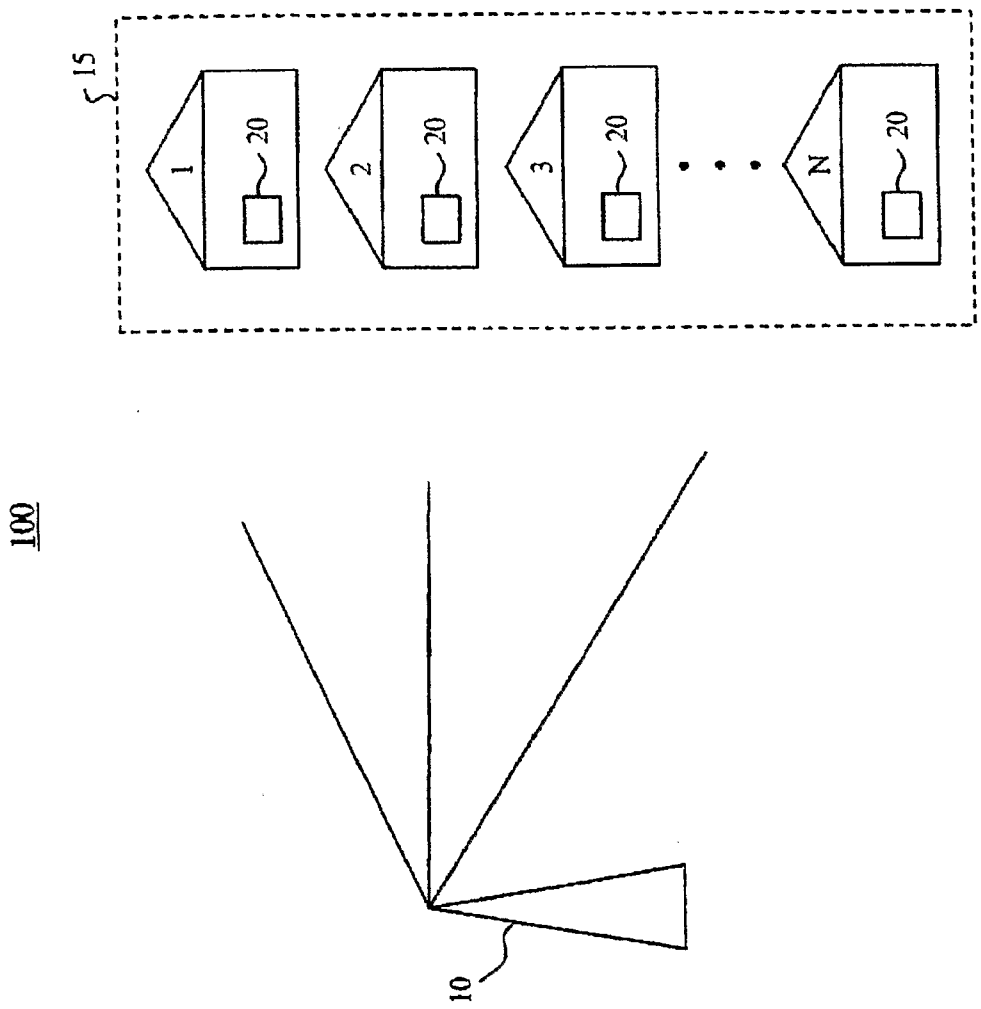

FIG. 1

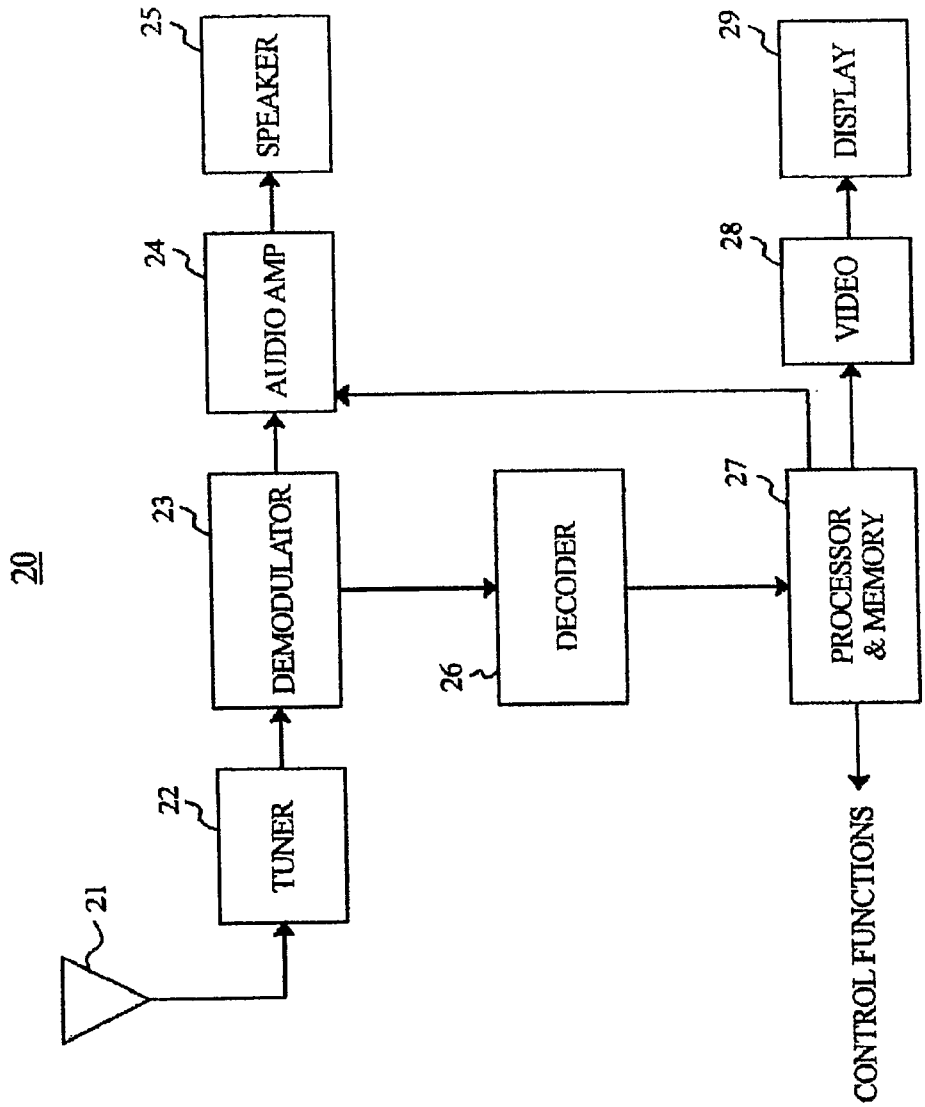
20
21
22
TUNER
23
DEMODULATOR
24
AUDIO AMP
25
SPEAKER
26
DECODER
27
PROCESSOR & MEMORY
28
VIDEO
29
DISPLAY
CONTROL FUNCTIONS

