IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

MOTOROLA, INC.,	§	
	§	
Plaintiff,	§	Civil Action No. 08-69
	§	
v.	§	
	§	**JURY**
RESEARCH IN MOTION LIMITED AND RESEARCH IN MOTION CORPORATION,	§	
	§	
Defendants.	§	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff, Motorola, Inc. ("Plaintiff"), for its complaint against defendants Research in Motion Limited and Research in Motion Corporation (collectively "Defendants"), avers as follows:

JURISDICTION AND VENUE

1. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 101 *et seq.* This Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

2. Venue is proper in this Judicial District under 28 U.S.C. §§ 1391(b), (c), (d), and 1400(b).

3. Upon information and belief, this Court has personal jurisdiction over Defendants because Defendants regularly conduct business in this district and have committed acts of patent infringement in this district. Defendant, Research in Motion Limited, although required to designate or maintain a resident agent for service of process, has not so designated or maintained a resident agent. The Secretary of State of the State of Texas is an agent for service of process

on defendant Research in Motion Limited, who has engaged in business in the State of Texas. Since said non-resident defendant does not maintain a regular place of business in Texas, has not designated an agent for service of process, and this lawsuit arises out of this non-resident defendant's transaction of business in Texas, service of Summons upon defendant Research in Motion Limited may be made through the Secretary of State.

THE PARTIES

4. Plaintiff Motorola, Inc., is a corporation organized and existing under the laws of the State of Delaware and having a principal place of business at 1303 East Algonquin Road, Schaumburg, Illinois 60196.

5. Upon information and belief, Defendant Research in Motion Limited is a corporation organized under the laws of Canada and has its principal place of business at 295 Phillip Street, Waterloo, Ontario, Canada N2L 3WB. Upon information and belief, defendant Research in Motion Limited directly or indirectly through its subsidiaries and affiliated companies, distributes, markets, sells and/or offers to sell throughout the United States (including in this Judicial District), and/or imports into the United States consumer products, including wireless communication devices, associated equipment and software.

6. Defendant Research in Motion Corporation is a corporation organized under the laws of the State of Delaware and has its principal place of business at 122 West John Carpenter Parkway, Suite 430, Irving, Texas 75039. Upon information and belief, defendant Research in Motion Corporation directly or indirectly through its subsidiaries and affiliated companies, distributes, markets, sells and/or offers to sell throughout the United States (including in this Judicial District), and/or imports into the United States consumer products, including wireless communication devices, associated equipment and software.

BACKGROUND
Asserted Patents

7. United States Patent No. 5,157,391, titled "APPARATUS AND METHOD FOR DISPLAYING A PLURALITY OF FUNCTION INDICATORS IN A SELECTIVE CALL RECEIVER" ("the '391 patent"), was duly and legally issued on October 20, 1992, to Inventor Randi F. Weitzen. Plaintiff is the owner by assignment of all right, title and interest in and to the '391 patent, including the right to sue and recover for past infringement thereof. A true and correct copy of the '391 patent is attached hereto as Exhibit A.

8. United States Patent No. 5,359,317, titled "METHOD AND APPARATUS FOR SELECTIVELY STORING A PORTION OF A RECEIVED MESSAGE IN A SELECTIVE CALL RECEIVER" ("the '317 patent"), was duly and legally issued on October 25, 1994, to Inventors Fernando A. Gomez and Mark T. Stair. Plaintiff is the owner by assignment of all right, title and interest in and to the '317 patent, including the right to sue and recover for past infringement thereof. A true and correct copy of the '317 patent is attached hereto as Exhibit B.

9. United States Patent No. 5,394,140, titled "METHOD AND APPARATUS FOR PRE-PROGRAMMED CALL-BACK-NUMBER-DETERMINED ALERT" ("the '140 patent"), was duly and legally issued on February 28, 1995, to Inventors Poh-T'in Wong, Allen J. Weidler and William J. Burke. Plaintiff is the owner by assignment of all right, title and interest in and to the '140 patent, including the right to sue for past infringement thereof. A true and correct copy of the '140 patent is attached hereto as Exhibit C.

10. United States Patent No. 5,612,682, titled "METHOD AND APPARATUS FOR CONTROLLING UTILIZATION OF A PROCESS ADDED TO A PORTABLE COMMUNICATION DEVICE" ("the '682 patent"), was duly and legally issued March 18, 1997, to Inventors Michael J. DeLuca, George W. Smoot and Douglas R. Kraul. Plaintiff is the

owner by assignment of all right, title and interest in and to the ‘682 patent, including the right to sue for past infringement thereof. A true and correct copy of the ‘682 patent is attached hereto as Exhibit D.

11. United States Patent No. 5,764,899, titled “METHOD AND APPARATUS FOR COMMUNICATING AN OPTIMIZED REPLY” (“the ‘899 patent”), was duly and legally issued on June 9, 1998, to Inventors Gene Eggleston, Mitch Hansen and Anthony Rzany. Plaintiff is the owner by assignment of all right, title and interest in and to the ‘899 patent, including the right to sue and recover for past infringement thereof. A true and correct copy of the ‘899 patent is attached hereto as Exhibit E.

12. United States Patent No. 5,771,353, titled “SYSTEM HAVING VIRTUAL SESSION MANAGER USED SESSIONLESS-ORIENTED PROTOCOL TO COMMUNICATE WITH USER DEVICE VIA WIRELESS CHANNEL AND SESSION-ORIENTED PROTOCOL TO COMMUNICATE WITH HOST SERVER” (“the ‘353 patent”), was duly and legally issued on June 23, 1998, to Inventors Gene Eggleston and Mitch Hansen. Plaintiff is the owner by assignment of all right, title and interest in and to the ‘353 patent, including the right to sue and recover for past infringement thereof. A true and correct copy of the ‘353 patent is attached hereto as Exhibit F.

13. United States Patent No. 5,974,447, titled “METHOD AND SYSTEM FOR COUPLING A SELECTIVE CALL RECEIVER TO WIDELY DISTRIBUTED INFORMATION SOURCES” (“the ‘447 patent”), was duly and legally issued on October 26, 1999, to Inventors Gregory L. Cannon, David P. Kilp and Nick P. Lagen. Plaintiff is the owner by assignment of all right, title and interest in and to the ‘447 patent, including the right to sue and recover for past infringement thereof. A true and correct copy of the ‘447 patent is attached hereto as Exhibit G.

14. Upon information and belief, Defendants have had knowledge of the ‘391 patent, the ‘317 patent, the ‘140 patent, the ‘899 patent, the ‘353 patent, and the ‘447 patent since at least January 1, 2008.

CLAIM ONE
(Infringement of U.S. Patent No. 5,157,391)

15. Upon information and belief, Defendants have been and still are infringing, contributorily infringing or inducing infringement of at least claims 1, 8 and 9 of the ‘391 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making, using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s).

16. Defendants’ infringing activities have caused and will continue to cause Plaintiff irreparable harm for which it has no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

17. Defendants, with actual knowledge of the ‘391 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the ‘391 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

CLAIM TWO
(Infringement of U.S. Patent No. 5,359,317)

18. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claim 1 of the ‘317 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making, using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s).

19. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which it has no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

20. Defendants, with actual knowledge of the '317 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the '317 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

CLAIM THREE
(Infringement of U.S. Patent No. 5,394,140)

21. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claims 1 and 15 of the '140 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making, using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s).

22. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which it has no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

23. Defendants, with actual knowledge of the '140 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the '140 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

CLAIM FOUR
(Infringement of U.S. Patent No. 5,612,682)

24. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claim 1 of the '682 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making,

using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s).

25. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which it has no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

CLAIM FIVE
(Infringement of U.S. Patent No. 5,764,899)

26. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claim 1 of the '899 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making, using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s); and the BlackBerry Exchange Server software.

27. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which it has no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

28. Defendants, with actual knowledge of the '899 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the '899 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

CLAIM SIX
(Infringement of U.S. Patent No. 5,771,353)

29. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claim 9 of the '353 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making,

using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s); and the BlackBerry Exchange Server software.

30. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which they have no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

31. Defendants, with actual knowledge of the '353 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the '353 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

CLAIM SEVEN
(Infringement of U.S. Patent No. 5,974,447)

32. Upon information and belief, Defendants have been and still are infringing, contributorily infringing, or inducing infringement of at least claim 8 of the '447 patent, pursuant to 35 U.S.C. § 271(a), (b), (c), and/or (g), in this district and elsewhere, by their activities, including making, using, offering to sell, importing, or selling certain wireless communication devices and related equipment, including at least the BlackBerry 8100, 8130, 8300, 8320, 8800, 8820, and/or 8830 device(s); and the BlackBerry Exchange Server software.

33. Defendants' infringing activities have caused and will continue to cause Plaintiff irreparable harm for which they have no adequate remedy at law, unless such infringing activities are enjoined by this Court pursuant to 35 U.S.C. § 283.

34. Defendants, with actual knowledge of the '447 patent, with knowledge of their infringement, and without lawful justification, have willfully infringed the '447 patent, entitling Plaintiff to damages and treble damages pursuant to 35 U.S.C. § 284.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays that the Court enter a judgment:

a. Adjudging that Defendants have infringed at least the asserted claims of the ‘391 patent, the ‘317 patent, the ‘140 patent, the ‘682 patent, the ‘899 patent, the ‘353 patent, and the ‘447 patent;

b. Permanently enjoining Defendants and its directors, officers, employees, attorneys, agents, and all persons in active concert or participation with any of the foregoing from further acts of infringement, contributory infringement or inducement of infringement of the asserted patents unless and until licensed under the asserted patents by Plaintiff;

c. Awarding to Plaintiff damages sufficient to compensate Plaintiff for the infringement by Defendants, together with both pre-judgment and post-judgment interest;

d. Trebling the damages awarded for infringement claims one through three and five through seven, as provided by 35 U.S.C. § 284;

e. Finding this action constitutes an exceptional case under 35 U.S.C. § 285;

f. Awarding to Plaintiff its costs and attorney fees; and

g. Awarding to Plaintiff such other and further relief as this Court deems proper and just.

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Dated: February 16, 2008

DEMAND FOR TRIAL BY JURY

Pursuant to Rule 38(b), Fed. R. Civ. P., and the Seventh Amendment to the Constitution of the United States, Plaintiff demands a trial by jury of all claims and all issues triable as of right by jury in this action.

US005157391A

United States Patent [19]

Weitzen

[11] Patent Number: 5,157,391

[45] Date of Patent: Oct. 20, 1992

[54] **APPARATUS AND METHOD FOR DISPLAYING A PLURALITY OF FUNCTION INDICATORS IN A SELECTIVE CALL RECEIVER**

[75] Inventor: **Randi F. Weitzen**, Boynton Beach, Fla.

[73] Assignee: **Motorola, Inc.**, Schaumburg, Ill.

[21] Appl. No.: **402,740**

[22] Filed: **Sep. 5, 1989**

[51] **Int. Cl.**[5] **H04Q 7/00**

[52] **U.S. Cl.** **340/825.44**; 340/311.1

[58] **Field of Search** 340/311.1, 709, 710, 340/711, 765, 815.06, 825.44, 825.31, 825.46, 825.47, 825.48; 341/20, 22; 358/194.1; 368/69, 70, 224; 364/709.12, 709.13, 709.14, 709.15, 709.16; 370/93

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4,829,466	5/1989	Davis et al.	364/900
4,857,898	8/1989	Smith	341/22
4,864,592	9/1989	Lee	364/709.12

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Motorola "PMR200", 1986, pp. 2–5 (anonymous author(s).

Primary Examiner—Donald J. Yusko
Assistant Examiner—Dervis Magistre
Attorney, Agent, or Firm—Gregg E. Rasor; Vincent B. Ingrassia; William E. Koch

[57] **ABSTRACT**

In a selective call receiver, an apparatus and method are provided for accessing one or more operational functions via a plurality of displayed function indicators. The function indicators are categorized in sets with a first set representing a selective call receiver status mode that allows alteration of operating characteristics associated with a selective call receiver, and a second set representing a message read mode for controlling the disposition of received messages.

9 Claims, 3 Drawing Sheets

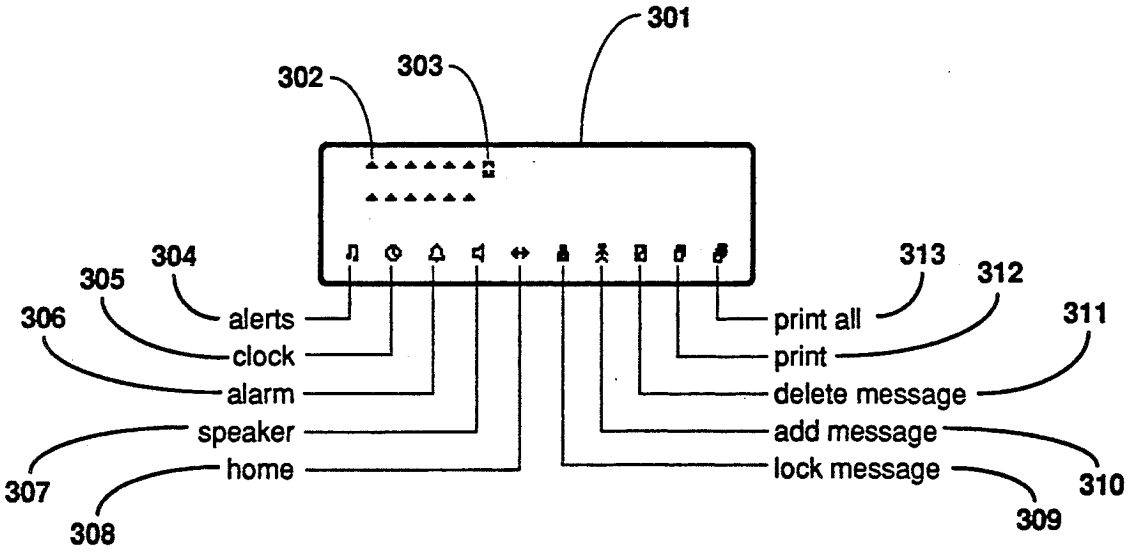


FIG. 1
Prior Art

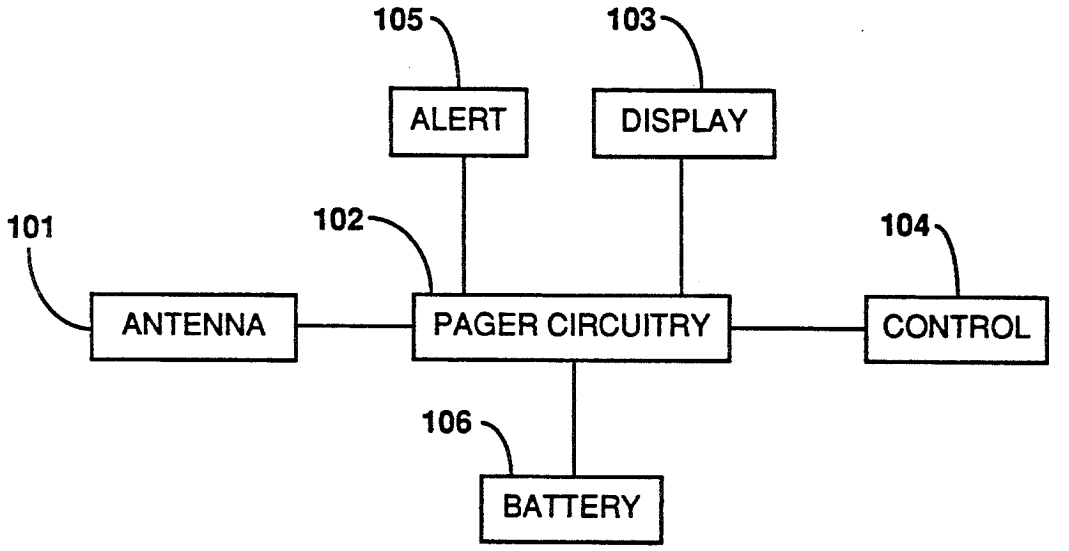


FIG. 2

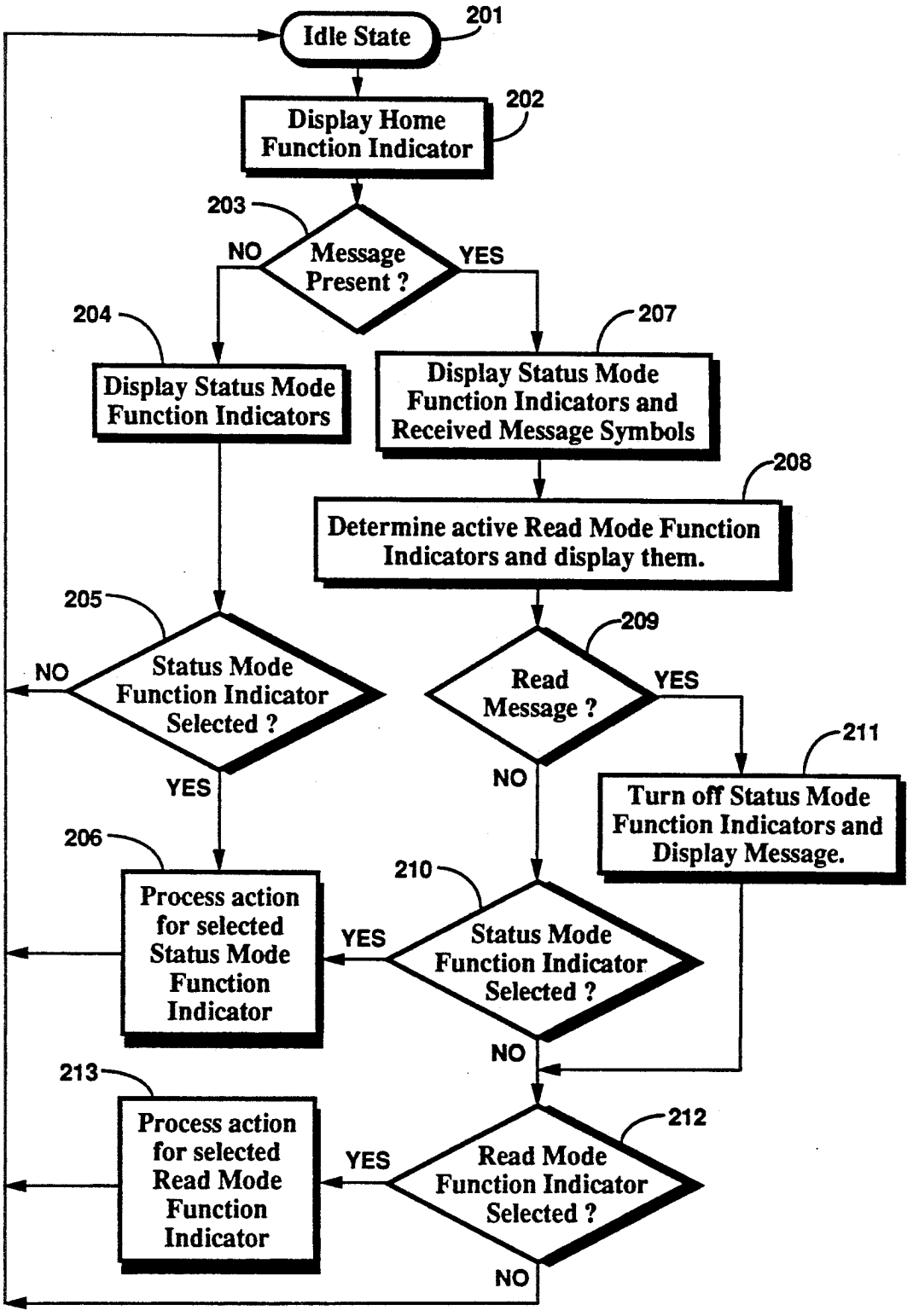
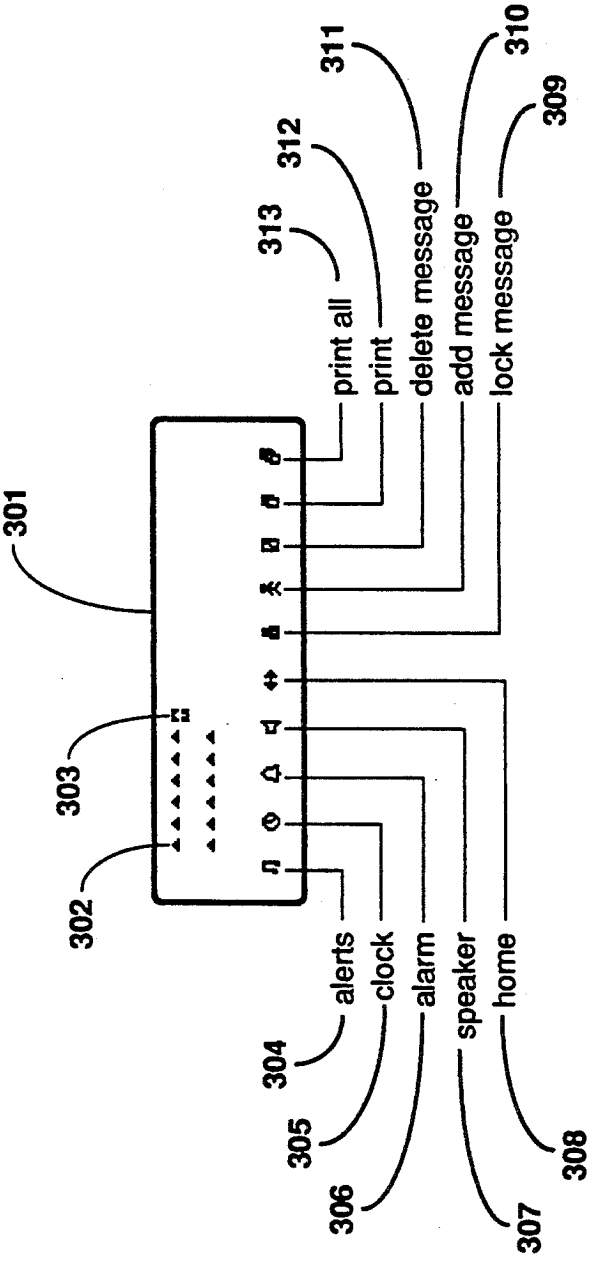

Idle State
201
Display Home Function Indicator
202
203
Message Present ?
NO
YES
204
Display Status Mode Function Indicators
207
Display Status Mode Function Indicators and Received Message Symbols
208
Determine active Read Mode Function Indicators and display them.
205
Status Mode Function Indicator Selected ?
NO
YES
209
Read Message ?
YES
NO
211
Turn off Status Mode Function Indicators and Display Message.
206
Process action for selected Status Mode Function Indicator
210
Status Mode Function Indicator Selected ?
YES
NO
213
Process action for selected Read Mode Function Indicator
212
Read Mode Function Indicator Selected ?
YES
NO

FIG. 3


301
302
303
304
alerts
305
clock
306
alarm
307
speaker
308
home
309
lock message
310
add message
311
delete message
312
print
313
print all

APPARATUS AND METHOD FOR DISPLAYING A PLURALITY OF FUNCTION INDICATORS IN A SELECTIVE CALL RECEIVER

FIELD OF THE INVENTION

This invention relates in general to selective call receivers and more particularly to the menu driven alteration of configuration parameters and information stored within a selective call receiver.

BACKGROUND OF THE INVENTION

Selective call receivers for displaying or presenting information are well known. As technology advances, the marketplace dictates that more features are to be offered on a selective call receiver. In order to access these features, manufacturers have included an array of switches used singularly or in combination to access a specific feature. To achieve user friendly operation of a selective call receiver, the keystroke operation sequence to access a feature must be kept to a minimum. Because of size constraints, the number of switches on a typical selective call receiver is limited to four. Using four switches as an example, the current technology using single keystroke commands can execute four functions directly from the front panel. If one of the switches is designated as a shift operator, the other three can be multiplexed into addressing six functions from the front panel. More functions can be multiplexed on a doubly or triply shifted level but this presents the need for the casual user who has not memorized the operating sequence to refer to an operating manual. Thus, what is needed is a method utilizing a menu driven interface which provides function access using a minimal number of keystrokes.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide an improved method of accessing one or more functions using a menu driven interface to provide for the alteration of configuration parameters and information stored within a selective call receiver.

In carrying out the above and other objects of the invention in one form, there is provided a method for presenting function indicators on a selective call receiver capable of receiving a message, displaying in a first mode a first set of function indicators associated with the first mode and a message, and displaying in a second mode a second set of function indicators associated with the second mode.

BRIEF DESCRIPTION OF THE INVENTION

FIG. **1** is a block diagram of a prior art selective call receiver system.

FIG. **2** is a flow chart of the decision tree used in accordance with a preferred embodiment.

FIG. **3** is a drawing of the display screen used in accordance with the preferred embodiment.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **1**, pager circuitry **102** provides an alert **105** and a message on the display **103** in response to an RF signal received by the antenna **101**. The user selects one or more functions by activating controls **104**. The selective call receiver shown in FIG. **1** is well known to those skilled in the art.

Referring to FIG. **2**, the flow chart shows a decision tree which controls the display of function indicators that represent specific function actions. In the standby mode, the controller waits in an idle state **201**. When the user invokes the function menu, the home function indicator is displayed **202** and the controller checks for the presence of at least one message **203**. If no messages are present, the selective call receiver displays status mode function indicators **204**. The controller then checks for the selection of a status mode function indicator **205**. When a status mode function indicator has been selected, the controller processes the action associated with the selected status mode function indicator **206**. In all cases, when the selected action has been completed or the user chooses to escape from the sequence, control is returned to the idle state **201**.

If the controller is in the idle state **201** and at least one message has been received by the selective call receiver, when the user invokes the function menu, the home function indicator is displayed **202** and the message present test **203** is true. The controller displays the status mode function indicators and received message symbols **207**, then determines which read mode function indicators are active by examining information associated with the selected message to uniquely associate specific read mode function indicators with the selected message and display these function indicators **208**. If the user chooses to read the message **209**, the status mode indicators are turned off and the message is displayed **211**. The user may then select an active read mode indicator **212** and process the action associated with the selected mode indicator **213**. If the user does not choose to read the selected message **209**, the options are to select either a status mode indicator **210** and its associated action **206** or a read mode indicator **212** and its associated action **213**. In all cases, when the selected action has been completed or the user chooses to escape from the sequence, control is returned to the idle state **201**.

Referring to FIG. **3**, the preferred embodiment of a display screen layout **301** is shown. The filled triangles are received message symbols **302** which represent message slots (information storage "bins") that contain information received by the selective call receiver. The inverse highlighted filled triangle **303** represents the position of the active message pointer.

The function indicators **304**, **305**, **306**, **307**, **308**, **309**, **310**, **311**, **312**, **313**, are arranged in a menu format below the message slot display lines. These function indicators represent actions which can be performed on information within the selective call receiver. The indicators are grouped by function into read and status modes. The read mode function indicators **308**, **309**, **310**, **311**, **312**, **313** are used to control the disposition of messages received by the selective call receiver. In this embodiment, read mode function indicators include message locking **309**, message addition **310**, message deletion **311**, print message **312**, and print all messages **313**. The status mode function indicators **304**, **305**, **306**, **307**, **308**, are used to access and alter operational parameters associated with intrinsic functions within the selective call receiver. In this embodiment, status mode function indicators include alert selection **304**, clock configuration **305**, alarm configuration **306**, and speaker control **307**. The home function indicator **308** is shared by both the read and status modes.

I claim:

1. A method of presenting a plurality of function indicators in a selective call receiver capable of receiving a message, the method comprising the steps of:

in a message read mode:

displaying a first set of said plurality of function indicators associated with said message read mode and said message; and

in a selective call receiver status mode:

displaying a second set of said plurality of function indicators associated with said selective call receiver status mode.

2. A method for displaying a plurality of function indicators on a display of a selective call receiver capable of receiving and presenting a message, said method comprising the steps of:

in a message read mode:

determining at least one active indicator from a first set of said plurality of function indicators by examining characteristics associated with said message;

displaying said at least one active indicator; and

in selective call receiver status mode:

displaying a second set of said plurality o function indicators associated with the characteristics of said selective call receiver.

3. The method according to claim 2 wherein said determining step comprises the step of comparing information associated with each of said messages to uniquely associate specific operations and their corresponding function indicators within said first set of said plurality of function indicators with each of said messages.

4. The method according to claim 3 wherein said selective call receiver includes an information storage medium and said method executes at least one of the steps of:

reading at least one received message by presenting the received message on the display;

printing at least one received message;

deleting at least one received message from the information storage medium;

adding at least one received message to a different message slot within the information storage medium; and

locking at least one received message to prevent deletion from the information storage medium.

5. An apparatus for presenting a plurality of function indicators in a selective call receiver capable of receiving a message, comprising:

in a message read mode:

first means for displaying a first set of said plurality of function indicators associated with said message read mode and said message; and

in a selective call receiver status mode:

second means for displaying a second set of said plurality of function indicators associated with said selective call receiver status mode.

6. An apparatus for displaying a plurality of function indicators on a display of a selective call receive capable of receiving and presenting a message, said apparatus comprising:

in a message read mode of operation:

first means for determining at least one active indicator from a first set of said plurality of function indicators by examining characteristics associated with said message;

second means for displaying said at least one active indicator; and

in a selective call receiver status mode of operation:

third means for displaying a second set of said plurality of function indicators associated with the characteristics of said selective call receiver.

7. The apparatus according to claim 6 wherein said first means comprises comparing information associated with each of said messages to uniquely associate specific operations and their corresponding function indicators within said first set of said plurality of function indicators with each of said messages.

8. An apparatus for displaying a function menu including a plurality of function indicators on a display of a selective call receiver of the type which receives messages and presents messages, said method comprising:

means for displaying only those of said function indicators which may be selected; and

means for performing an operation associated with one of said plurality of function indicators when said function indicator is selected.

9. The apparatus according to claim 8 wherein said selective call receiver includes an information storage medium and wherein said means for performing comprises means for reading, writing, deleting, and moving information within said information storage medium.

* * * * *

US005359317A

United States Patent [19]

Gomez et al.

[11] Patent Number: 5,359,317

[45] Date of Patent: Oct. 25, 1994

[54] **METHOD AND APPARATUS FOR SELECTIVELY STORING A PORTION OF A RECEIVED MESSAGE IN A SELECTIVE CALL RECEIVER**

[75] Inventors: **Fernando A. Gomez**, West Palm Beach; **Mark T. Stair**, Delray Beach, both of Fla.

[73] Assignee: **Motorola, Inc.**, Schaumburg, Ill.

[21] Appl. No.: **958,847**

[22] Filed: **Oct. 9, 1992**

[51] **Int. Cl.**[5] **H04Q 7/00**

[52] **U.S. Cl.** **340/825.44**; 340/825.22

[58] **Field of Search** 340/825.44, 825.22, 340/825.44, 825.22

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5,258,739	11/1993	DeLuca et al.	340/825.44

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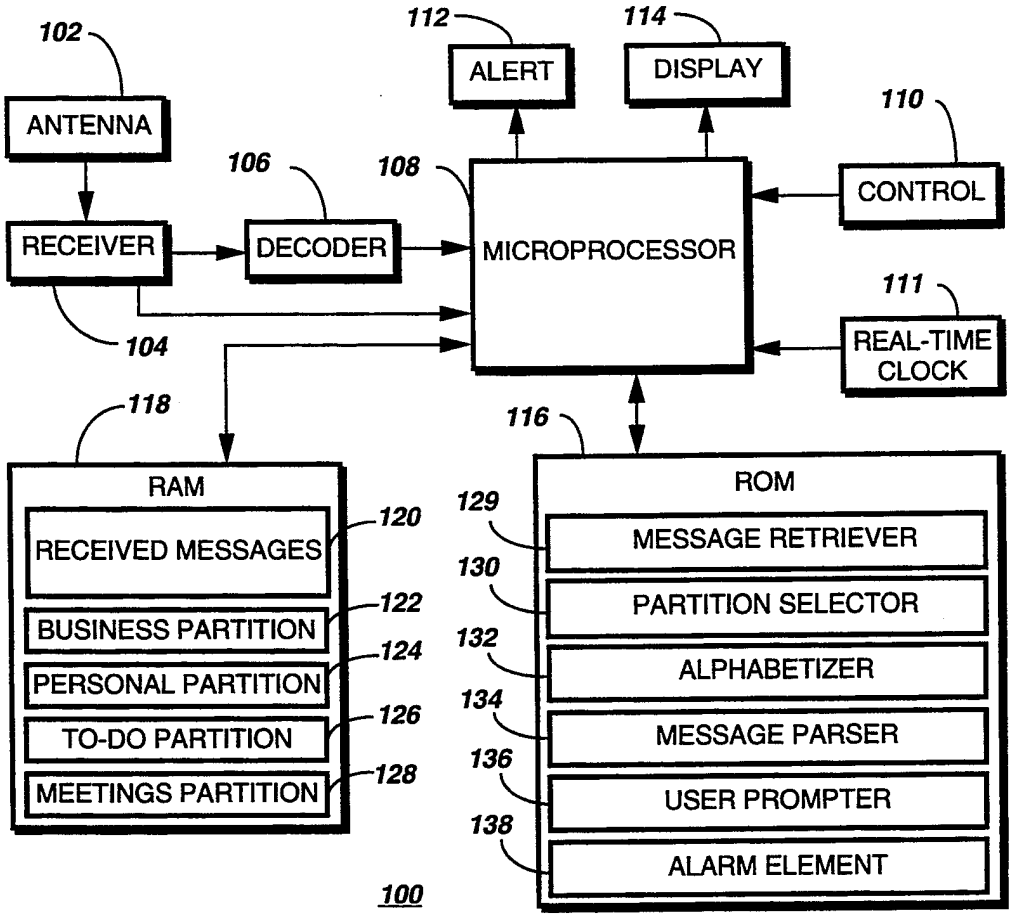
Assistant Examiner—Gregg V. Miller
Attorney, Agent, or Firm—R. Louis Breeden; Thomas G. Berry

[57] **ABSTRACT**

A method and apparatus allows a user to selectively store (**604**) a portion of a received message in a selective call receiver (**100**). The selective call receiver (**100**) includes first and second memory elements (**118**) for storing the received message and the portion thereof, respectively. The second memory element has a plurality of partitions (**122, 124, 126, 128**) corresponding to a plurality of file types. The user defines (FIG. **5**) the portion of the received message stored in the first memory element, which portion is to be stored in the second memory element, and then selects (**602**) one of the plurality of partitions (**122, 124, 126, 128**) for storing the defined portion of the received message. The defined portion of the received message is then stored (**604**) in the selected one of the plurality of partitions (**122, 124, 126, 128**).

22 Claims, 4 Drawing Sheets



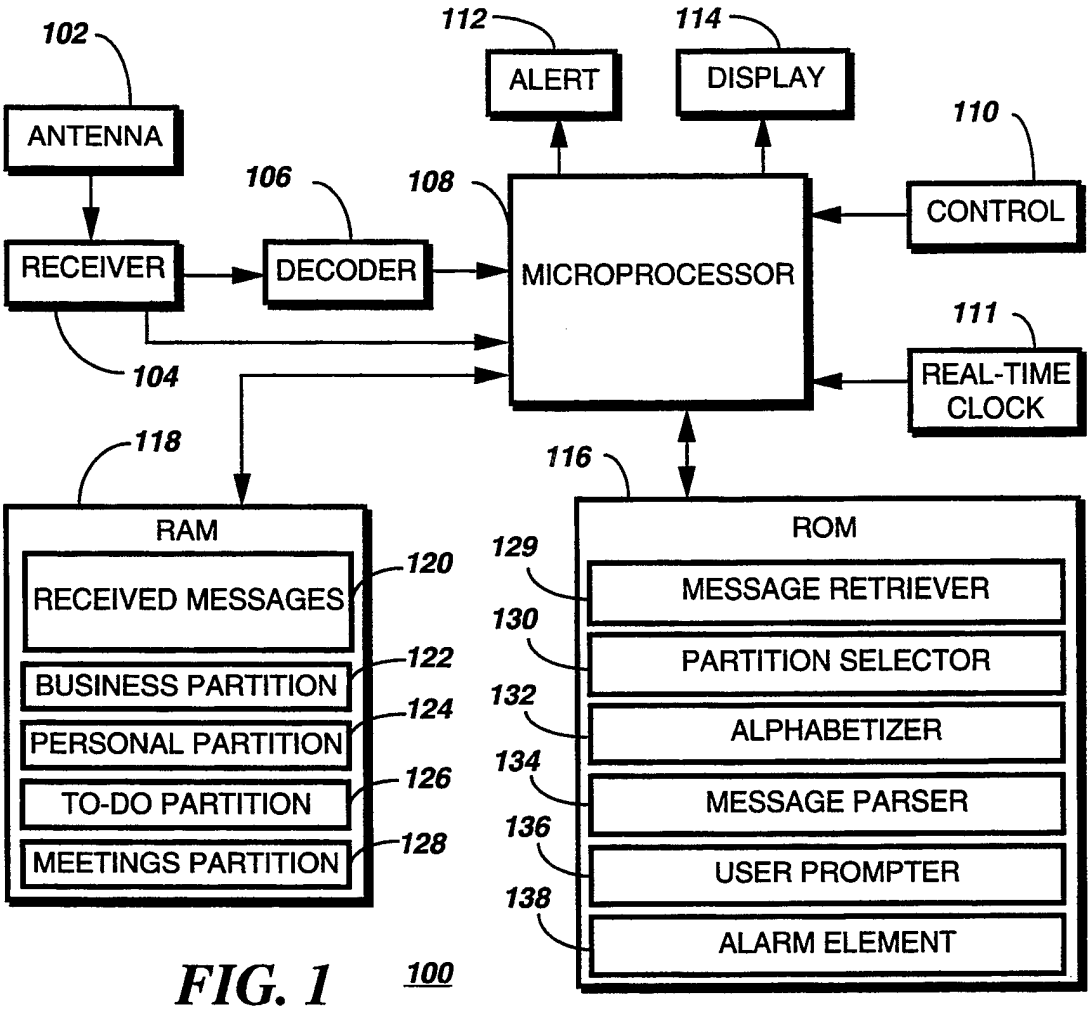

102
ANTENNA
112
ALERT
114
DISPLAY
110
CONTROL
106
DECODER
108
MICROPROCESSOR
RECEIVER
104
111
REAL-TIME CLOCK
118
RAM
RECEIVED MESSAGES
120
BUSINESS PARTITION
122
PERSONAL PARTITION
124
TO-DO PARTITION
126
MEETINGS PARTITION
128
116
ROM
129
MESSAGE RETRIEVER
130
PARTITION SELECTOR
132
ALPHABETIZER
134
MESSAGE PARSER
136
USER PROMPTER
138
ALARM ELEMENT
100

FIG. 1

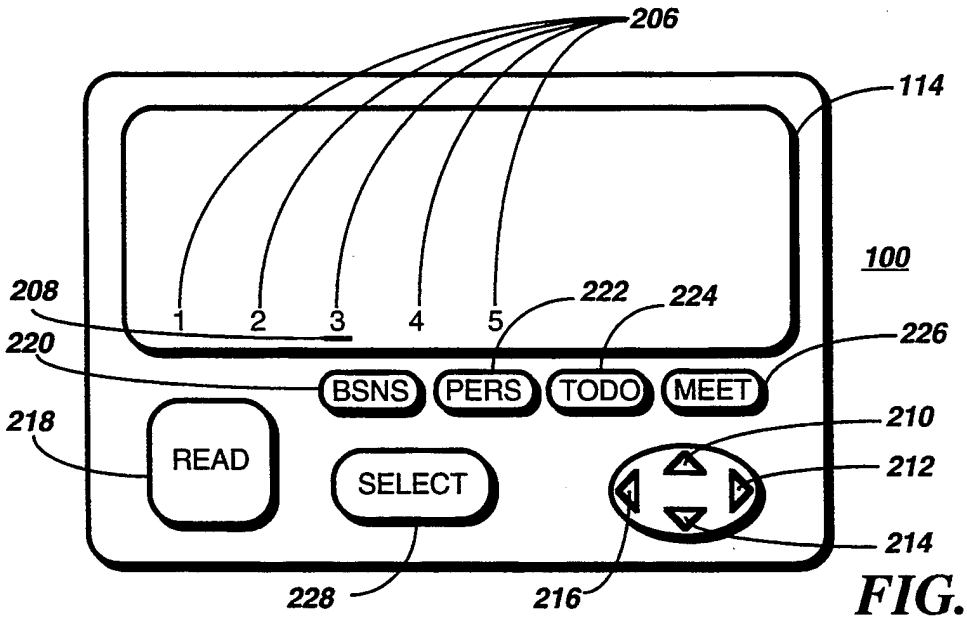

206
114
100
208
1
2
3
4
5
222
224
220
226
BSNS
PERS
TODO
MEET
218
READ
SELECT
210
212
214
228
216

FIG. 2

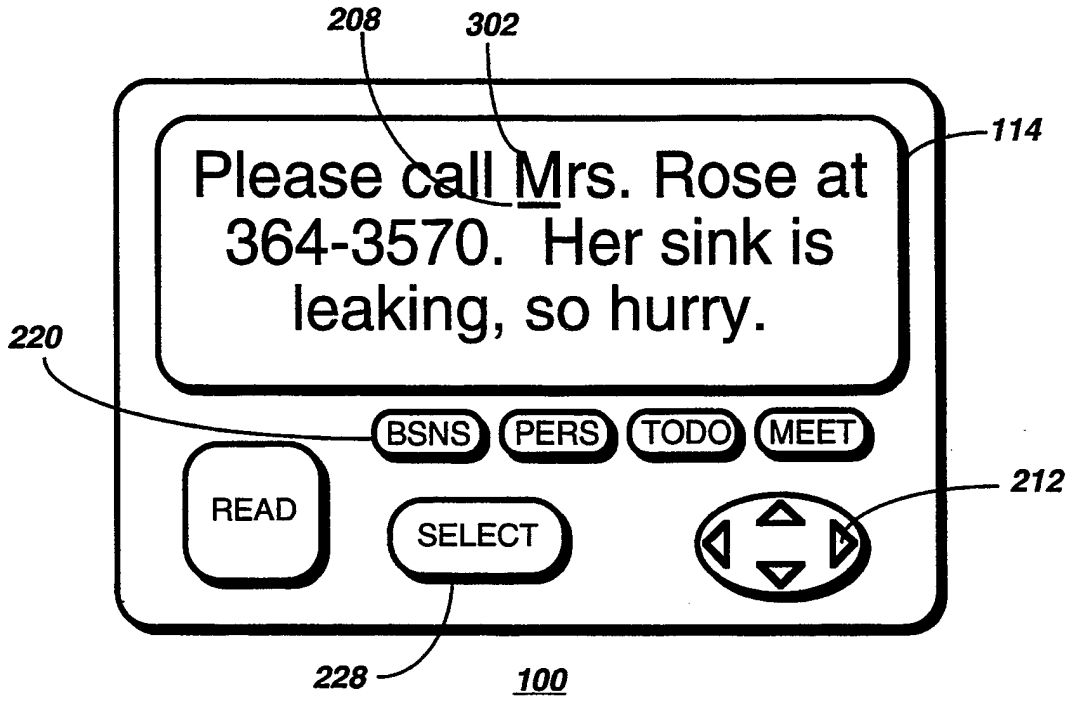

208
302
114
Please call Mrs. Rose at 364-3570. Her sink is leaking, so hurry.
220
BSNS
PERS
TODO
MEET
READ
SELECT
212
228
100