FIG. 2

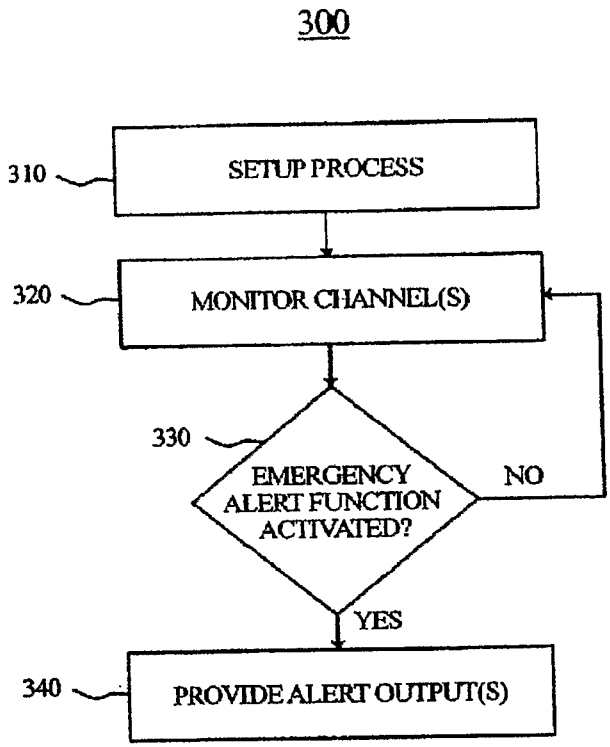
300
310
SETUP PROCESS
320
MONITOR CHANNEL(S)
330
EMERGENCY ALERT FUNCTION ACTIVATED?
NO
YES
340
PROVIDE ALERT OUTPUT(S)

FIG. 3

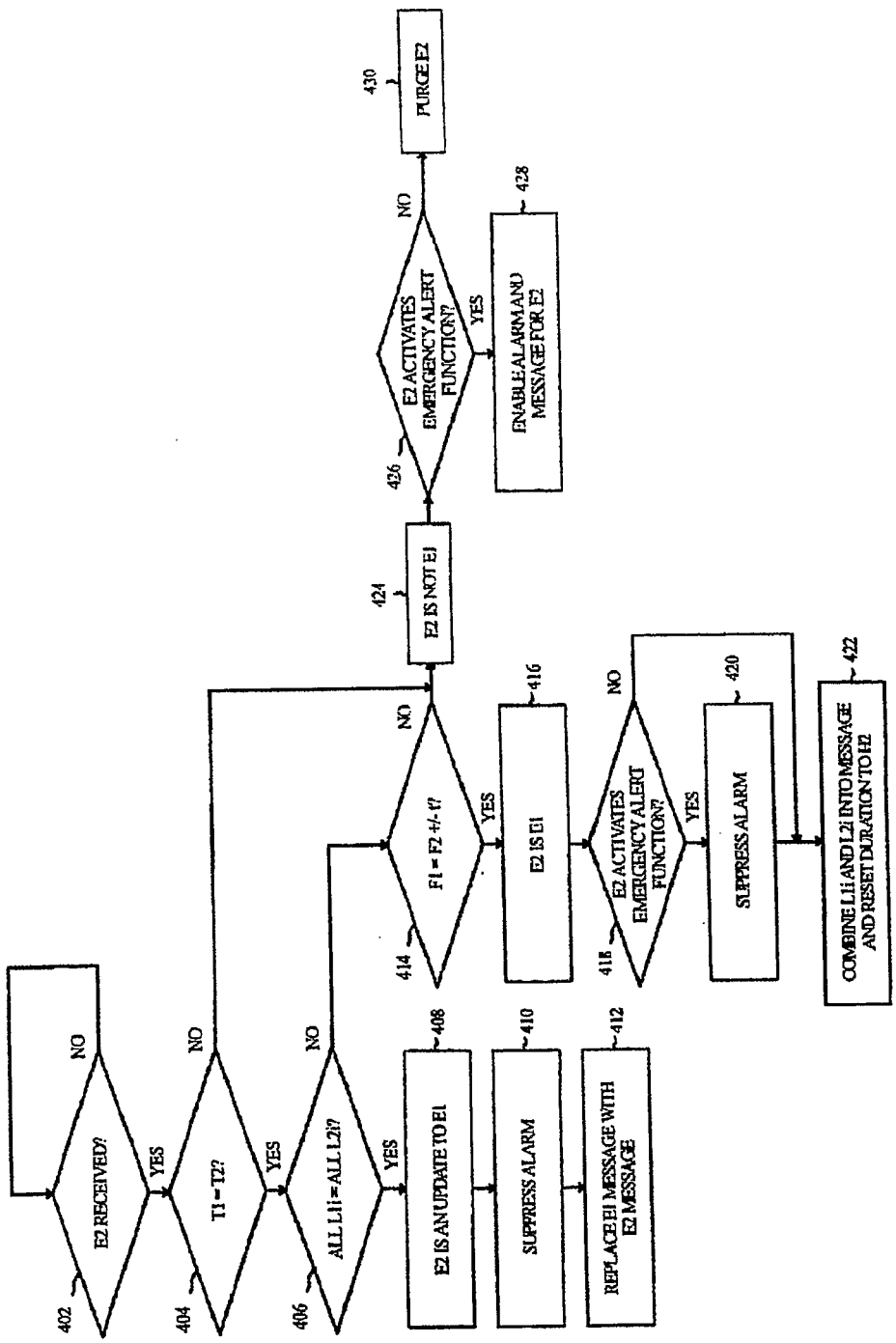
400
E2 RECEIVED?
NO
YES
402
T1 = T2?
NO
YES
404
ALL Li = ALL L2i?
NO
YES
406
E2 IS AN UPDATE TO E1
408
SUPPRESS ALARM
410
REPLACE E1 MESSAGE WITH E2 MESSAGE
412
F1 = F2 +/- 1?
NO
YES
414
E2 IS E1
416
E2 ACTIVATES EMERGENCY ALERT FUNCTION?
NO
YES
418
SUPPRESS ALARM
420
COMBINE L1i AND L2i INTO MESSAGE AND RESET DURATION TO H2
422
E2 IS NOT E1
424
E2 ACTIVATES EMERGENCY ALERT FUNCTION?
NO
YES
426
ENABLE ALARM AND MESSAGE FOR E2
428
PURGE E2
430