FIG. 3

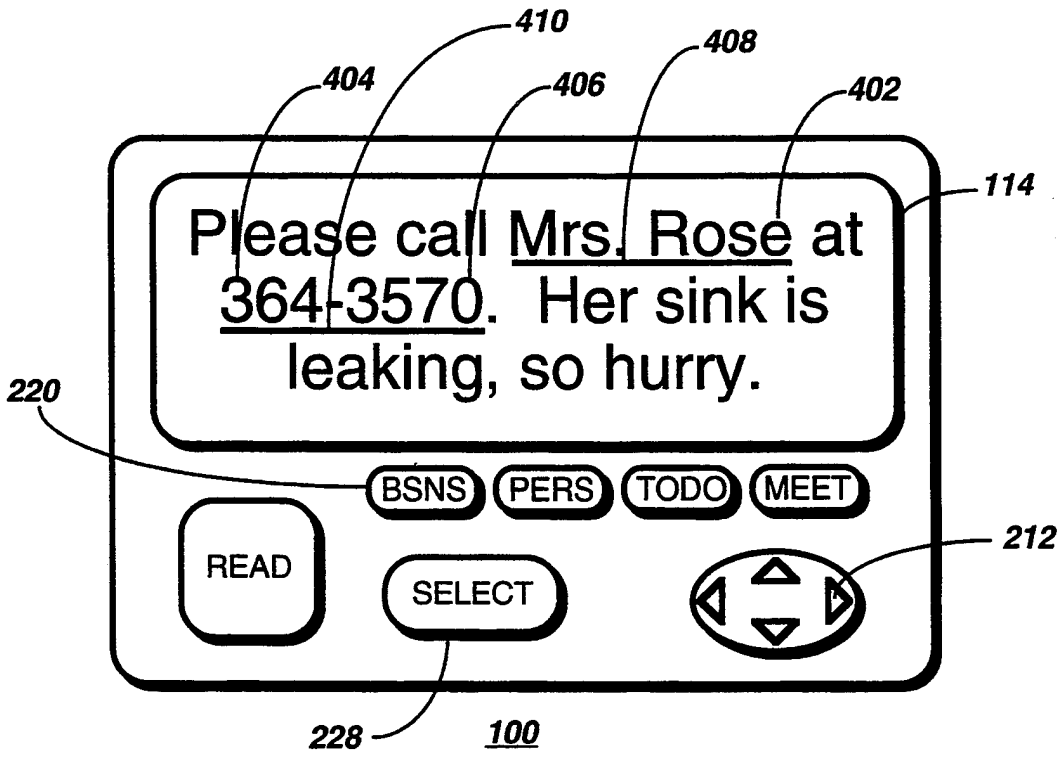

410
404
406
408
402
114
Please call Mrs. Rose at 364-3570. Her sink is leaking, so hurry.
220
BSNS
PERS
TODO
MEET
READ
SELECT
212
228
100

FIG. 4

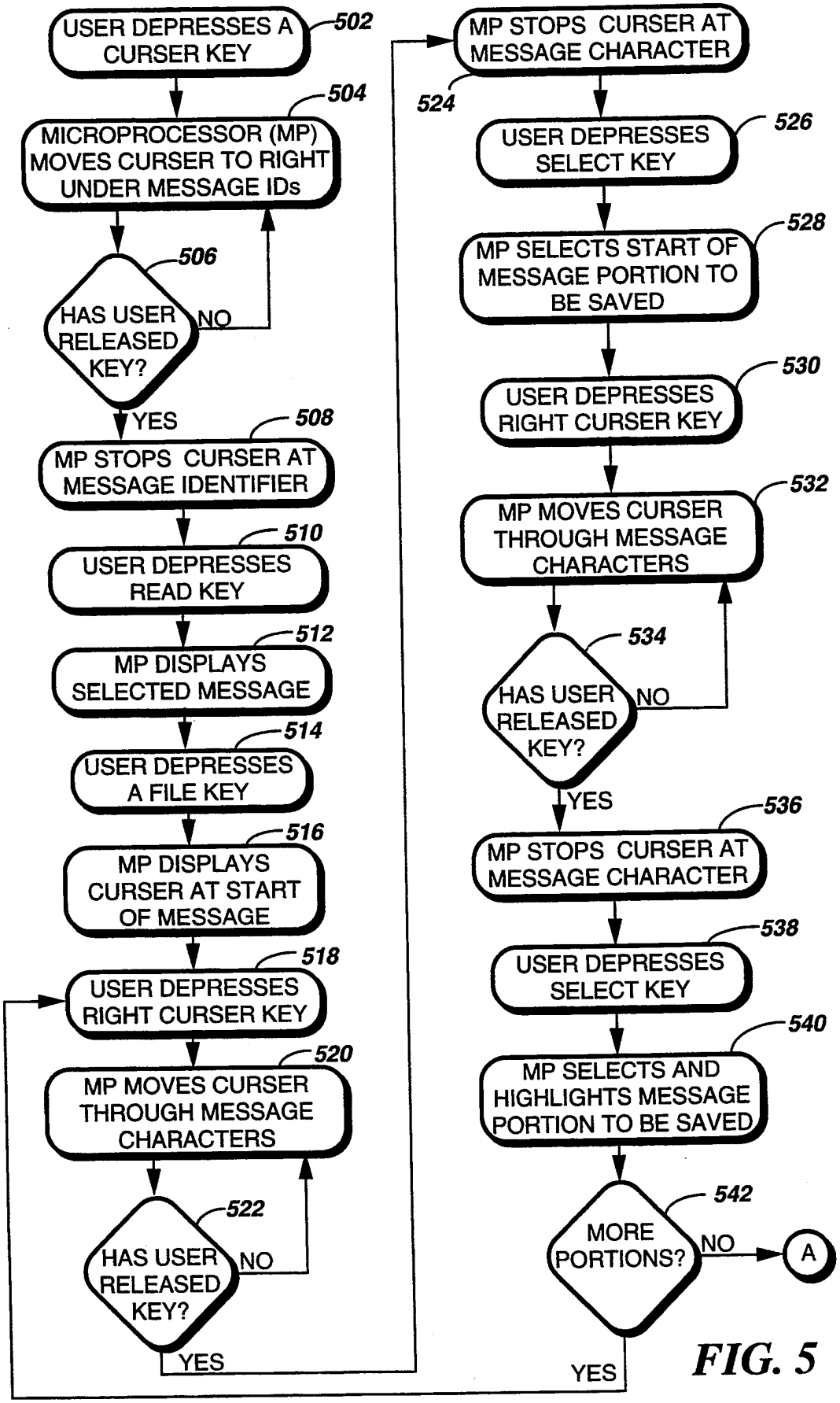

USER DEPRESSES A CURSER KEY
502
MICROPROCESSOR (MP) MOVES CURSER TO RIGHT UNDER MESSAGE IDs
504
HAS USER RELEASED KEY?
506
NO
YES
MP STOPS CURSER AT MESSAGE IDENTIFIER
508
USER DEPRESSES READ KEY
510
MP DISPLAYS SELECTED MESSAGE
512
USER DEPRESSES A FILE KEY
514
MP DISPLAYS CURSER AT START OF MESSAGE
516
USER DEPRESSES RIGHT CURSER KEY
518
MP MOVES CURSER THROUGH MESSAGE CHARACTERS
520
HAS USER RELEASED KEY?
522
NO
YES
MP STOPS CURSER AT MESSAGE CHARACTER
524
USER DEPRESSES SELECT KEY
526
MP SELECTS START OF MESSAGE PORTION TO BE SAVED
528
USER DEPRESSES RIGHT CURSER KEY
530
MP MOVES CURSER THROUGH MESSAGE CHARACTERS
532
HAS USER RELEASED KEY?
534
NO
YES
MP STOPS CURSER AT MESSAGE CHARACTER
536
USER DEPRESSES SELECT KEY
538
MP SELECTS AND HIGHLIGHTS MESSAGE PORTION TO BE SAVED
540
MORE PORTIONS?
542
NO
A
YES

FIG. 5

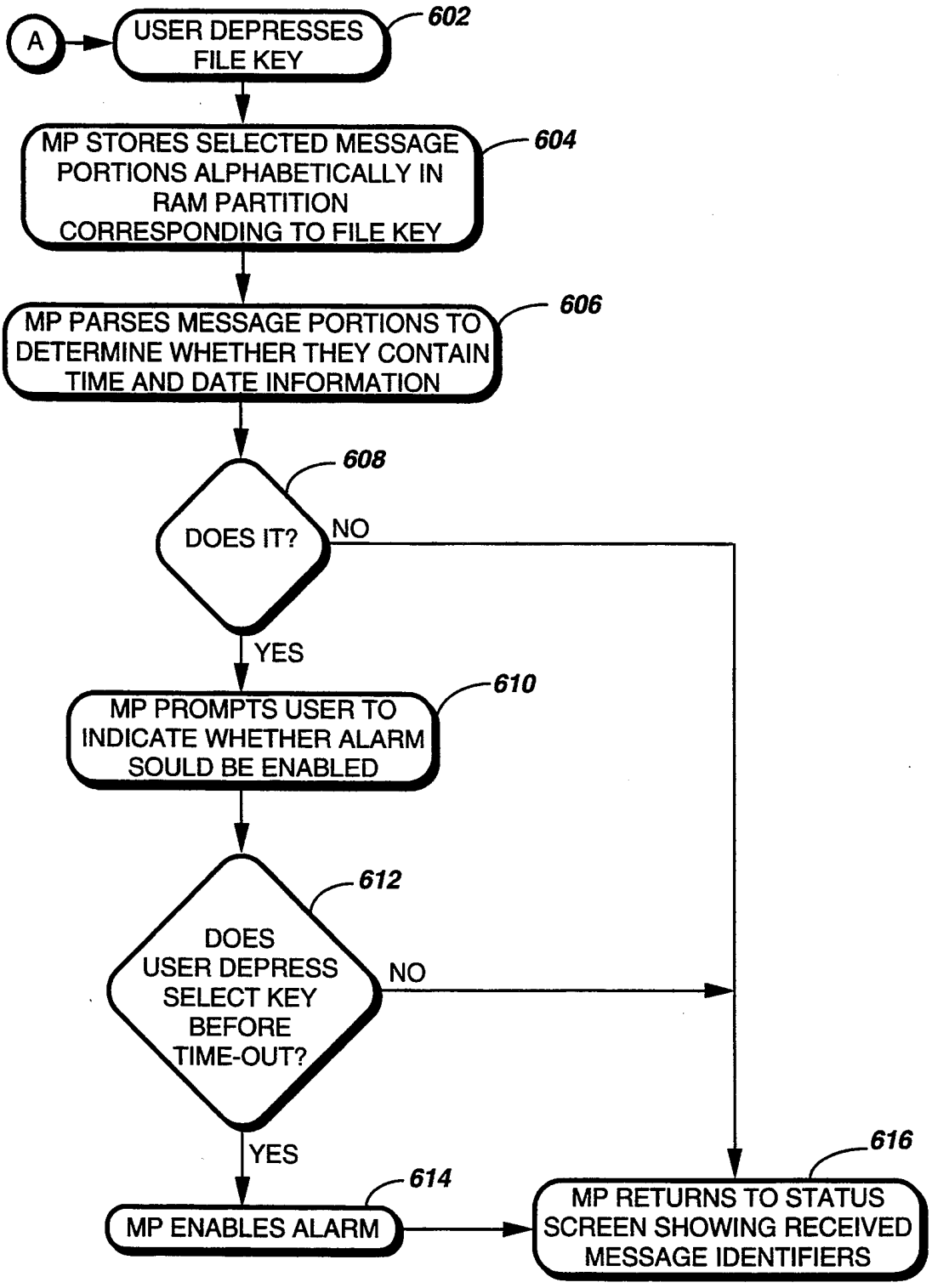

A
USER DEPRESSES FILE KEY
602
MP STORES SELECTED MESSAGE PORTIONS ALPHABETICALLY IN RAM PARTITION CORRESPONDING TO FILE KEY
604
MP PARSES MESSAGE PORTIONS TO DETERMINE WHETHER THEY CONTAIN TIME AND DATE INFORMATION
606
608
DOES IT?
NO
YES
MP PROMPTS USER TO INDICATE WHETHER ALARM SOULD BE ENABLED
610
612
DOES USER DEPRESS SELECT KEY BEFORE TIME-OUT?
NO
YES
614
MP ENABLES ALARM
616
MP RETURNS TO STATUS SCREEN SHOWING RECEIVED MESSAGE IDENTIFIERS

FIG. 6

METHOD AND APPARATUS FOR SELECTIVELY STORING A PORTION OF A RECEIVED MESSAGE IN A SELECTIVE CALL RECEIVER

FIELD OF THE INVENTION

This invention relates in general to selective call receivers, and more specifically to a method and apparatus for selectively storing a portion of a received message in a selective call receiver.

BACKGROUND OF THE INVENTION

Selective call receivers having an alphanumeric display for displaying received messages and a memory for storing the received messages are well-known in the art. Such receivers typically have had a limited amount of memory for storing message characters, e.g., memory for 2,000 characters. Consequently, received messages could not be retained indefinitely, because the messages would accumulate over time and overflow the limited amount of memory. Even as new selective call receivers are designed and constructed with larger amounts of memory, there is still a limit to the amount of information that can be stored.

Conventional selective call receivers have offered a user a limited choice regarding the retention of received messages in memory. Typically the user has been able either to retain a received message in its entirety or to delete a received message in its entirety. Also typically, there has not been a way to organize retained messages.

Still, some portions of a received message, e.g., a sender's name and telephone number, might be far more important for the user to retain than some other parts of a received message. Currently, a user must consume memory sufficient to store a whole message, even though the user is interested in only a small part of the information contained therein. The ultimate result is memory waste.

Thus, what is needed is a way of retaining the interesting parts of a received message without having to retain the uninteresting parts. What is also needed is a way of organizing the retained message parts to facilitate recalling them at a future time.

SUMMARY OF THE INVENTION

One aspect of the present invention is a method for selectively storing by a user a portion of a received message in a selective call receiver. The selective call receiver comprises first and second memory elements for storing the received message and the portion thereof, respectively. The second memory element has a plurality of partitions corresponding to a plurality of file types. The method comprises the steps of defining by the user the portion of the received message stored in the first memory element to be stored in the second memory element, and selecting by the user one of the plurality of partitions for storing the defined portion of the received message. The method further comprises the step of storing in the selected one of the plurality of partitions the defined portion of the received message.

Another aspect of the present invention is a selective call receiver including an apparatus for selectively storing by a user a portion of a received message in the selective call receiver. The selective call receiver comprises a receiver element for receiving a signal comprising an address and a message, and a decoder coupled to the receiver element for decoding the address defining an intended recipient of the message. The selective call receiver further comprises a processor coupled to the receiver element for processing the received message, and a display coupled to the processor for displaying the received message. The selective call receiver also includes a first memory element coupled to the processor for storing the received message, and a second memory element coupled to the processor for storing the portion of the received message. The second memory element comprises a plurality of partitions corresponding to a plurality of file types for categorizing portions of received messages stored therein. The selective call receiver further comprises a user control coupled to the processor for accepting user commands for controlling the processing of the received message. The user control is utilized by the user to define the portion of the received message that is to be stored, and further to select one of the plurality of partitions for storing the portion of the received message .

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an electrical block diagram of a selective call receiver in accordance with the preferred embodiment of the present invention.

FIG. **2** is an orthographic front view of the selective call receiver depicting a status screen having a cursor and message identifiers for five received messages in accordance with the preferred embodiment of the present invention.

FIG. **3** is an orthographic front view of a selective call receiver depicting a displayed message and the curser for selecting a portion of the displayed message in accordance with the preferred embodiment of the present invention. FIG. **4** is an orthographic front view of a selective call receiver depicting selected portions of the displayed message in accordance with the preferred embodiment of the present invention. FIG. **5** is a flow chart of the operation of a selective call receiver in accordance with the preferred embodiment of the present invention. FIG. **6** is a continuation of the flow chart of the operation of a selective call receiver in accordance with the preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. **1**, an electrical block diagram of a selective call receiver **100** in accordance with the preferred embodiment of the present invention comprises an antenna **102** for intercepting RF signals comprising information. The antenna **102** is coupled to a receiver **104** for receiving the intercepted RF signals. A decoder **106** is coupled to the receiver **104** for decoding a selective call address contained within the information received. A microprocessor **108** is coupled to the receiver **104** for processing the information received to recover messages. The microprocessor **108** is also coupled to the decoder **106** for responding to a selective call address decoded therein. An alert device **112** is coupled to the microprocessor **108** for providing an audible or tactile alert to the user when the microprocessor **108** has a message ready for presentation. A display **114** is coupled to the microprocessor **108** for displaying recovered messages. A control section **110** comprises user accessible interfaces for allowing the user to command the microprocessor **108** to perform selective call receiver operations, and includes control switches such as an on/off control button, a cursor

control key, and other control keys that are described herein below in accordance with the preferred embodiment of the present invention. A real-time clock **111** is also coupled to the microprocessor **108** for providing an alarm function.

The microprocessor **108** is coupled to and controls a random access memory (RAM) **118** supplied with battery-backed-up power to provide non-volatility of memory contents. The RAM **118** comprises a received message area **120** for storing messages as they are received. The RAM **118** further comprises a business partition **122** for storing portions of business messages, and a personal partition **124** for storing portions of personal messages. In addition, the RAM **118** comprises a to-do partition **126** for storing portions of messages requiring future action, and a meetings partition **128** for storing portions of messages related to meetings. As will be apparent to one of ordinary skill in the art, the number of the partitions **122, 124, 126, 128** may be changed to a greater or lesser number, and the partitions **122, 124, 126, 128** may be either of fixed size or dynamically controlled size, i.e., size adjusted according to data storage requirements for each file type.

The microprocessor **108** also is coupled to a read-only memory (ROM) **116** for accessing stored software algorithms for performing various tasks in accordance with the preferred embodiment of the present invention. The software algorithms include a message retriever **129** for retrieving received messages stored in the RAM **118**, a partition selector **130** for selecting a partition **122, 124, 126, 128** corresponding to a selected file type, and an alphabetizer **132** for storing message portions in alphabetical order within each partition **122, 124, 126, 128**. In addition, there is a message examiner **134** for examining a message portion to determine whether the message portion contains date and time information. Also included are a user prompter **136** for prompting the user to respond about setting an alarm, and an alarm element **138** for setting and generating an alarm.

With reference to FIG. **2**, an orthographic front view of the selective call receiver **100** depicts a status screen having a cursor **208** and message identifiers **206** for five received messages in accordance with the preferred embodiment of the present invention. The selective call receiver **100** includes curser control keys comprising an up key **210**, a right key **212**, a down key **214**, and a left key **216**. The curser control keys **210, 212, 214, 216** are used to move the curser **208** to character positions in received messages and to message identifiers **206** for use in selecting the corresponding character position or message identifier **206**.

Also included are a read key **218** for displaying a received message corresponding to a selected message identifier **206**, and a select key **228** for selecting portions of a displayed received message. In addition there are business, personal, to-do, and meetings file keys **220, 222, 224, 226**, respectively. The business file key **220** is used for storing selected message portions in the business partition **122** of the RAM **118** (FIG. **1**), and the personal file key **222** is used for storing selected message portions in the personal partition **124** (FIG. **1**). Similarly, the to-do key **224** is used for storing selected message portions in the to-do partition **126** (FIG. **1**), and the meetings key **226** is used for storing selected message portions in the meetings partition **128** (FIG. **1**).

With reference to FIG. **3**, an orthographic front view of the selective call receiver **100** depicts a displayed message and the curser **208** for selecting a portion of the displayed message in accordance with the preferred embodiment of the present invention. In FIG. **3** a user has depressed one of the file keys **220, 222, 224, 226** to begin a process of selecting at least one message portion for storage. Next, the user has depressed the right key **212** to move the curser **208** under the "M" character **302**. If desired, the user may now select the "M" character **302** as the starting point of message portion selection by depressing the select key **228**.

With reference to FIG. **4**, an orthographic front view of the selective call receiver **100** depicts selected portions of the displayed message in accordance with the preferred embodiment of the present invention. First and second message portions that have been selected are indicated by underlines **408, 410**. The selection of the first message portion was accomplished by using the right key **212** to move the curser **208** from the selected starting point at the "M" character **302** (FIG. **3**) to an ending point **402**, followed by depressing the select key **228**. Then the right key **212** was used to move the curser **208** to the starting point **404** of the second message portion, after which the select key **228** was again depressed. Next the right key **212** was used to move the curser **208** to the ending point **406** of the second message portion, after which the select key **228** was again depressed to select the second message portion. At this point of operation, depressing a file key, e.g., the business file key **220**, will cause the selected message portions to be stored in the business partition **122** of the RAM **118** (FIG. **1**). If desired, e.g., for longer messages, it is of course possible to select more than two message portions for storage.

With reference to FIG. **5**, a flow chart of the operation of the selective call receiver **100** in accordance with the preferred embodiment of the present invention begins with the display **114** of the selective call receiver **100** (FIGS. **1** and **2**) showing received message status by means of the message identifiers **206**, as depicted in FIG. **2**. The user depresses **502** a curser key, e.g., the right key **212** (FIG. **2**), to cause the microprocessor **108** (FIG. **1**) to move **504** the curser **208** (FIG. **2**) to the right under a message identifier **206**. This process repeats until in step **506** the user releases the curser key, at which time the microprocessor **108** stops **508** the curser **208** under a message identifier **206**. To display a message corresponding to the message identifier **206** above the curser **208**, the user depresses **510** the read key **218** (FIG. **2**). In response, the microprocessor **108** accesses the ROM-based message retriever **129** (FIG. **1**) and displays **512** the corresponding message.

To begin a process of message portion selection the user next depresses **514** a file key, e.g., the business file key **220** (FIG. **2**), which causes the microprocessor **108** (FIG. **1**) to display **516** the curser **208** (FIG. **2**) at the start of the message. The user then depresses **518** a curser key, e.g., the right key **212** (FIG. **2**) to cause the microprocessor **108** to move **520** the curser through the message characters until in step **522** the user releases the curser key, at which time the microprocessor **108** stops moving **524** the curser **208**. If the message selected in step **510** is longer than can be displayed on a single screen "page," then in moving the curser **208** the microprocessor **108** will scroll to a new page of the message each time the curser **208** reaches the end of a currently displayed page.

To select a beginning point for a first message portion the user depresses **526** the select key **228** (FIG. **2**). This

causes the microprocessor **108** (FIG. **1**) to select **528** the message character over the curser **208** (FIG. **2**) as the start of a message portion to be saved. Next, the user depresses **530** the right key **212** (FIG. **2**) to cause the microprocessor **108** to move **532** the curser **208** through message characters to the right. This process continues until in step **534** the user releases the right key **212**, at which time the microprocessor **108** stops **536** moving the curser **208**. If desired, the user may also adjust the curser position in single steps by using short depressions of the right or left keys **212**, **216**. The user then depresses **538** the select key **228** (FIG. **2**), which causes the microprocessor **108** to select and underline **540** the message portion to be saved from the beginning point through the current curser position. If in step **542** the user desires to select additional portions of the message, then the user depresses the right key **212**, and the process repeats from step **518**. If in step **542** the user does not desire to select additional message portions, then the process moves to step **602** (FIG. **6**).

With reference to FIG. **6**, in step **602** the user depresses a file key, e.g., the business file key **220** (FIG. **2**). This causes the microprocessor **108** (FIG. **1**) to access the ROM-based partition selector **130** (FIG. **1**) and alphabetizer **132** (FIG. **1**) to store **604** the selected message portions alphabetically in the partition in the RAM **118** (FIG. **1**) corresponding to the file key, e.g., the business partition **122** (FIG. **1**). Next, the microprocessor **108** accesses its message examiner **134** (FIG. **1**) to examine **606** the message portions to determine whether they contain time and date information, i.e., information matching certain pre-programmed patterns, e.g., "NN/NN/NN at NN:NN PM," where N represents a numeric digit. If not, in step **608** the microprocessor **108** returns **616** the display **114** to the status screen showing the received message identifiers **206** (FIG. **2**). If, on the other hand, the microprocessor **108** determines in step **608** that there is time and date information in the message portions, then the microprocessor accesses **610** its user prompter **136** to ask the user whether alarm setting is desired.

If in step **612** the user responds by depressing the select key **228** (FIG. **2**) before a pre-programmed time-out, e.g., five seconds, then the microprocessor **108** (FIG. **1**) accesses its alarm element **138** (FIG. **1**) to enable **614** an alarm that will occur when the real-time clock **111** (FIG. **1**) reaches the time and date contained in the message portions. Then the microprocessor **108** returns **616** the display **114** to the status screen showing the received message identifiers **206** (FIG. **2**). If, on the other hand, the user does not respond in time in step **612**, then the microprocessor **108** simply returns **616** the display **114** to the status screen showing the received message identifiers **206** (FIG. **2**).

Thus, the present invention provides a way of retaining the interesting parts of a message received by a selective call receiver without having to retain the uninteresting parts. This allows a user to store portions of a message, for example, a name and telephone number, while discarding the remainder of the message to conserve memory in the selective call receiver. The present invention also provides a way of organizing the retained message parts alphabetically and by category to facilitate recalling the retained message parts at a future time. Over time, the present invention allows the user to build and access a library of useful information selected and stored by the user from messages received by the selective call receiver.

What is claimed is:

1. A method for selectively storing by a user portion of a received message in a selective call receiver comprising first and second memory means for storing the received message and the portion thereof, respectively, the second memory means having a plurality of partitions corresponding to a plurality of file types, the method comprising the steps of:

(a) defining by the user the portion of the received message stored in the first memory means to be stored in the second memory means;

(b) selecting by the user one of the plurality of partitions for storing the defined portion of the received message; and

(c) storing in the selected one of the plurality of partitions the defined portion of the received message.

2. The method according to claim **1**,

wherein the selective call receiver further comprises display means for displaying the received message along with a message identifier and a movable indicator, and

wherein step (a) comprises the steps of:

(d) moving the movable indicator to a displayed starting point of the portion of the received message;

(e) selecting the displayed starting point to which the movable indicator was moved in step (d);

(f) moving the movable indicator to a displayed ending point of the portion of the received message; and

(g) selecting the displayed ending point to which the movable indicator was moved in step (f).

3. The method according to claim **1**, wherein step (b) comprises the steps of:

(d) selecting one of the plurality of file types; and

(e) selecting the corresponding one of the plurality of partitions for storing the portion of the received message.

4. The method according to claim **1**, wherein step (c) comprises the step of:

(d) storing the portion of the received message in alphabetical order relative to previously stored portions of received messages.

5. The method according to claim **1**, wherein step (a) comprises the step of:

(d) choosing from a plurality of received messages in the first memory means a received message to store selectively.

6. The method according to claim **5**,

wherein the selective call receiver further comprises display means for displaying the received message along with a message identifier and a movable indicator, and

wherein step (d) comprises the steps of:

(e) moving the movable indicator to the message identifier corresponding to the received message to be selectively stored;

(f) selecting the message identifier to which the movable indicator was moved in step (e); and

(g) displaying the received message corresponding to the message identifier selected in step (f).

7. The method according to claim **1**,

wherein the selective call receiver further comprises control means for controlling the selection and storing of the at least one portion of the received message, and

wherein the method further comprises the steps of:

(d) examining by the control means characters of the portion of the received message defined in step (a)

to determine whether the portion of the received message contains characters matching a pre-programmed pattern corresponding to a common representation of time and date; and

(e) generating a user prompt for alarm setting in response the portion of the received message having been determined in step (d) to contain characters matching the pre-programmed pattern corresponding to the common representation of time and date.

8. The method according to claim **7**, further comprising the step of:

(f) setting by the control means an alarm having an activation time and date corresponding to the characters matching the pre-programmed pattern in response to a user having responded affirmatively to the user prompt.

9. A selective call receiver including an apparatus for selectively storing by a user a portion of a received message in the selective call receiver comprises:

receiver means for receiving a signal comprising an address and a message;

decoder means coupled to the receiver means for decoding the address defining an intended recipient of the message;

processor means coupled to the receiver means for processing the received message;

display means coupled to the processor means for displaying the received message;

first memory means coupled to the processor means for storing the received message;

second memory means coupled to the processor means for storing the portion of the received message, the second memory means comprising a plurality of partitions corresponding to a plurality of file types for categorizing portions of received messages stored therein; and

user control means coupled to the processor means for accepting user commands for controlling the processing of the received message, wherein the user control means is utilized by the user to define the portion of the received message that is to be stored, and further to select one of the plurality of partitions for storing the portion of the received message.

10. The selective call receiver according to claim **9**,

wherein the display means comprises a movable indicator, and

wherein the user control means comprises a movable indicator control means for moving the movable indicator to a displayed starting point and to a displayed ending point of the portion of the received message, and

wherein the user control means further comprises a portion selector for selecting the portion of the received message from the displayed starting point to the displayed ending point.

11. The selective call receiver according to claim **9**, wherein the processor means further comprises an alphabetizing means for storing the portion of the received message in alphabetical order relative to previously stored portions of messages.

12. The selective call receiver according to claim **9**, further comprising real-time clock means, and

wherein the processor means comprises examining means for examining characters of the portion of a received message to determine whether the portion of the received message contains characters matching a pre-programmed pattern corresponding to a common representation of time and date; and

wherein the processor means further comprises user prompting means for generating a user prompt for alarm setting in response to the portion of the received message having been determined to contain characters matching the pre-programmed pattern corresponding to the common representation of time and date, and

wherein the processor means further comprises alarm setting means coupled to the real-time clock means for setting an alarm having an activation time and date corresponding to the characters matching the pre-programmed pattern in response to a user having responded affirmatively to the user prompt.

13. The selective call receiver according to claim **9**,

wherein the user control means comprises selector means coupled to the processor means for selecting the portion of the received message to be stored in one of the plurality of partitions.

14. The selective call receiver according to claim **13**,

wherein the user control means further comprises a file selector for selecting a file type, and

wherein the processor means comprises a partition selector means for selecting the one of the plurality of partitions for storing the portion of the received message such that the selected one of the plurality of partitions corresponds to the file type selected.

15. The selective call receiver according to claim **9**, further comprising a message identifier means, wherein the user control means further comprises a message identifier selection means for choosing from a plurality of received messages in the first memory means a received message to be stored selectively.

16. The selective call receiver according to claim. **15**,

wherein the display means comprises a movable indicator, and

wherein the user control means comprises a movable indicator control means for moving the movable indicator to the message identifier means corresponding to the received message to be selectively stored, and

wherein the user control means further comprises an identifier selector for selecting the message identifier to which the movable indicator has been moved, and

wherein the processor means comprises message retrieval means for displaying the received message corresponding to the selected message identifier.

17. A selective call receiver including an apparatus for selectively storing by a user a portion of a received message in the selective call receiver comprises:

a receiver for receiving a signal comprising an address and a message;

a decoder coupled to the receiver for decoding the address defining an intended recipient of the message;

a processor coupled to the receiver for processing the received message;

a display coupled to the processor for displaying the received message;

a first memory element coupled to the processor for storing the received message;

a second memory element coupled to the processor for storing the portion of the received message, the second memory element comprising a plurality of partitions corresponding to a plurality of file types

for categorizing portions of received messages stored therein; and

a user control coupled to the processor for accepting user commands for controlling the processing of the received message, wherein the user control is utilized by the user to define the portion of the received message that is to be stored, and further to select one of the plurality of partitions for storing the portion of the received message.

18. The selective call receiver according to claim **17**,

wherein the display comprises a movable indicator, and

wherein the user control comprises a movable indicator control for moving the movable indicator to a displayed starting point and to a displayed ending point of the portion of the received message, and

wherein the user control further comprises a portion selector for selecting the portion of the received message from the displayed starting point to the displayed ending point.

19. The selective call receiver according to claim **17**, further comprising a message identifier,

wherein the user control comprises a message identifier selector for choosing from a plurality of received messages in the first memory a received message to be stored selectively, and

wherein the display comprises a movable indicator, and

wherein the user control further comprises a movable indicator control for moving the movable indicator to the message identifier corresponding to the received message to be selectively stored, and

wherein the user control further comprises an identifier selector for selecting the message identifier to which the movable indicator has been moved, and

wherein the processor comprises a message retriever for displaying the received message corresponding to the selected message identifier.

20. The selective call receiver according to claim **17**, further comprising a real-time clock, and

wherein the processor comprises an examining element for examining characters of the portion of the received message to determine whether the portion of the received message contains characters matching a pre-programmed pattern corresponding to a common representation of time and date; and

wherein the processor further comprises a prompting element for generating a user prompt for alarm setting in response to the portion of the received message having been determined to contain characters matching the pre-programmed pattern corresponding to the common representation of time and date, and

wherein the processor further comprises an alarm setting element coupled to the real-time clock for setting an alarm having an activation time and date corresponding to the characters matching the pre,-programmed pattern in response to a user having responded affirmatively to the user prompt.

21. The selective call receiver according to claim **17**,

wherein the user control comprises a selector coupled to the processor for selecting the portion of the received message to be stored in one of the plurality of partitions.

22. The selective call receiver according to claim **21**,

wherein the user control further comprises a file selector for selecting a file type, and

wherein the processor comprises a partition selector for selecting the one of the plurality of partitions for storing the portion of the received message such that the selected one of the plurality of partitions corresponds to the file type selected.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 5,359,317

DATED : October 25, 1994

INVENTOR(S) : Gomez et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 6, line 2, after the word "user" insert --a--.

Column 7, line 6, after the word "response" insert --to--.

Signed and Sealed this

Fifteenth Day of August, 1995

Attest:

Bruce Lehman

BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks

[redacted]

US005394140A

United States Patent [19]

Wong et al.

[11] Patent Number: 5,394,140

[45] Date of Patent: Feb. 28, 1995

[54] **METHOD AND APPARATUS FOR PRE-PROGRAMMED CALL-BACK-NUMBER-DETERMINED ALERT**

[75] Inventors: **Poh-T'in Wong**, Boynton Beach; **Allen J. Weidler**, Lake Worth; **William J. Burke**, Boca Raton, all of Fla.

[73] Assignee: **Motorola, Inc.**, Schaumburg, Ill.

[21] Appl. No.: **980,047**

[22] Filed: **Nov. 23, 1992**

[51] **Int. Cl.**[6] **G08B 5/22**

[52] **U.S. Cl.** **340/825.44**; 340/825.22

[58] **Field of Search** 340/825.44, 825.45, 340/825.46, 825.48, 311.1, 825.22; 364/705.05, 715.11; 455/38.1, 38.2, 38.5

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Primary Examiner—Michael Horabik
Attorney, Agent, or Firm—R. Louis Breeden

[57] **ABSTRACT**

A method and apparatus in a communication receiver (**110**) for controlling an alert in response to a received call-back number (**233**) include receiving (**402**) the call-back number (**233**). A processor (**208**) in the communication receiver (**110**) compares (**406**) the received call-back number (**233**) with a list of pre-programmed call-back numbers (**226, 228, 230**) stored in a memory (**210**). If the received call-back number (**233**) matches (**408**) one of the pre-programmed call-back numbers (**226, 228, 230**), the processor (**208**) selects (**410**) a pre-programmed alert (**236, 238, 240**) corresponding to the matched pre-programmed call-back number (**233**), and instructs (**414**) an alert generator (**212**) to generate the selected pre-programmed alert (**236, 238, 240**).

20 Claims, 6 Drawing Sheets

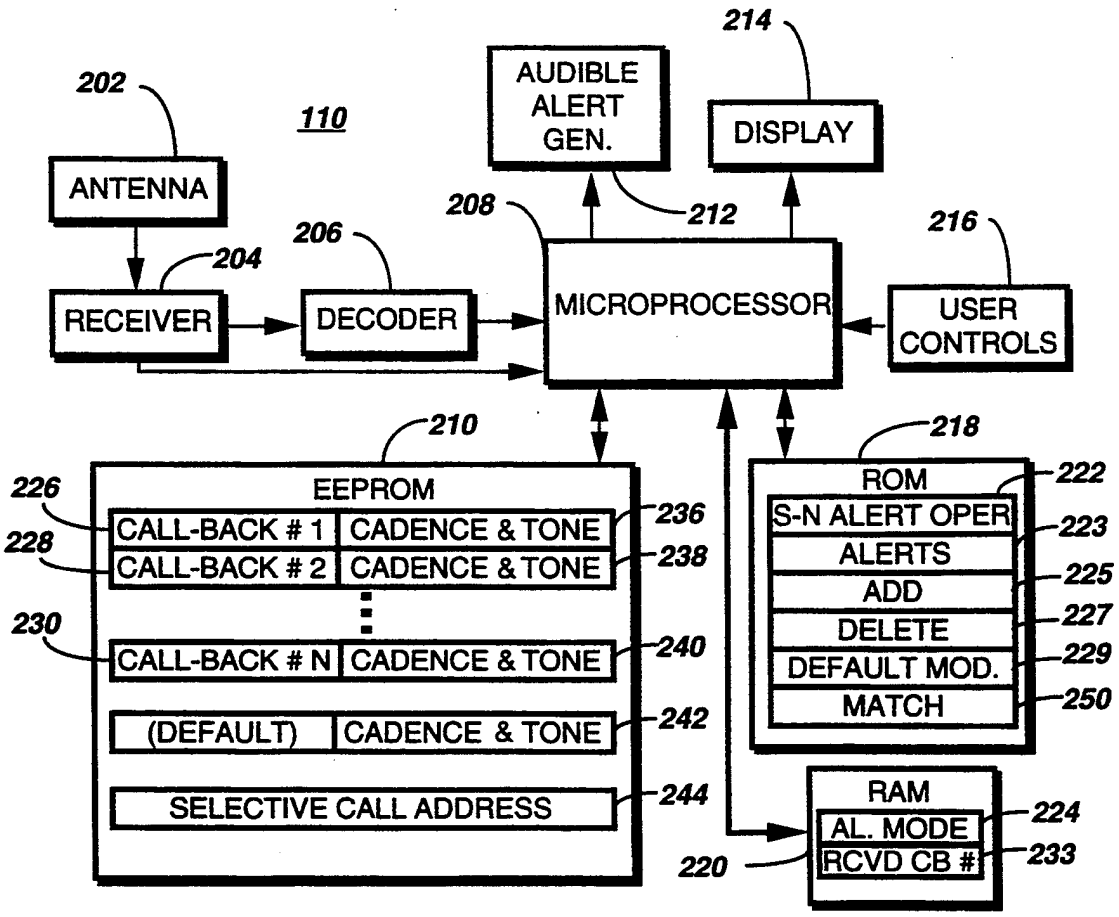
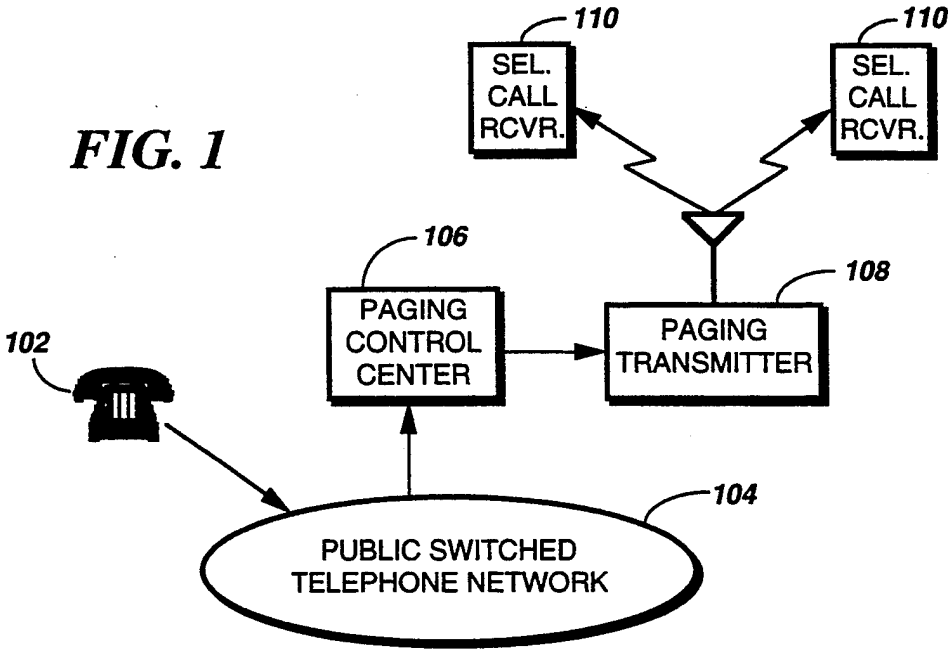


FIG. 1


110
SEL. CALL RCVR.
110
SEL. CALL RCVR.
106
PAGING CONTROL CENTER
108
PAGING TRANSMITTER
102
104
PUBLIC SWITCHED TELEPHONE NETWORK

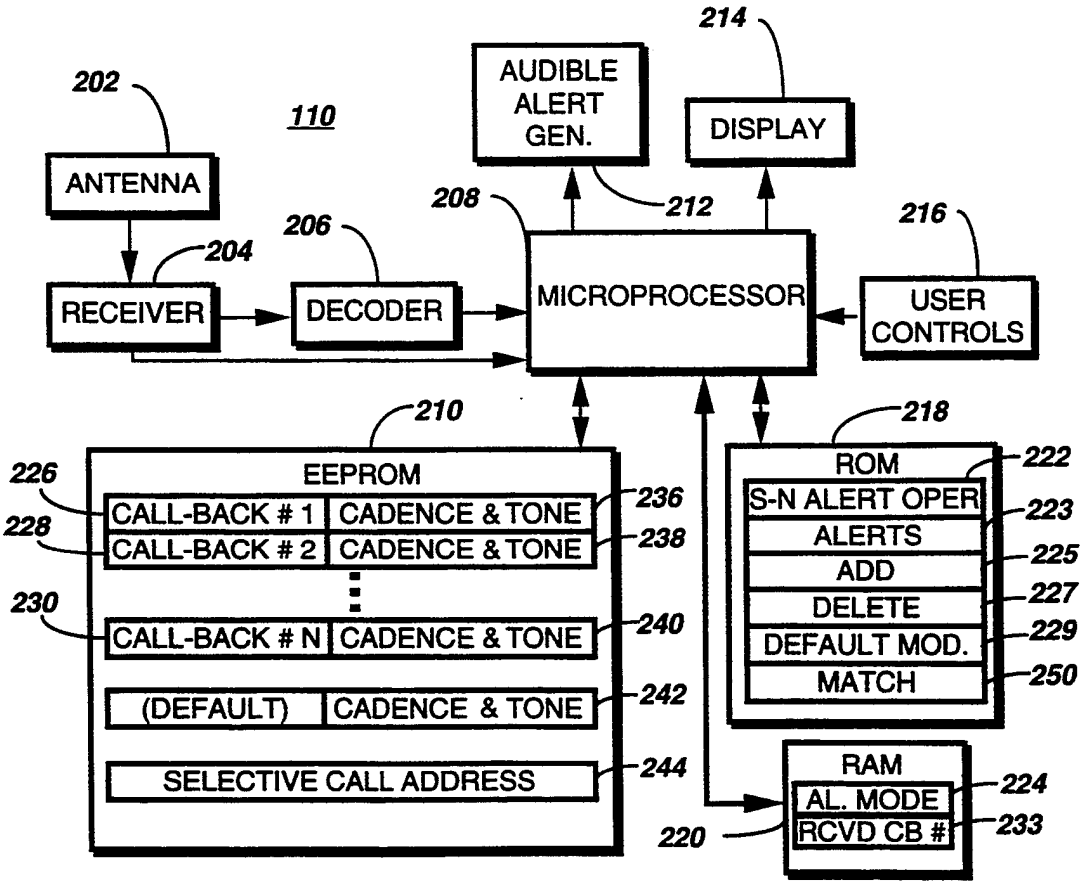

214
AUDIBLE ALERT GEN.
DISPLAY
202
110
ANTENNA
208
212
216
206
204
RECEIVER
DECODER
MICROPROCESSOR
USER CONTROLS
210
218
EEPROM
ROM
222
226
CALL-BACK # 1
CADENCE & TONE
236
S-N ALERT OPER
223
228
CALL-BACK # 2
CADENCE & TONE
238
ALERTS
225
ADD
227
230
CALL-BACK # N
CADENCE & TONE
240
DELETE
229
DEFAULT MOD.
(DEFAULT)
CADENCE & TONE
242
MATCH
250
SELECTIVE CALL ADDRESS
244
RAM
AL. MODE
224
220
RCVD CB #
233