FIG. 4

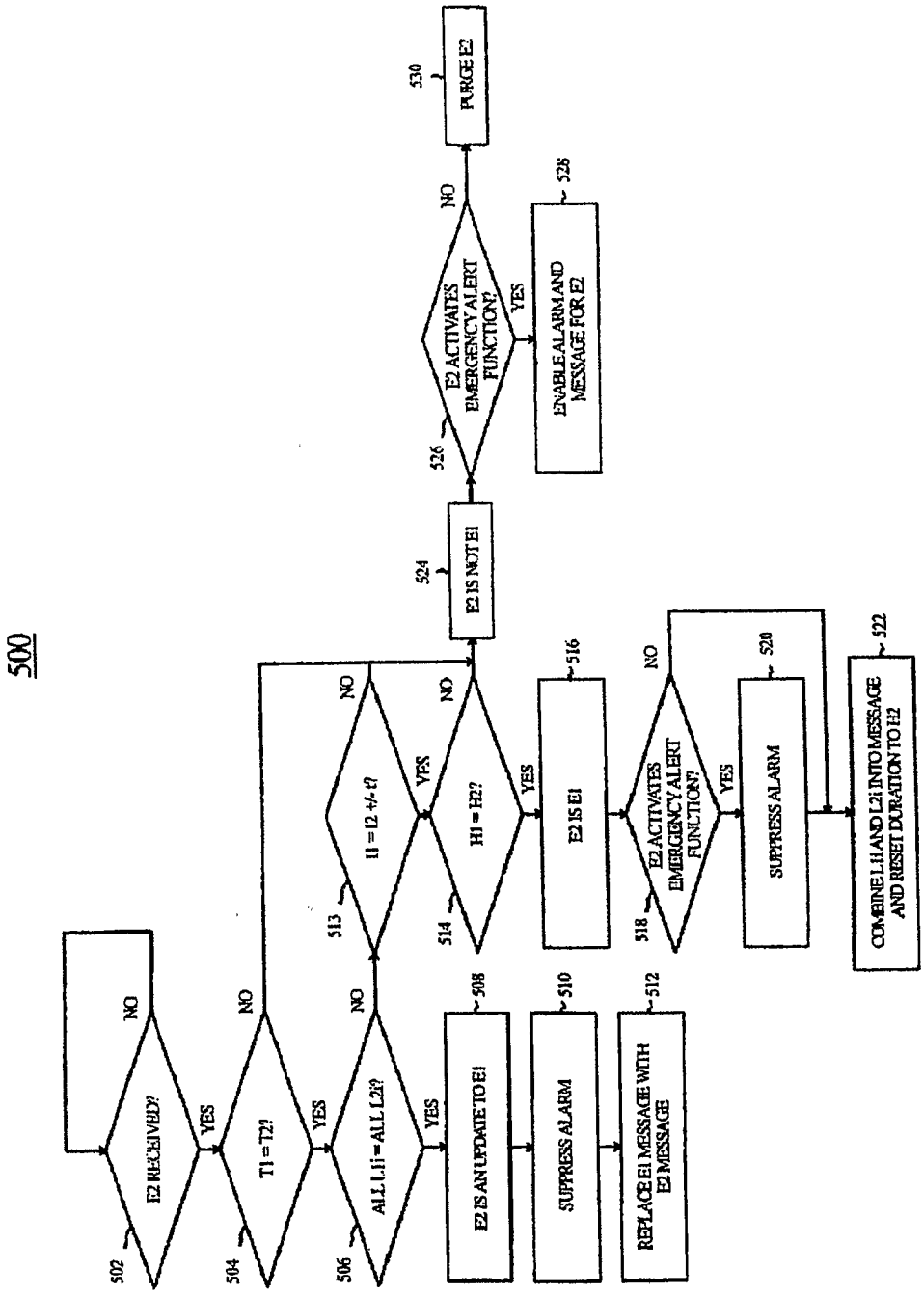
500
E2 RECEIVED?
NO
YES
502
T1 = T2?
NO
YES
504
ALL I.1i = ALL L2i?
NO
YES
506
E2 IS AN UPDATE TO E1
508
SUPPRESS ALARM
510
REPLACE E1 MESSAGE WITH E2 MESSAGE
512
I1 = I2 +/- i?
NO
YES
513
H1 = H2?
NO
YES
514
E2 IS E1
516
E2 ACTIVATES EMERGENCY ALERT FUNCTION?
NO
YES
518
SUPPRESS ALARM
520
COMBINE L1i AND L2i INTO MESSAGE AND RESET DURATION TO H2
522
E2 IS NOT E1
524
E2 ACTIVATES EMERGENCY ALERT FUNCTION?
NO
YES
526
ENABLE ALARM AND MESSAGE FOR E2
528
PURGE E2
530

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/022107

A. CLASSIFICATION OF SUBJECT MATTER
H04N5/445 G08B27/00

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 G08B G01W

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 143 394 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) 10 October 2001 (2001-10-10) column 7, lines 38-46; figures 1,3	1-15
Y	US 6 323 767 B1 (GROPPER DANIEL R) 27 November 2001 (2001-11-27) column 7, line 17 - line 23 column 5, line 40 - line 62	1-15
A	EP 1 426 908 A (MAPLE CHASE COMPANY) 9 June 2004 (2004-06-09) abstract	1,2,6,7, 11,12
A	US 2002/110352 A1 (POTREBIC PETER J) 15 August 2002 (2002-08-15) abstract	1,6,11

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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

Date of the actual completion of the international search	Date of mailing of the international search report
24 February 2006	03/03/2006

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Brod, R

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/022107

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/105794 A1 (JASINSCHI RADU S ET AL) 5 June 2003 (2003-06-05) figure 3	1,6,11

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

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International application No
PCT/US2005/022107

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EP 1426908 A	09-06-2004	AU 2003262102 A1	17-06-2004
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US 2002110352 A1	15-08-2002	NONE	
US 2003105794 A1	05-06-2003	WO 03041414 A1	15-05-2003