FIG. 2

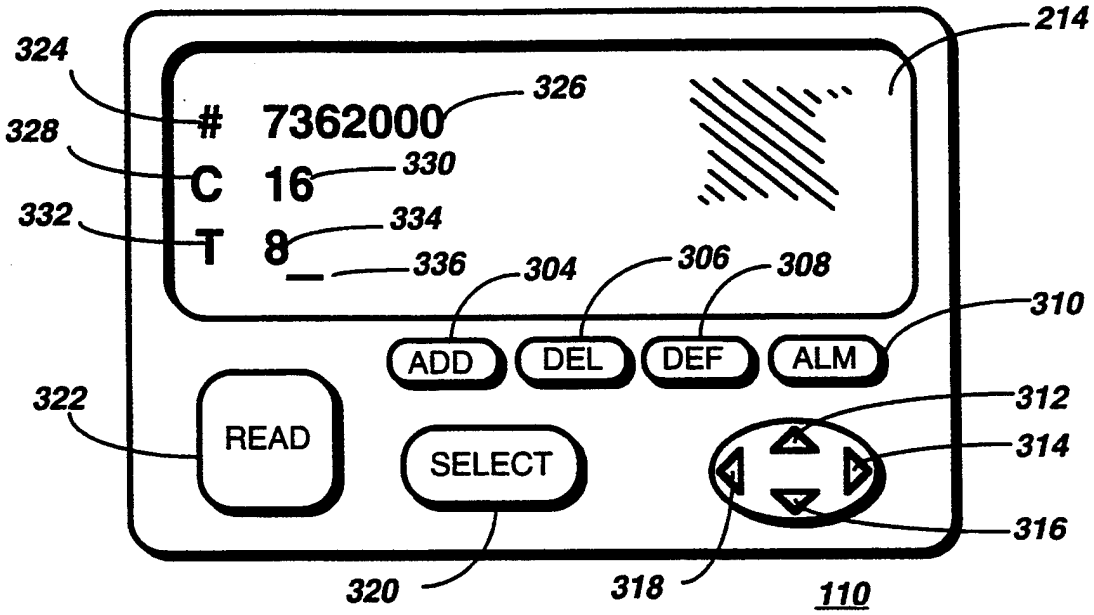

214
324
326
7362000
328
C 16
330
332
T 8
334
336
304
306
308
310
ADD
DEL
DEF
ALM
322
READ
SELECT
312
314
316
320
318
110

FIG. 3

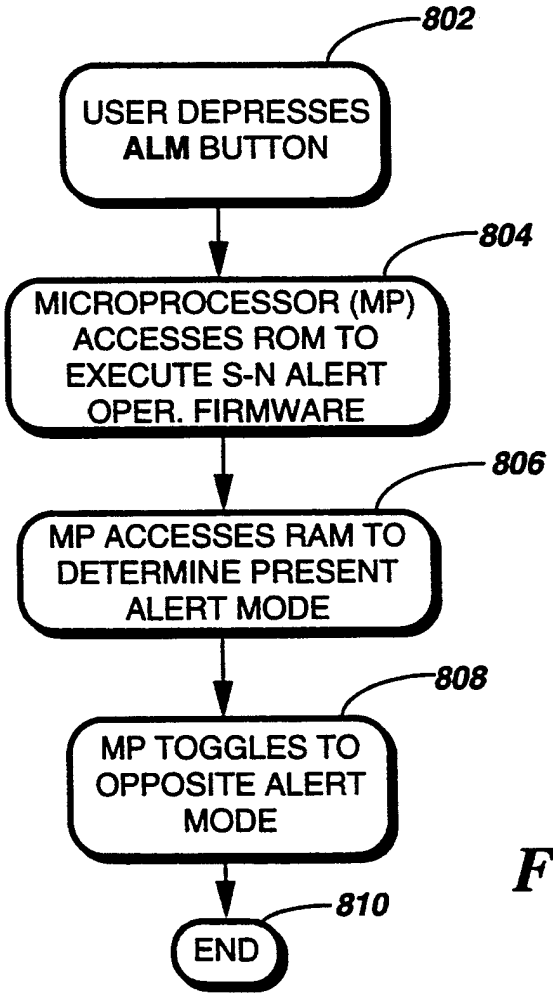

802
USER DEPRESSES ALM BUTTON
804
MICROPROCESSOR (MP) ACCESSES ROM TO EXECUTE S-N ALERT OPER. FIRMWARE
806
MP ACCESSES RAM TO DETERMINE PRESENT ALERT MODE
808
MP TOGGLES TO OPPOSITE ALERT MODE
810
END

FIG. 8

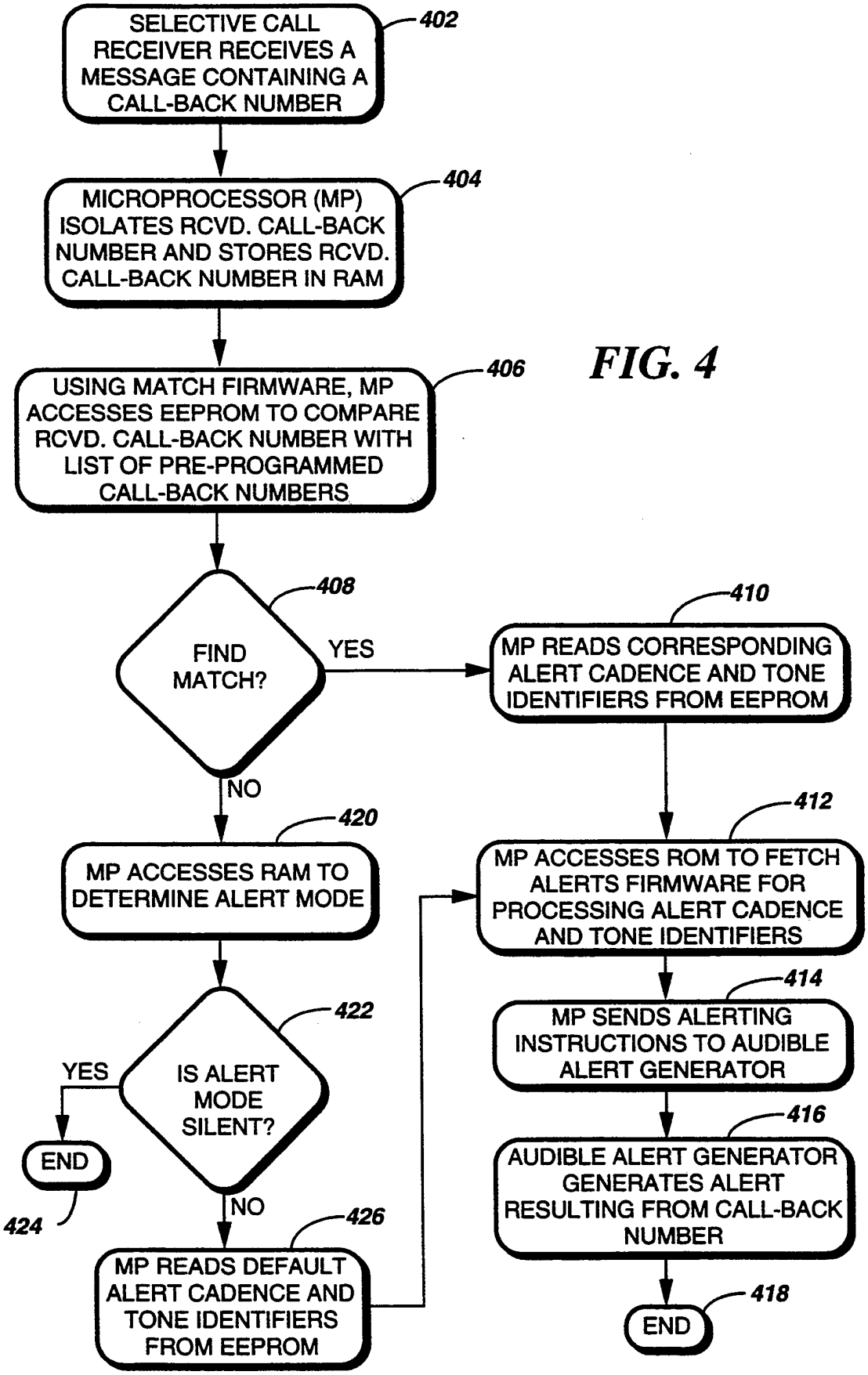

SELECTIVE CALL RECEIVER RECEIVES A MESSAGE CONTAINING A CALL-BACK NUMBER
402
MICROPROCESSOR (MP) ISOLATES RCVD. CALL-BACK NUMBER AND STORES RCVD. CALL-BACK NUMBER IN RAM
404
USING MATCH FIRMWARE, MP ACCESSES EEPROM TO COMPARE RCVD. CALL-BACK NUMBER WITH LIST OF PRE-PROGRAMMED CALL-BACK NUMBERS
406
FIND MATCH?
408
YES
NO
MP READS CORRESPONDING ALERT CADENCE AND TONE IDENTIFIERS FROM EEPROM
410
MP ACCESSES RAM TO DETERMINE ALERT MODE
420
MP ACCESSES ROM TO FETCH ALERTS FIRMWARE FOR PROCESSING ALERT CADENCE AND TONE IDENTIFIERS
412
IS ALERT MODE SILENT?
422
YES
NO
END
424
MP SENDS ALERTING INSTRUCTIONS TO AUDIBLE ALERT GENERATOR
414
AUDIBLE ALERT GENERATOR GENERATES ALERT RESULTING FROM CALL-BACK NUMBER
416
END
418
MP READS DEFAULT ALERT CADENCE AND TONE IDENTIFIERS FROM EEPROM
426

FIG. 4

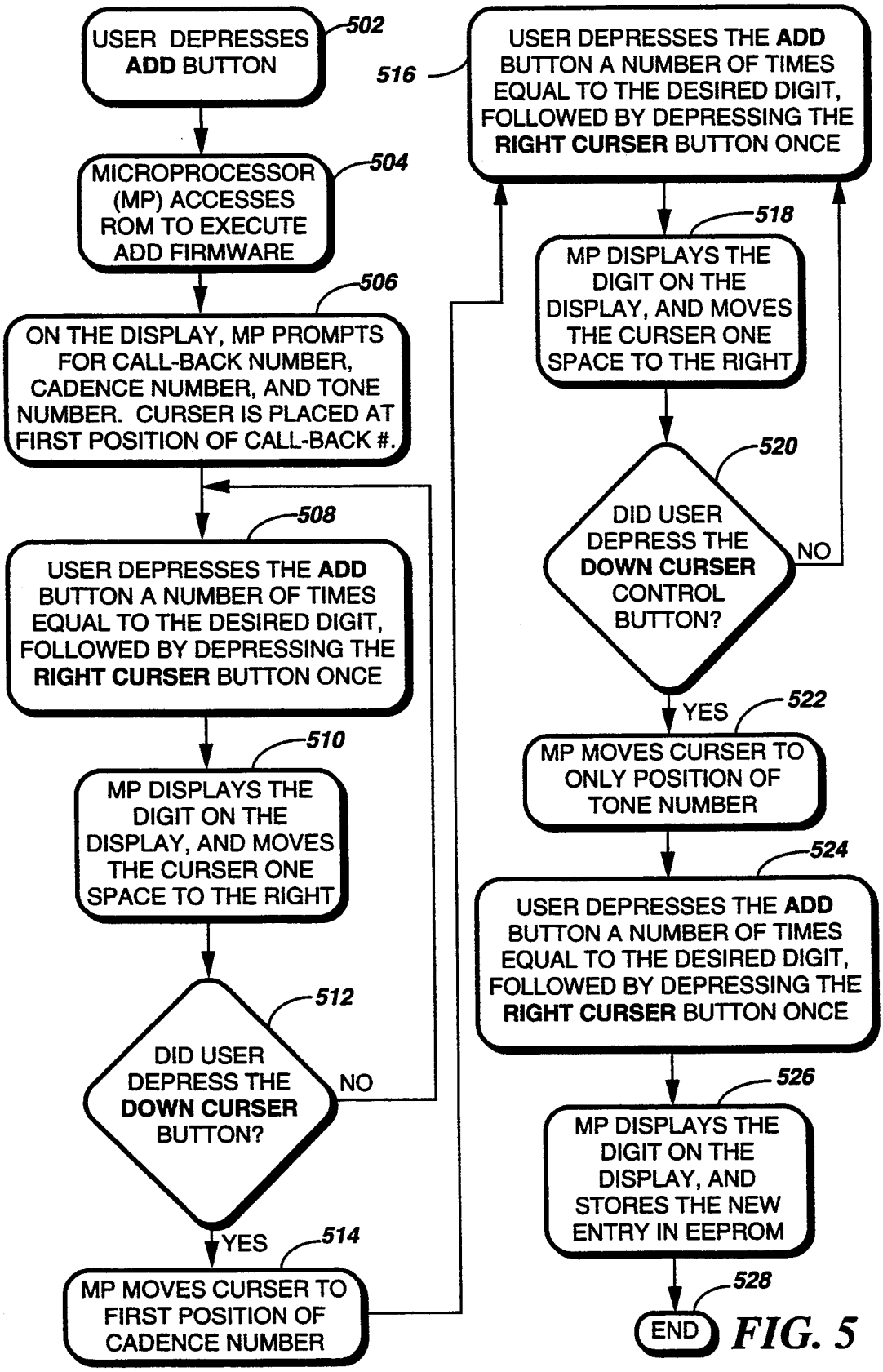

USER DEPRESSES ADD BUTTON
502
MICROPROCESSOR (MP) ACCESSES ROM TO EXECUTE ADD FIRMWARE
504
ON THE DISPLAY, MP PROMPTS FOR CALL-BACK NUMBER, CADENCE NUMBER, AND TONE NUMBER. CURSER IS PLACED AT FIRST POSITION OF CALL-BACK #.
506
USER DEPRESSES THE ADD BUTTON A NUMBER OF TIMES EQUAL TO THE DESIRED DIGIT, FOLLOWED BY DEPRESSING THE RIGHT CURSER BUTTON ONCE
508
MP DISPLAYS THE DIGIT ON THE DISPLAY, AND MOVES THE CURSER ONE SPACE TO THE RIGHT
510
DID USER DEPRESS THE DOWN CURSER BUTTON?
512
NO
YES
MP MOVES CURSER TO FIRST POSITION OF CADENCE NUMBER
514
USER DEPRESSES THE ADD BUTTON A NUMBER OF TIMES EQUAL TO THE DESIRED DIGIT, FOLLOWED BY DEPRESSING THE RIGHT CURSER BUTTON ONCE
516
MP DISPLAYS THE DIGIT ON THE DISPLAY, AND MOVES THE CURSER ONE SPACE TO THE RIGHT
518
DID USER DEPRESS THE DOWN CURSER CONTROL BUTTON?
520
NO
YES
MP MOVES CURSER TO ONLY POSITION OF TONE NUMBER
522
USER DEPRESSES THE ADD BUTTON A NUMBER OF TIMES EQUAL TO THE DESIRED DIGIT, FOLLOWED BY DEPRESSING THE RIGHT CURSER BUTTON ONCE
524
MP DISPLAYS THE DIGIT ON THE DISPLAY, AND STORES THE NEW ENTRY IN EEPROM
526
END
528

FIG. 5

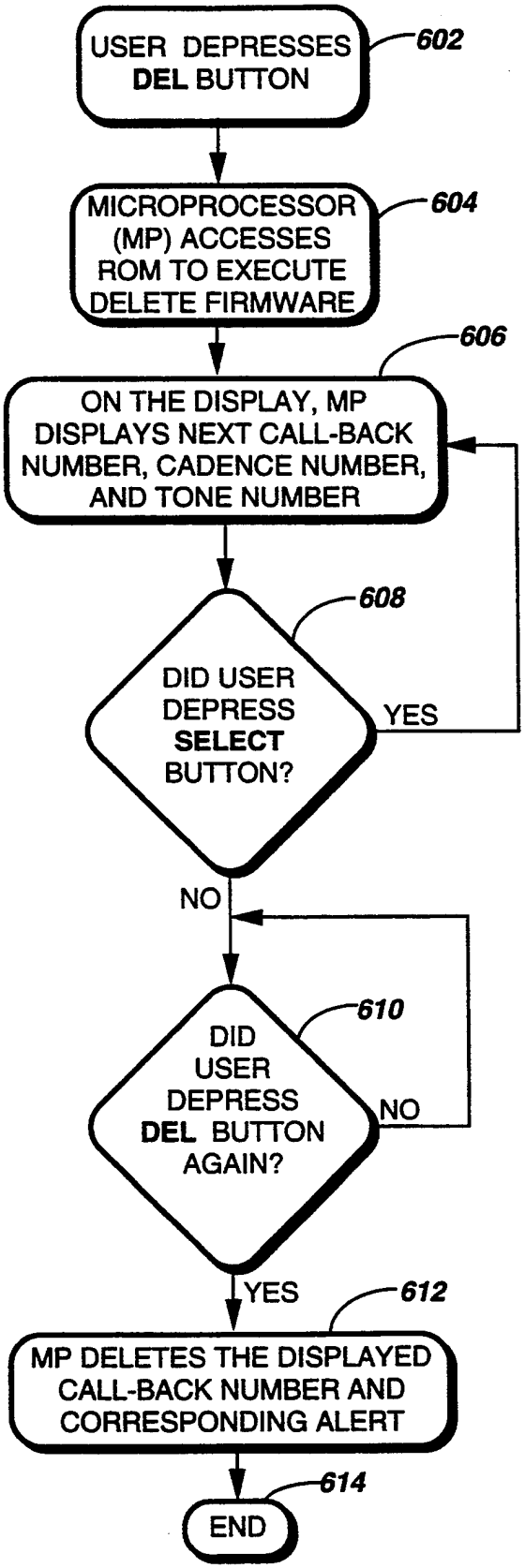

USER DEPRESSES DEL BUTTON
602
MICROPROCESSOR (MP) ACCESSES ROM TO EXECUTE DELETE FIRMWARE
604
ON THE DISPLAY, MP DISPLAYS NEXT CALL-BACK NUMBER, CADENCE NUMBER, AND TONE NUMBER
606
DID USER DEPRESS SELECT BUTTON?
608
YES
NO
DID USER DEPRESS DEL BUTTON AGAIN?
610
NO
YES
MP DELETES THE DISPLAYED CALL-BACK NUMBER AND CORRESPONDING ALERT
612
END
614

FIG. 6

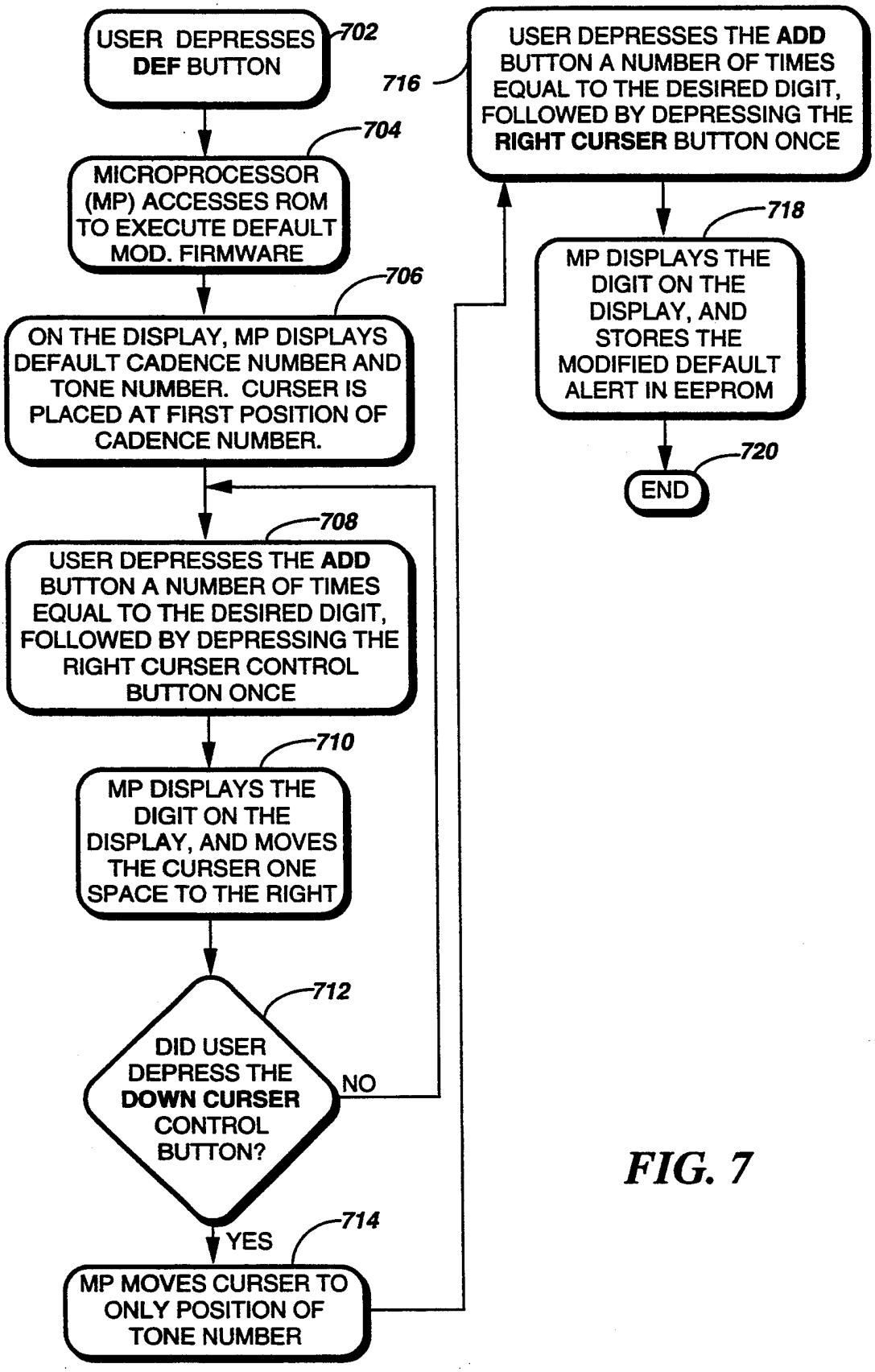

USER DEPRESSES DEF BUTTON
702
MICROPROCESSOR (MP) ACCESSES ROM TO EXECUTE DEFAULT MOD. FIRMWARE
704
ON THE DISPLAY, MP DISPLAYS DEFAULT CADENCE NUMBER AND TONE NUMBER. CURSER IS PLACED AT FIRST POSITION OF CADENCE NUMBER.
706
USER DEPRESSES THE ADD BUTTON A NUMBER OF TIMES EQUAL TO THE DESIRED DIGIT, FOLLOWED BY DEPRESSING THE RIGHT CURSER CONTROL BUTTON ONCE
708
MP DISPLAYS THE DIGIT ON THE DISPLAY, AND MOVES THE CURSER ONE SPACE TO THE RIGHT
710
DID USER DEPRESS THE DOWN CURSER CONTROL BUTTON?
712
NO
YES
MP MOVES CURSER TO ONLY POSITION OF TONE NUMBER
714
USER DEPRESSES THE ADD BUTTON A NUMBER OF TIMES EQUAL TO THE DESIRED DIGIT, FOLLOWED BY DEPRESSING THE RIGHT CURSER BUTTON ONCE
716
MP DISPLAYS THE DIGIT ON THE DISPLAY, AND STORES THE MODIFIED DEFAULT ALERT IN EEPROM
718
END
720

FIG. 7

METHOD AND APPARATUS FOR PRE-PROGRAMMED CALL-BACK-NUMBER-DETERMINED ALERT

FIELD OF THE INVENTION

This invention relates in general to communication receivers, and more specifically to a method and apparatus in a communication receiver for generating a pre-programmed special alert in response to receiving a call-back number that matches a pre-programmed number.

BACKGROUND OF THE INVENTION

Radio pagers (also known as selective call receivers) having a plurality of alerts are well known. It was common before numeric display pagers became available for a radio pager to have a plurality of predetermined selective call addresses, each associated with a telephone access number that could be dialed by callers to send pages to the associated selective call address. Typically, an indication, e.g., a unique alert tone or alert cadence, was generated in response to receiving a page directed to the selective call address. By partitioning potential callers into several different groups, each given a different telephone access number to call, a user could attain some degree of knowledge of the source of the call. For example, a user could give a first telephone access number to business associates, a second number to friends, a third number to relatives, etc. By noting the unique alert accompanying a page, a user was able to discern which telephone access number was dialed to send the page, and thus which of the groups of callers probably originated the page. A significant drawback to this approach of call source identification is that assigning multiple telephone access numbers to a pager is expensive. Another drawback resulted from the limited number of unique addresses and corresponding telephone access numbers possible for each pager.

The arrival of the numeric display pager significantly reduced the need to partition callers into separate groups dialing separate telephone access numbers. By utilizing numeric display paging, callers could dial a single telephone access number to send a call-back number (entered by the caller using, for example, a tone dialing telephone set) that the page recipient could then call to contact the caller by telephone. In many instances the page recipient could discern the identity of a familiar caller by recognizing a familiar call-back number, e.g., the number of the page recipient's home or office, or that of an important client. This ability largely eliminated the need for the expensive multiple telephone access number approach of source identification.

Still, there are situations that can impair one's ability to discern the identity of even an important caller from a displayed call-back number. For example, the call-back number might be that of a relatively new business associate and not yet committed to the page recipient's memory, or perhaps the display might be poorly lighted, making it difficult to read.

Thus, what is needed is a way to aid a user in discerning that a call is from a predetermined subset of important callers without the user's having to memorize call-back numbers or having to read a poorly lighted displayed number. A way is needed that does not require

expensive multiple telephone access numbers for a single pager.

SUMMARY OF THE INVENTION

An aspect of the present invention is a communication receiver comprising a receiver element for receiving a message comprising at least a received call-back number, and a storage element for storing at least one user-programmed call-back number along with data defining at least one corresponding user-programmed special audible alert, and further for storing data defining a user-programmed default audible alert. The communication receiver further comprises a processor coupled to the receiver element for processing the message to derive the received call-back number and coupled to the storage element for comparing the received call-back number with the at least one user-programmed call-back number. The communication receiver also includes an audible alert generation element coupled to the processor for generating, in response to the received call-back number being found equal to a call-back number included in the at least one user-programmed call-back number, the corresponding user-programmed special audible alert in accordance with the data defining said alert. The processor comprises a first processor element for controlling the audible alert generation element to generate the user-programmed default audible alert in response to the received call-back number being found not equal to any call-back number included in the at least one user-programmed call back number.

Another aspect of the present invention is a selective call receiver comprising a receiver for receiving information comprising an address and a message containing at least a received call-back number, and a decoder coupled to the receiver for decoding the received address. The selective call receiver further comprises a memory element for storing at least one user-programmed call-back number and data defining at least one corresponding user-programmed special audible alert, and further for storing data defining a user-programmed default audible alert. The selective call receiver also includes a processor responsive to the decoder and coupled to the receiver for processing the received message to derive the received call-back number, the processor also coupled to the memory element for comparing the received call-back number with the at least one user-programmed call-back number. In addition, the selective call receiver includes a display coupled to the processor for displaying the received message, and an audible alert generator coupled to the processor for generating, in response to the received call-back number being found equal to a call-back number included in the at least one user-programmed call-back number, the corresponding user-programmed special audible alert in accordance with the data defining the alert. The processor comprises a first processor element for controlling the audible alert generator to generate the user-programmed default audible alert in response to the received call-back number being found not equal to any call-back number included in the at least one user-programmed call back number.

Another aspect of the present invention is a method in a communication receiver for controlling an audible alert in response to a received call-back number, the method comprising the steps of (a) receiving a message comprising at least the received call-back number, and (b) comparing the received call-back number with at least one user-programmed call-back number. The

method further comprises the steps of (c) selecting a user-programmed special audible alert corresponding to the received call-back number in response to determining in step (b) that the received call-back number is equal to a call-back number included in the at least one user-programmed call-back number, and (d) selecting a user-programmed default audible alert in response to determining in step (b) that the received call-back number is not equal to any call-back number included in the at least one user-programmed call-back number. The method further comprises the step of (e) generating the user-programmed audible alert selected in accordance with steps (c) and (d).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an electrical block diagram of a communication system in accordance with the preferred embodiment of the present invention.

FIG. **2** is an electrical block diagram of a selective call receiver in accordance with the preferred embodiment of the present invention.

FIG. **3** is an orthographic front view of a selective call receiver in accordance with the preferred embodiment of the present invention.

FIG. **4** is a flow chart of a method in the selective call receiver for alert control responsive to a received call-back number in accordance with the preferred embodiment of the present invention.

FIG. **5** is a flow chart of a method in the selective call receiver for adding a new call-back number and corresponding special alert in accordance with the preferred embodiment of the present invention.

FIG. **6** is a flow chart of a method in the selective call receiver for deleting a call-back number and corresponding special alert in accordance with the preferred embodiment of the present invention.

FIG. **7** is a flow chart of a method in the selective call receiver for modifying a default alert in accordance with the preferred embodiment of the present invention.

FIG. **8** is a flow chart of a method in the selective call receiver for toggling an alert mode in accordance with the preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, an electrical block diagram of a communication system in accordance with the preferred embodiment of the present invention depicts a telephone **102** coupled through the Public Switched Telephone Network (PSTN) **104** to a paging control center **106**. The paging control center **106** is coupled to a paging transmitter **108**, which transmits selective call messages by radio signals to a selective call receiver **110** preferably having display capability for displaying a call-back number. In operation, a caller desiring to contact a user of a selective call receiver **110** uses the telephone **102** to place a call through the PSTN **104** by dialing a paging access number assigned to an address of the selective call receiver **110**. Upon receiving the call, the paging control center **106** prompts the caller to enter a call-back number using tone dialing buttons of the telephone **102**, after which the paging control center **106** sends the address of the called selective call receiver **110** and the call-back number to the paging transmitter **108**. In response, the paging transmitter **108** transmits over the air the address along with the call-back number, preferably using a standard radio paging protocol such as the Post Office Code Standardization Advisory Group (POCSAG) protocol, although it will be appreciated that other signaling protocols can be utilized as well.

After receiving the address and upon recognizing that the address matches an address of the selective call receiver **110**, the selective call receiver **110** generates an alert, and then in response to an action by a user of the selective call receiver **110**, e.g., a button push, displays the call-back number. The user then finds a telephone and places a call to the call-back number to converse with the caller. Additionally, in accordance with the preferred embodiment of the present invention, upon receipt of the call-back number the selective call receiver **110** accesses a list of pre-programmed call-back numbers **226**, **228**, **230** (FIG. **2**) and corresponding special alerts **236**, **238**, **240** (FIG. **2**), as is described in detail herein below. Then, if the received call-back number matches one of the pre-programmed call-back numbers **226**, **228**, **230**, the selective call receiver **110** generates one of the corresponding special alerts **136**, **238**, **240**.

Referring to FIG. **2**, an electrical block diagram of the selective call receiver **110** in accordance with the preferred embodiment of the present invention comprises an antenna **202** for intercepting the radio signals transmitted by the paging transmitter **108** (FIG. **1**). The antenna **202** is coupled to a receiver **204** for demodulating the intercepted radio signals to derive address and message information comprising at least a call-back number. The receiver **204** is coupled to a decoder **206** for decoding the address information, and to a microprocessor **208** for processing the message information. The microprocessor **208** is coupled to an audible alert generator **212** for generating an audible alert in response to instructions from the processor after receipt of a message. The microprocessor **208** is also coupled to a display **214**, such as a liquid crystal display, for displaying the received message. The microprocessor **208** is also coupled to user controls **216**, such as well-known buttons and switches, for allowing a user to control operation of the selective call receiver **110**.

In addition, the microprocessor **208** is coupled to an electrically erasable programmable read only memory (EEPROM) **210**, a read only memory (ROM) **218**, and a random access memory (RAM) **220** for storing pre-programmed values, operating firmware, and temporarily needed values, respectively. The EEPROM **210** comprises values for the pre-programmed call-back numbers **226**, **228**, **230** and the corresponding special alerts **236**, **238**, **240** comprising values for both alert cadence and alert tone frequency. Also included in the EEPROM **210** are alert cadence and alert tone frequency values for a default alert **242** associated with a default call-back number, i.e., a received call-back number that does not match any of the pre-programmed call-back numbers **226**, **228**, **230**. In addition, the EEPROM **210** stores values for at least one pre-programmed selective call address **244** to which the selective call receiver is responsive.

The ROM **218** comprises Silent and Non-silent Alert Operation firmware **222** for controlling alerting of the selective call receiver **110** according to a silent or non-silent alert mode selected by the user. Also included is Alerts firmware **223** for controlling the audible alert generator **212** in accordance with the pre-programmed special alerts **236**, **238**, **240** and default alert **242**. In addition, Add, Delete, and Default Modify firmware **225**, **227**, and **229** are provided for adding a new mem-

ber of the pre-programmed call-back numbers **226, 228, 230** and corresponding special alerts **236, 238, 240**, and for modifying the default alert **242**. Also included is Match firmware **250** for comparing a received call-back number with the pre-programmed call-back numbers **226, 228, 230**.

The RAM **220** is utilized by the microprocessor **208** for temporary storage of operational values, such as timer values, counters, received information, etc., in RAM locations in a manner well known in the art of stored program processing systems. One such location is an Alert Mode location **224** for storing the alert mode, i.e., silent or non-silent alert mode, last selected by the user. Another such location is a received call-back number location **233** for storing a received call-back number.

Referring to FIG. **3**, an orthographic front view of the selective call receiver **110** in accordance with the preferred embodiment of the present invention depicts the display **214** as it would appear during a procedure for adding a new member to the pre-programmed call-back numbers **226, 228, 230** and corresponding special alerts **236, 238, 240** (FIG. **2**). Also depicted are members of the user controls **216** (FIG. **2**) comprising an ADD button **304** for adding a new member to the pre-programmed call-back numbers **226, 228, 230** and corresponding special alerts **236, 238, 240**, and a DEL button **306** for deleting one of the pre-programmed call-back numbers **226, 228, 230** and corresponding special alerts **236, 238, 240**. A DEF button **308** is for modifying the default alert **242** (FIG. **2**), while an ALM button **310** is provided for toggling between silent and non-silent alert modes. Movement of a cursor **336** on the display **214** is controlled by an UP CURSOR button **312**, a RIGHT CURSOR button **314**, a DOWN CURSOR button **316**, and a LEFT CURSOR button **318**. In addition, there is a SELECT button **320** for selecting a displayed item, as described herein below, and a READ button **322** for reading a selected received message. Operation of the user controls **214** in accordance with the preferred embodiment of the present invention is more fully described herein below in the detailed description of FIGS. **5, 6, 7**, and **8**.

On the display **214** are a call-back number prompt **324** and an entered call-back number **326** entered by the user. A cadence prompt **328** is also on the display, followed by a cadence identifier **330** selected by the user. In addition, the display shows a tone frequency prompt **332** and a tone frequency identifier **334** selected by the user.

Referring to FIG. **4**, a flow chart of a method in the selective call receiver **110** (FIG. **2**) for alert control responsive to a received call-back number in accordance with the preferred embodiment of the present invention begins with the selective call receiver **110** receiving **402** a message containing a call-back number. The microprocessor **208** (FIG. **2**) of the selective call receiver **110** isolates **404** the received call-back number and stores it temporarily in the received call-back number location **233** in the RAM **220** (FIG. **2**). Next, using the Match firmware **250** (FIG. **2**), the microprocessor **208** accesses **406** the EEPROM **210** (FIG. **2**) to compare the received call-back number with the pre-programmed call-back numbers **226, 228, 230** to see if any of the pre-programmed call-back numbers **226, 228, 230** match the received call-back number. If in step **408** a match is found, then the microprocessor **208** reads **410** from the EEPROM **210** the corresponding one of the special alerts **236, 238, 240** (FIG. **2**) comprising alert cadence and tone frequency identifiers. Using the Alerts firmware **223** (FIG. **2**), the microprocessor **208** processes **412** the alert cadence and tone frequency identifiers to determine alerting instructions. Next, the microprocessor **208** sends **414** the alerting instructions to the audible alert generator **212** (FIG. **2**). In response, the audible alert generator **212** generates **416** an alert corresponding to the one of the special alert **236, 238, 240** pre-programmed for the matched received call-back number, and the process ends **418**. Programmable audible alert generators, such as the audible alert generator **212**, are well known in the art. U.S. Pat. No. 4,868,561 issued Sep. 19, 1989 to Davis, which describes a programmable audible alert generator, is hereby incorporated by reference herein.

If, on the other hand, in step **408** the microprocessor **208** (FIG. **2**) does not find a match to the received call-back number, then the microprocessor **208** accesses **420** the Alert Mode location **224** in the RAM **220** to determine the alert mode. If in step **422** the microprocessor **208** finds that the alert mode is silent, then the process ends **424**. If in step **422** the microprocessor **208** finds that the alert mode is non-silent, then the microprocessor **208** reads **426** the default alert **242** (FIG. **2**) from the EEPROM **210** and sends the cadence and tone frequency identifiers to step **412** as before, ultimately resulting in generation of an alert corresponding to the default alert **242**.

Referring to FIG. **5**, a flow chart of a method in the selective call receiver **110** (FIG. **2**) for adding a new call-back number and corresponding special alert in accordance with the preferred embodiment of the present invention begins with a user depressing **502** the ADD button **304** (FIG. **3**). In response, the microprocessor **208** (FIG. **2**) accesses **504** the ROM **218** to execute the Add firmware **225** (FIG. **2**). Next, the microprocessor **208** instructs **506** the display **214** (FIG. **3**) to generate the call-back number prompt **324**, the cadence prompt **328**, and the tone frequency prompt **332** (FIG. **3**), while placing the cursor **336** at a first position for entry of the new call-back number. To enter the first digit of the new call-back number, the user depresses **508** the ADD button **304** a number of times equal to the desired digit, e.g., no times for the digit zero or six times for the digit six, followed by depressing the RIGHT CURSOR button **314** (FIG. **3**) once to move to the next digit. While not shown in the flow chart of FIG. **5**, the user also may depress the DEL button **306** (FIG. **3**) to reduce the value of a digit at the position of the cursor **336** by a count of one, e.g., to correct an overcount. Concurrent with the depression of the ADD (or DEL) button **304, 306** the microprocessor **208** displays **510** the resultant digit on the display **214**, and after the depression of the RIGHT CURSOR button **314**, moves the cursor **336** one position to the right. If in step **512** the user has not additionally depressed the DOWN CURSOR button **316** (FIG. **3**), then flow returns to step **508** for entry of the next digit of the new call-back number.

If, on the other hand, in step **512** the user has depressed the DOWN CURSOR button **316** (FIG. **3**), then the microprocessor **208** (FIG. **2**) moves **514** the cursor **336** (FIG. **3**) to a first position for entry of a cadence identifier number. As before, the user depresses **516** the ADD (or DEL) button **304, 306** (FIG. **3**) a number of times to reach the desired digit, followed by depressing the RIGHT CURSOR button **314** (FIG. **3**) to move to the next digit position. Also as before, con-

current with the depression of the ADD (or DEL) button **304, 306** the microprocessor **208** displays **518** the resultant digit on the display **214** (FIG. 3), and after the depression of the RIGHT CURSOR button **314**, moves the cursor **336** one position to the right. If in step **520** the user has not additionally depressed the DOWN CURSOR button **316**, then flow returns to step **516** for entry of the next digit of the cadence identifier number.

If, on the other hand, in step **520** the user has depressed the DOWN CURSOR button **316** (FIG. 3), then the microprocessor **208** (FIG. 2) moves **522** the cursor **336** (FIG. 3) to the single position for entry of a tone frequency identifier number. Next, the user depresses **524** the ADD (or DEL) button **304, 306** (FIG. 3) a number of times to reach the desired digit, followed by depressing the RIGHT CURSOR button **314** (FIG. 3) once. In response, the microprocessor **208** displays **526** the digit on the display **214** (FIG. 3) and stores the new call-back number and corresponding special alert along with the other pre-programmed call-back numbers **226, 228, 230** and corresponding special alerts **236, 238, 240** in the EEPROM **210** (FIG. 2). At step **528**, the process ends.

Referring to FIG. **6**, a flow chart of a method in the selective call receiver **110** (FIG. 2) for deleting one of the call-back numbers **226, 228, 230** (FIG. 2) and corresponding special alerts **236, 238, 240** (FIG. 2) in accordance with the preferred embodiment of the present invention begins with the user depressing the DEL button **306** (FIG. 3). In response, the microprocessor **208** (FIG. 2) accesses **604** the ROE **218** to execute the Delete firmware **227**. On the display **214** (FIG. 3) the microprocessor **208** displays **606** the first one of the pre-programmed call-back numbers **226, 228, 230**, along with an alert descriptor of the corresponding one of the special alerts **236, 238, 240**, the alert descriptor comprising a cadence identifier number and a tone frequency identifier number. If in step **608** the user depresses the SELECT button **320** (FIG. 3), then the flow returns to step **606** to display the next one of the pre-programmed call-back numbers **226, 228, 230** and corresponding alert descriptor, and so on, until the user finds one of the call-back numbers **226, 228, 230** that the user desires to delete. When in step **608** the user has not depressed the SELECT button **320**, but instead has again pressed the DEL button **306**, then from step **610** flow advances to step **612**, where the microprocessor **208** deletes the currently displayed one of the call-back numbers **226, 228, 230** and corresponding one of the special alerts **236, 238, 240**, after which the process ends **614**.

Referring to FIG. **7**, a flow chart of a method in the selective call receiver **110** (FIG. 2) for modifying the default alert **242** (FIG. 2) in accordance with the preferred embodiment of the present invention begins with the user depressing **702** the DEF button **308** (FIG. 3). In response, the microprocessor **208** (FIG. 2) accesses **704** the ROM **218** (FIG. 2) to execute the Default Modify firmware **229** (FIG. 2). On the display **214** (FIG. 3) the microprocessor **208** displays **706** the currently programmed default cadence identifier number and default tone frequency identifier number. The cursor **336** (FIG. 3) is placed at the first position for entry of the cadence identifier number. As before, the user depresses **708** the ADD (or DEL) button **304, 306** (FIG. 3) a number of times to reach the desired digit, followed by depressing the RIGHT CURSOR button **314** (FIG. 3) to move to the next digit position. If the user does not wish to change a displayed digit at the cursor position, the user may depress the RIGHT CURSOR button **314** without depressing the ADD (or DEL) button **304, 306**. Also as before, concurrent with the depression of the ADD (or DEL) button **304, 306** (FIG. 3) the microprocessor **208** displays **710** the resultant digit on the display **214** (FIG. 3), and after the depression of the RIGHT CURSOR button **314**, moves the cursor **336** one position to the right. If in step **712** the user has not additionally depressed the DOWN CURSOR button **316** (FIG. 3), then flow returns to step **708** for entry of the next digit of the cadence identifier number.

If, on the other hand, in step **712** the user has depressed the DOWN CURSOR button **316** (FIG. 3), then the microprocessor **208** (FIG. 2) moves **714** the cursor **336** (FIG. 3) to the single position for entry of a tone frequency identifier number. Next, the user depresses **716** the ADD (or DEL) button **304, 306** (FIG. 3) a number of times to reach the desired digit, followed by depressing the RIGHT CURSOR button **314** (FIG. 3) once. If the user does not wish to change the displayed digit at the cursor position, the user may depress the RIGHT CURSOR button **314** without depressing the ADD (or DEL) button **304, 306**. In response, the microprocessor **208** displays **718** the digit on the display **214** (FIG. 3) and writes the newly entered values into the location in the EEPROM **210** (FIG. 2) for the modified default alert **242** (FIG. 2), after which the process ends **720**.

Referring to FIG. **8**, a flow chart of a method in the selective call receiver **110** (FIG. 2) for toggling the alert mode **224** (FIG. 2) in accordance with the preferred embodiment of the present invention begins with the user depressing **802** the ALM button **310** (FIG. 3). In response, the microprocessor **208** (FIG. 2) accesses the ROM **218** (FIG. 2) to execute the Silent and Non-silent Alert Operation firmware **222** (FIG. 2). Next, the microprocessor **208** accesses **806** the Alert Mode location **224** in the RAM **220** (FIG. 2) to determine the current alert mode, and then toggles **808** the alert mode to the mode opposite the current mode, e.g., to the silent alert mode if the current alert mode is non-silent, and vice versa, after which the process ends **810**.

It will be appreciated that different user controls and different user control operation may be substituted for the user controls and user control operation described herein above for the preferred embodiment without departing from the intent of the present invention. For example, a displayed menu and a cursor could be used instead of direct buttons to access functions such as Add, Delete, etc., in a manner well known in the art. For another example, a full numeric keypad could be used to enter information such as call-back number, cadence number, etc., instead of multiple depressions of a single button to count up or down to a digit value.

Thus, the present invention provides a way of helping a user discern that a call is from a predetermined important caller or group of important callers without the user's having to memorize call-back numbers or having to read a poorly lighted displayed number. The present invention advantageously enables the user to pre-program a selective call receiver such that the selective call receiver generates a recognizable, unique, audible alert in response to receiving a call-back number that the user considers important. The present invention advantageously eliminates the need to use expensive multiple telephone access numbers for a single pager in order to provide audibly distinct alerts.

We claim:

1. A communication receiver comprising:

receiver means for receiving a message comprising at least a received call-back number;

storage means for storing at least one user-programmed call-back number along with data defining at least one corresponding user-programmed special audible alert, and further for storing data defining a user-programmed default audible alert;

processor means coupled to the receiver means for processing the message to derive the received call-back number and coupled to the storage means for comparing the received call-back number with the at least one user-programmed call-back number; and

audible alert generation means coupled to the processor means for generating, in response to the received call-back number being found equal to a call-back number included in the at least one user-programmed call-back number, the corresponding user-programmed special audible alert in accordance with the data defining said alert,

wherein the processor means comprises a first processor element for controlling the audible alert generation means to generate the user-programmed default audible alert in response to the received call-back number being found not equal to any call-back number included in the at least one user-programmed call back number.

2. The communication receiver in accordance with claim 1, further comprising user control means coupled to the processor means and to the storage means for allowing a user to add or delete a user-programmed call-back number and a corresponding user-programmed special audible alert.

3. The communication receiver in accordance with claim 1, wherein the storage means comprises a non-volatile memory.

4. The communication receiver in accordance with claim 1, further comprising user control means coupled to the processor means for allowing a user to modify the user-programmed default audible alert.

5. The communication receiver in accordance with claim 4, further comprising a second processor element coupled to the processor means and responsive to the user control means for controlling the generation of the user-programmed default audible alert,

wherein the second processor element disallows generation of the user-programmed default audible alert but allows generation of the user-programmed special audible alert in response to user selection of a first alert mode, and

wherein the second processor element allows generation of both the user-programmed default audible alert and the user-programmed special audible alert in response to user selection of a second alert mode.

6. The communication receiver in accordance with claim 2, wherein the user control means comprises:

means for a user to select a cadence for a new user-programmed special audible alert; and

means for a user to select a tone frequency for the new user-programmed special audible alert, and

wherein the audible alert generation means generates the new user-programmed special audible alert in accordance with the selected cadence and tone frequency.

7. The communication receiver in accordance with claim 4, wherein the user control means comprises:

means for a user to select a cadence for the user-programmed default audible alert; and

means for a user to select a tone frequency for the user-programmed default audible alert, and

wherein the audible alert generation means generates the user-programmed default audible alert in accordance with the selected cadence and tone frequency.

8. (Amended) A selective call receiver comprising:

a receiver for receiving information comprising an address and a message containing at least a received call-back number;

a decoder coupled to the receiver for decoding the received address;

a memory element for storing at least one user-programmed call-back number and data defining at least one corresponding user-programmed special audible alert, and further for storing data defining a user-programmed default audible alert;

a processor responsive to the decoder and coupled to the receiver for processing the received message to derive the received call-back number, the processor also coupled to the memory element for comparing the received call-back number with the at least one user-programmed call-back number;

a display coupled to the processor for displaying the received message; and

an audible alert generator coupled to the processor for generating, in response to the received call-back number being found equal to a call-back number included in the at least one user-programmed call-back number, the corresponding user-programmed special audible alert in accordance with the data defining said alert,

wherein the processor comprises a first processor element for controlling the audible alert generator to generate the user-programmed default audible alert in response to the received call-back number being found not equal to any call-back number included in the at least one user-programmed call back number.

9. The selective call receiver in accordance with claim 8, further comprising user controls coupled to the processor and to the memory element for allowing a user to add or delete a user-programmed call-back number and a corresponding user-programmed special audible alert.

10. The selective call receiver in accordance with claim 8, wherein the memory element comprises a non-volatile memory.

11. The selective call receiver in accordance with claim 8, further comprising user controls coupled to the processor for allowing a user to modify the user-programmed default audible alert.

12. The selective call receiver in accordance with claim 11, further comprising a second processor element coupled to the processor and responsive to the user controls for controlling the generation of the user-programmed default audible alert,

wherein the second processor element disallows generation of the user-programmed default audible alert but allows generation of the user-programmed special audible alert in response to user selection of a first alert mode, and

wherein the second processor element allows generation of both the user-programmed default audible alert and the user-programmed special audible alert in response to user selection of a second alert mode.

13. The selective call receiver in accordance with claim 9, wherein the user controls comprise:

first elements that allow a user to select a cadence for a new user-programmed special audible alert; and

second elements that allow a user to select a tone frequency for the new user-programmed special audible alert, and

wherein the audible alert generator generates the new user-programmed special audible alert in accordance with the selected cadence and tone frequency.

14. The selective call receiver in accordance with claim 11, wherein the user controls comprise:

first elements that allow a user to select a cadence for the user-programmed default audible alert; and

second elements that allow a user to select a tone frequency for the user-programmed default audible alert, and

wherein the audible alert generator generates the user-programmed default audible alert in accordance with the selected cadence and tone frequency.

15. A method in a communication receiver for controlling an audible alert in response to a received call-back number, the method comprising the steps of:

(a) receiving a message comprising at least the received call-back number;

(b) comparing the received call-back number with at least one user-programmed call-back number;

(c) selecting a user-programmed special audible alert corresponding to the received call-back number in response to determining in step (b) that the received call-back number is equal to a call-back number included in the at least one user-programmed call-back number;

(d) selecting a user-programmed default audible alert in response to determining in step (b) that the received call-back number is not equal to any call-back number included in the at least one user-programmed call-back number; and

(e) generating the user-programmed audible alert selected in accordance with steps (c) and (d).

16. The method in accordance with claim 15, further comprising the step of adding a new user-programmed call-back number and a corresponding new user-programmed special audible alert in response to a user control sequence.

17. The method in accordance with claim 15, further comprising the step of deleting an existing user-programmed call-back number and a corresponding user-programmed special audible alert in response to a user control sequence.

18. The method in accordance with claim 15, further comprising the step of modifying the user-programmed default audible alert in response to a user control sequence.

19. The method in accordance with claim 15, wherein step (d) further comprises the step of de-selecting the user-programmed default audible alert to prevent the generation thereof, a user of the communication receiver having selected a silent alert mode.

20. The method in accordance with claim 16, wherein the step of adding the new user-programmed call-back number and the corresponding new user-programmed special audible alert comprises the steps of:

selecting a user-programmable cadence for the new user-programmed special audible alert; and

selecting a user-programmable tone frequency for the new user-programmed special audible alert, and

wherein the new user-programmed special audible alert is generated in accordance with the selected cadence and tone frequency.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,394,140

DATED : February 28, 1995

INVENTOR(S) : Wong et al.

It is certified that error appears in the above-indentified patent and that said Letters Patent is hereby corrected as shown below:

Column 10, line 9, please delete "(Amended)".

Signed and Sealed this

Twelfth Day of September, 1995

Attest:

BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks

US005612682A

United States Patent [19]

DeLuca et al.

[11] Patent Number: 5,612,682

[45] Date of Patent: Mar. 18, 1997

[54] **METHOD AND APPARATUS FOR CONTROLLING UTILIZATION OF A PROCESS ADDED TO A PORTABLE COMMUNICATION DEVICE**

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[73] Assignee: **Motorola, Inc.**, Schaumburg, Ill.

[21] Appl. No.: **452,785**

[22] Filed: **May 30, 1995**

[51] **Int. Cl.**[6] **G07D 7/00**; G08B 5/22

[52] **U.S. Cl.** **340/825.34**; 340/825.44; 340/825.33; 379/57

[58] **Field of Search** 340/825.34, 825.44, 340/825.33, 825.35, 825.22; 379/57; 395/200.01, 200.05

[56] **References Cited**

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5,335,278 8/1994 Matchett et al. 340/825.34

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Primary Examiner—Michael Horabik

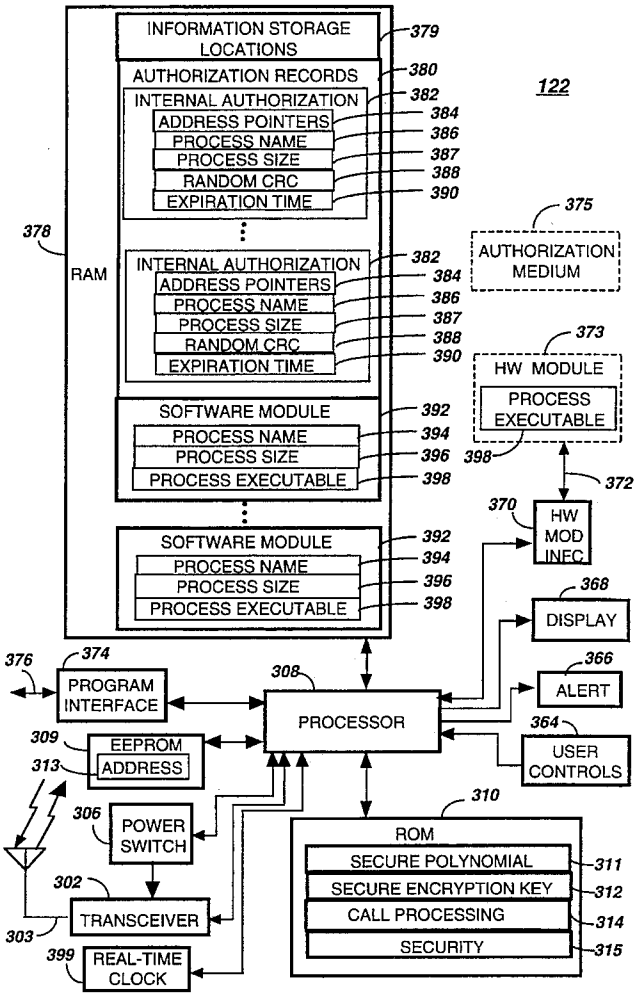
Assistant Examiner—Edward Merz

Attorney, Agent, or Firm—John H. Moore

[57] **ABSTRACT**

A method and apparatus in a communication system operated by a service provider controls utilization of a module (**602**, **606**) added to a portable communication device (**122**) including a transceiver (**302**) which communicates with a fixed portion (**102**) of the communication system. The portable communication device (**122**) receives (**604**) a request for utilization of the module. In response, the portable communication device (**122**) acts (**612**) to obtain a usage authorization for utilizing the module. The portable communication device (**122**) disallows (**640**) the utilization of the module, in response to the usage authorization being unobtainable.

24 Claims, 7 Drawing Sheets



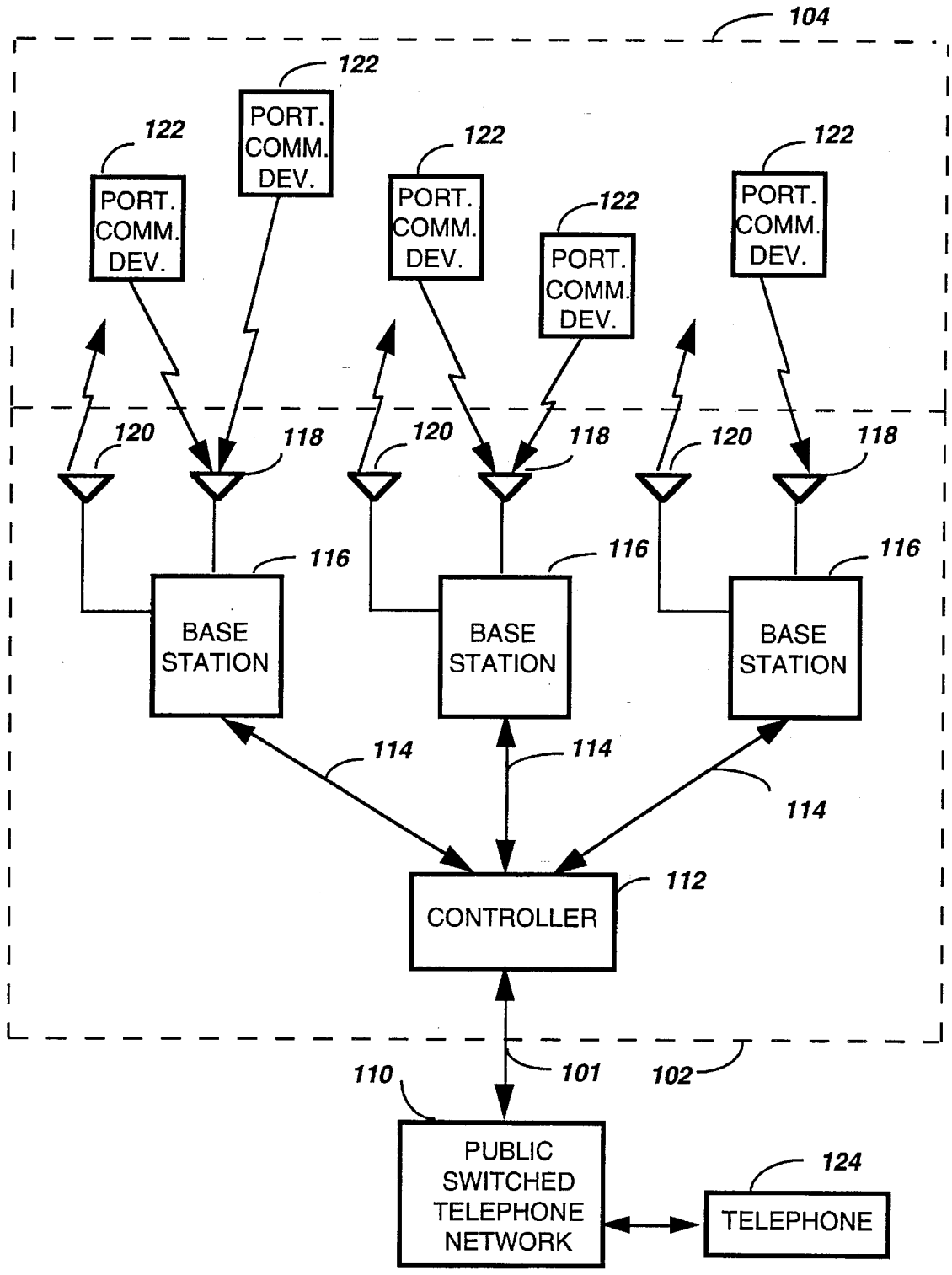
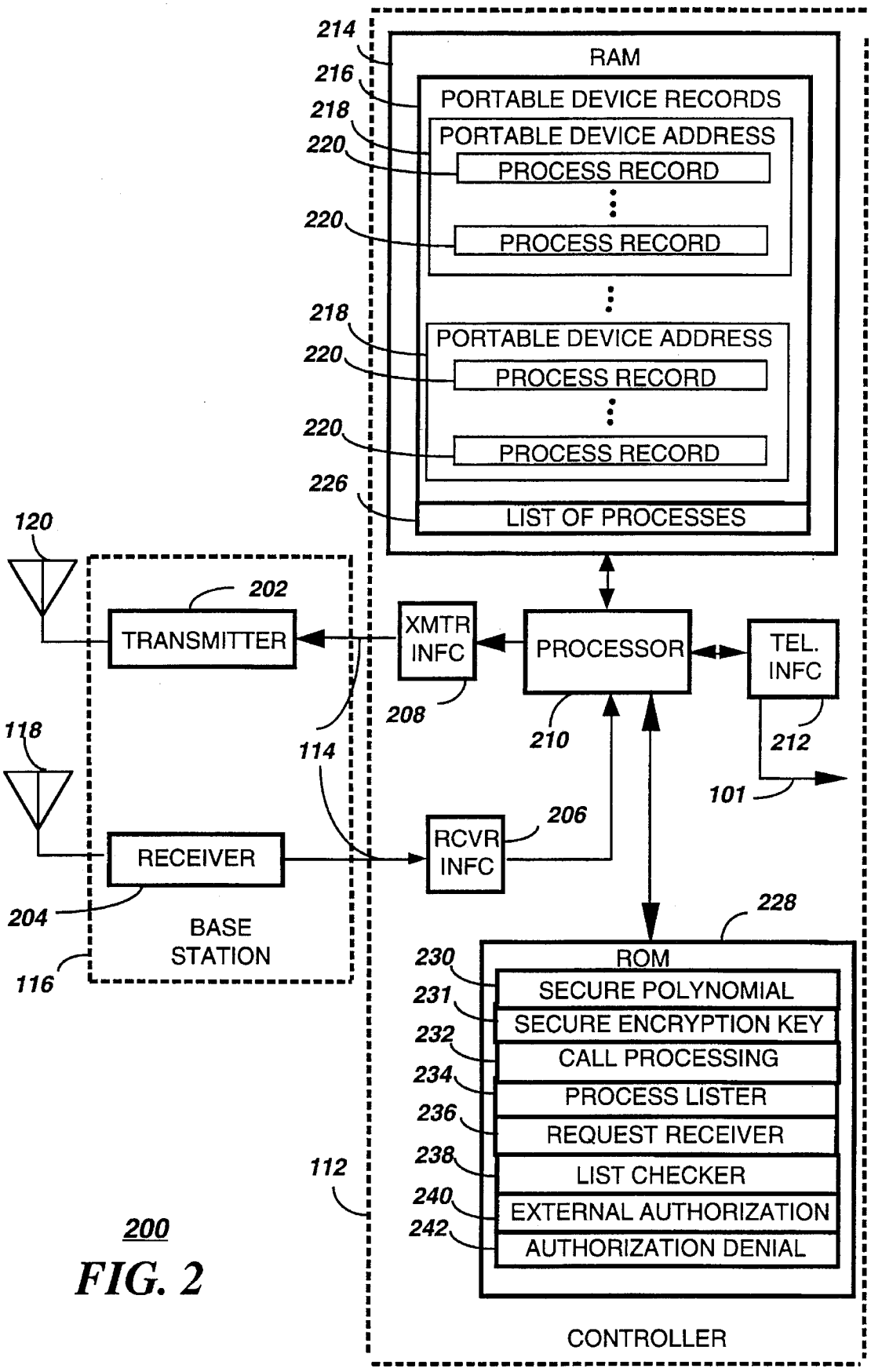

104
122
PORT. COMM. DEV.
120
118
116
BASE STATION
114
CONTROLLER
112
110
101
102
PUBLIC SWITCHED TELEPHONE NETWORK
124
TELEPHONE

FIG. 1


214
RAM
216
PORTABLE DEVICE RECORDS
218
PORTABLE DEVICE ADDRESS
220
PROCESS RECORD
220
PROCESS RECORD
218
PORTABLE DEVICE ADDRESS
220
PROCESS RECORD
220
PROCESS RECORD
226
LIST OF PROCESSES
120
202
TRANSMITTER
XMTR INFC
208
PROCESSOR
210
TEL. INFC
212
101
118
114
RECEIVER
204
BASE STATION
116
RCVR INFC
206
228
ROM
230
SECURE POLYNOMIAL
231
SECURE ENCRYPTION KEY
232
CALL PROCESSING
234
PROCESS LISTER
236
REQUEST RECEIVER
238
LIST CHECKER
240
EXTERNAL AUTHORIZATION
242
AUTHORIZATION DENIAL
112
CONTROLLER

200

FIG. 2

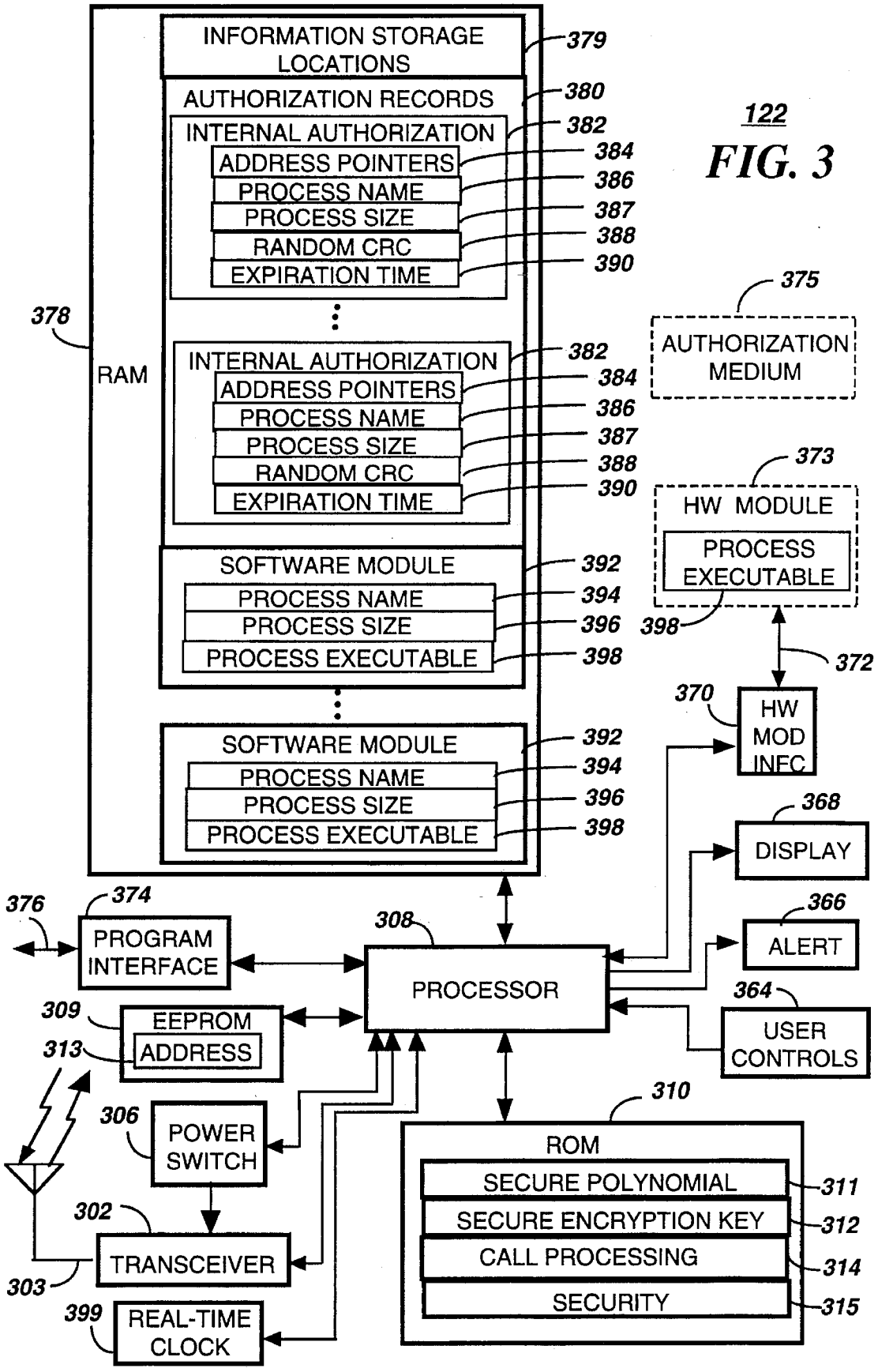

122
INFORMATION STORAGE LOCATIONS
379
AUTHORIZATION RECORDS
380
INTERNAL AUTHORIZATION
382
ADDRESS POINTERS
384
PROCESS NAME
386
PROCESS SIZE
387
RANDOM CRC
388
EXPIRATION TIME
390
378
RAM
INTERNAL AUTHORIZATION
382
ADDRESS POINTERS
384
PROCESS NAME
386
PROCESS SIZE
387
RANDOM CRC
388
EXPIRATION TIME
390
SOFTWARE MODULE
392
PROCESS NAME
394
PROCESS SIZE
396
PROCESS EXECUTABLE
398
SOFTWARE MODULE
392
PROCESS NAME
394
PROCESS SIZE
396
PROCESS EXECUTABLE
398
375
AUTHORIZATION MEDIUM
373
HW MODULE
PROCESS EXECUTABLE
398
372
370
HW MOD INFC
368
DISPLAY
366
ALERT
364
USER CONTROLS
376
374
PROGRAM INTERFACE
308
PROCESSOR
309
EEPROM
313
ADDRESS
306
POWER SWITCH
302
TRANSCEIVER
303
399
REAL-TIME CLOCK
310
ROM
SECURE POLYNOMIAL
311
SECURE ENCRYPTION KEY
312
CALL PROCESSING
314
SECURITY
315

FIG. 3

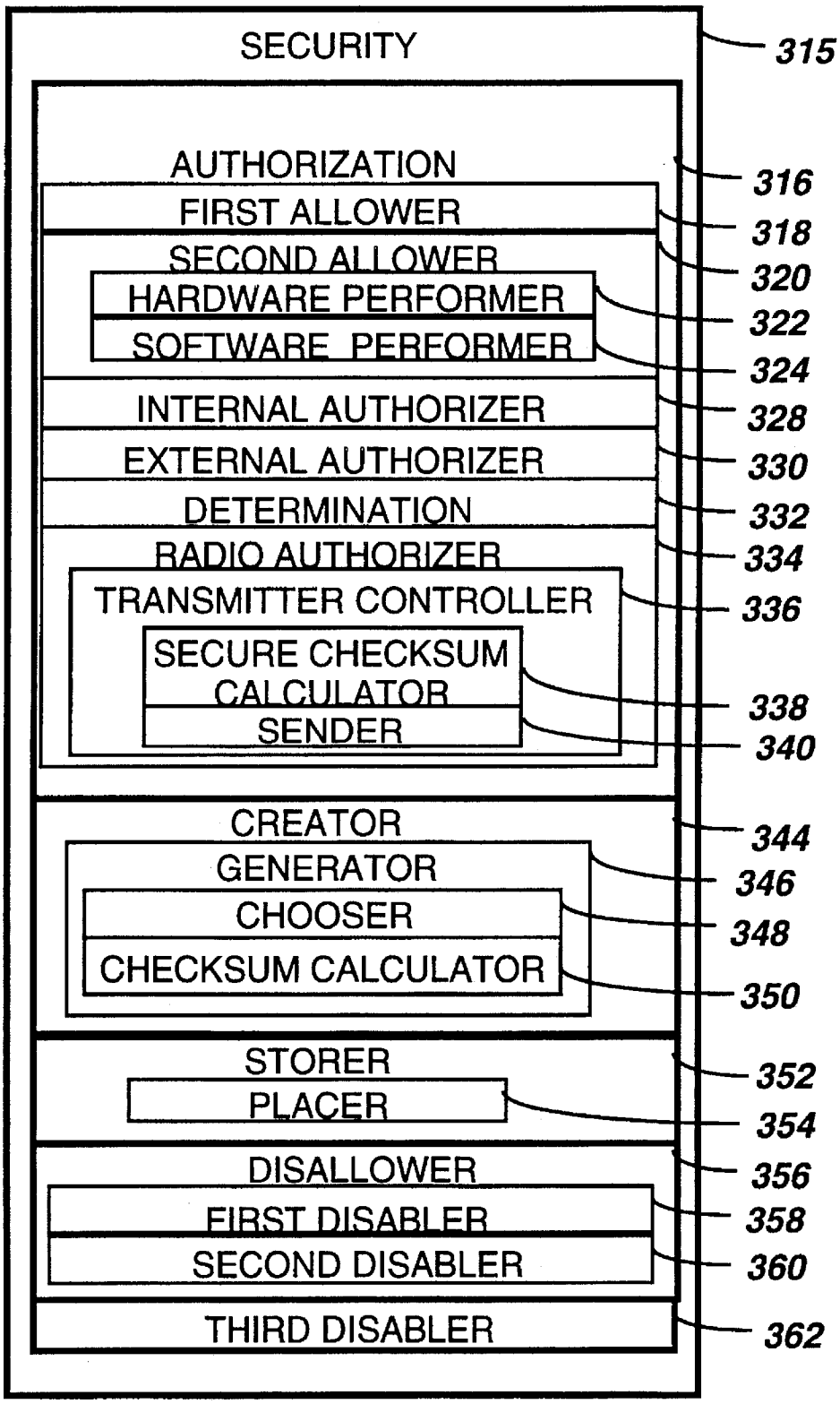
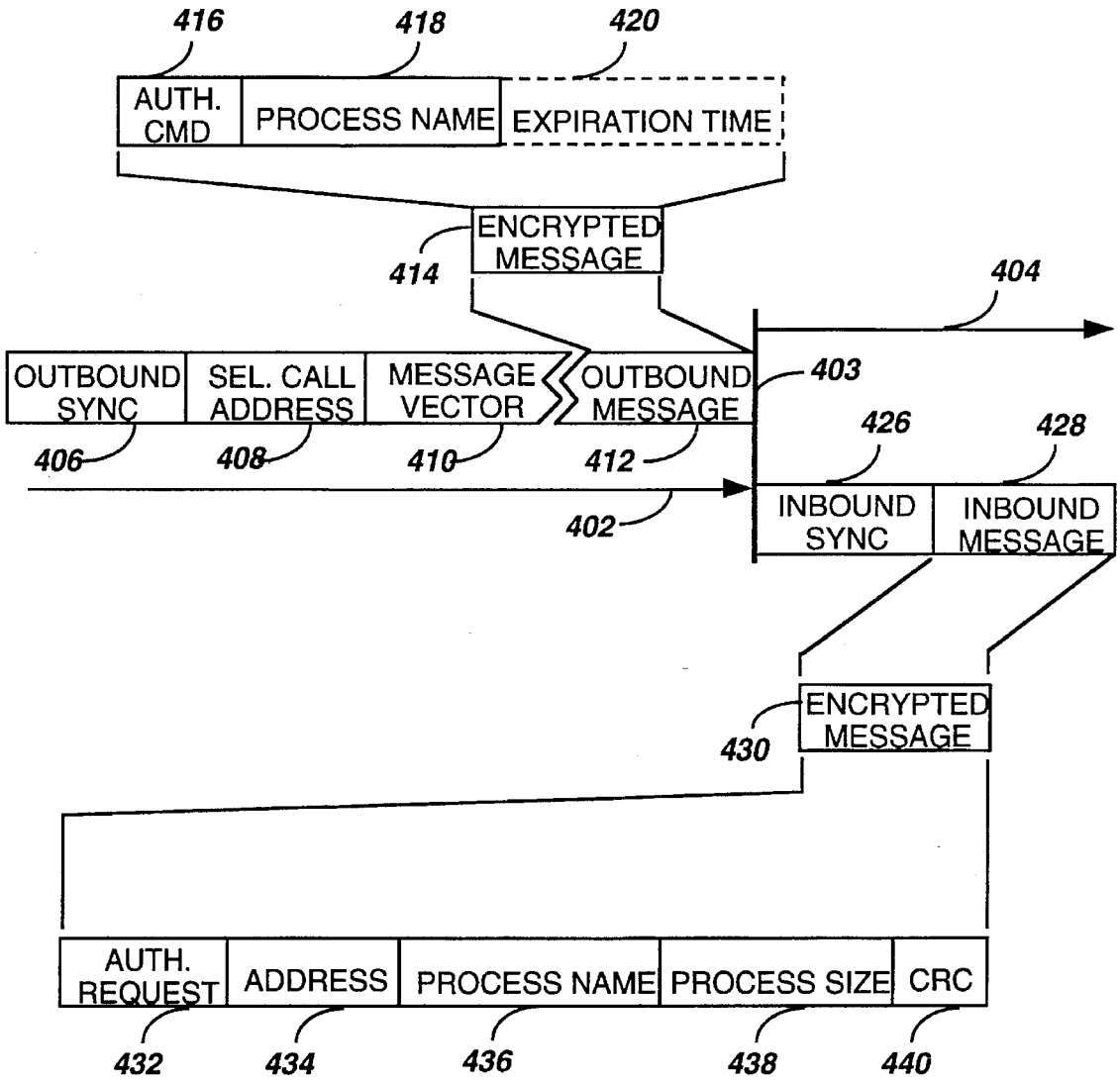
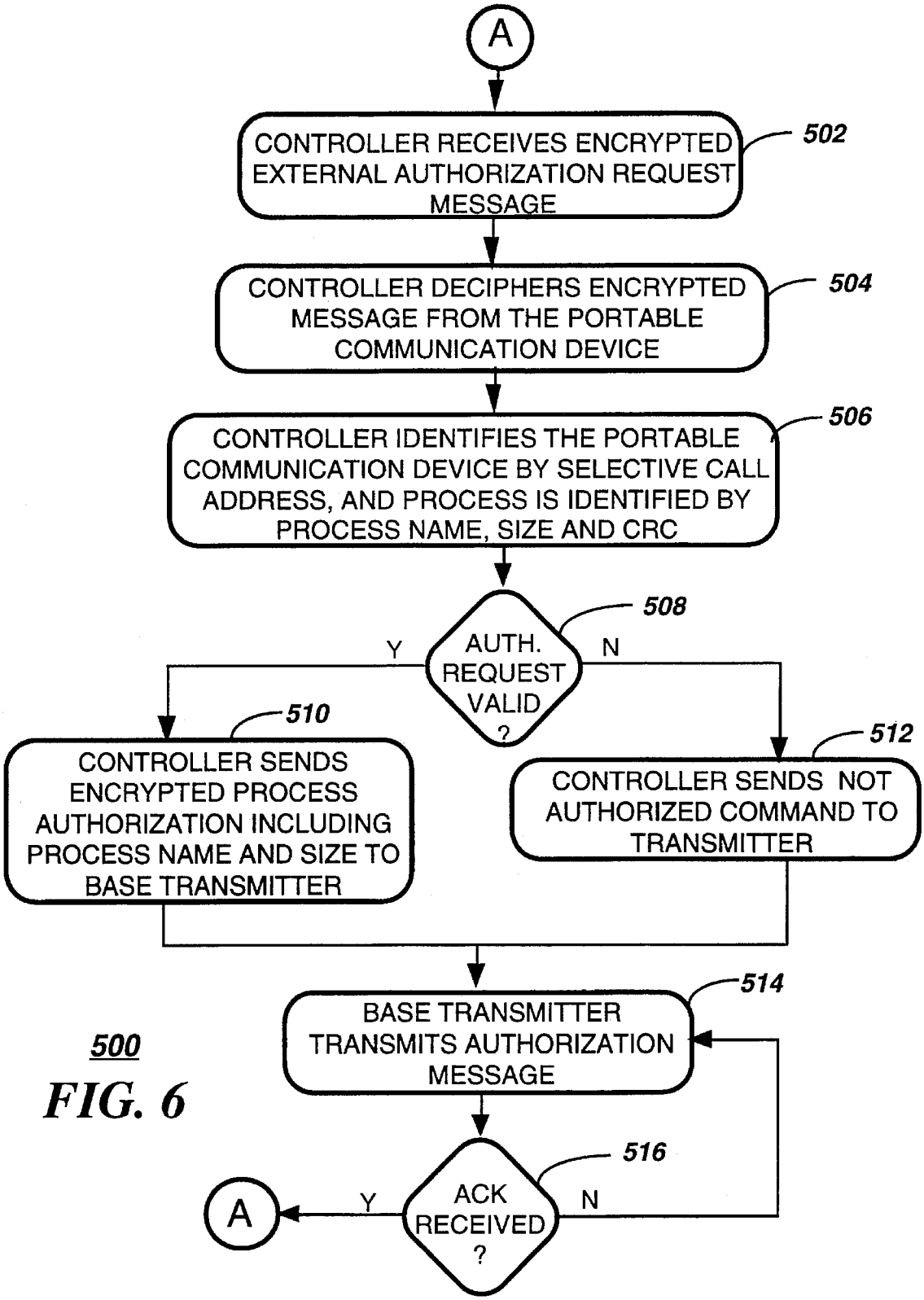

SECURITY
315
AUTHORIZATION
316
FIRST ALLOWER
318
SECOND ALLOWER
320
HARDWARE PERFORMER
322
SOFTWARE PERFORMER
324
INTERNAL AUTHORIZER
328
EXTERNAL AUTHORIZER
330
DETERMINATION
332
RADIO AUTHORIZER
334
TRANSMITTER CONTROLLER
336
SECURE CHECKSUM CALCULATOR
338
SENDER
340
CREATOR
344
GENERATOR
346
CHOOSER
348
CHECKSUM CALCULATOR
350
STORER
352
PLACER
354
DISALLOWER
356
FIRST DISABLER
358
SECOND DISABLER
360
THIRD DISABLER
362

FIG. 4


416
418
420
AUTH. CMD
PROCESS NAME
EXPIRATION TIME
ENCRYPTED MESSAGE
414
404
OUTBOUND SYNC
SEL. CALL ADDRESS
MESSAGE VECTOR
OUTBOUND MESSAGE
403
406
408
410
412
426
428
INBOUND SYNC
INBOUND MESSAGE
402
ENCRYPTED MESSAGE
430
AUTH. REQUEST
ADDRESS
PROCESS NAME
PROCESS SIZE
CRC
432
434
436
438
440

400

FIG. 5


A
CONTROLLER RECEIVES ENCRYPTED EXTERNAL AUTHORIZATION REQUEST MESSAGE
502
CONTROLLER DECIPHERS ENCRYPTED MESSAGE FROM THE PORTABLE COMMUNICATION DEVICE
504
CONTROLLER IDENTIFIES THE PORTABLE COMMUNICATION DEVICE BY SELECTIVE CALL ADDRESS, AND PROCESS IS IDENTIFIED BY PROCESS NAME, SIZE AND CRC
506
AUTH. REQUEST VALID ?
508
Y
N
CONTROLLER SENDS ENCRYPTED PROCESS AUTHORIZATION INCLUDING PROCESS NAME AND SIZE TO BASE TRANSMITTER
510
CONTROLLER SENDS NOT AUTHORIZED COMMAND TO TRANSMITTER
512
BASE TRANSMITTER TRANSMITS AUTHORIZATION MESSAGE
514
ACK RECEIVED ?
516
Y
N
A

500

FIG. 6

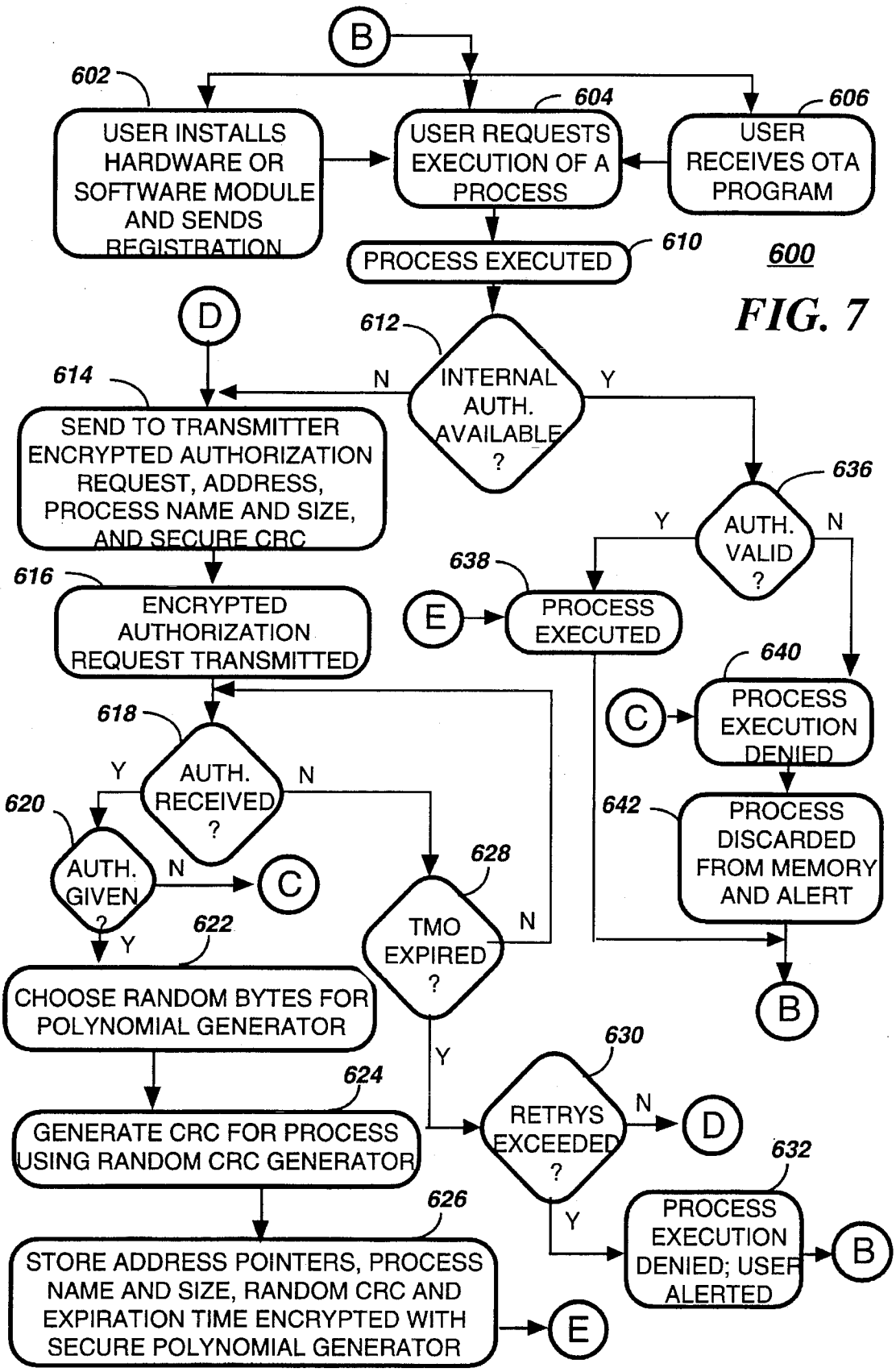

B
602
USER INSTALLS HARDWARE OR SOFTWARE MODULE AND SENDS REGISTRATION
604
USER REQUESTS EXECUTION OF A PROCESS
606
USER RECEIVES OTA PROGRAM
PROCESS EXECUTED
610
600
D
612
INTERNAL AUTH. AVAILABLE ?
N
Y
614
SEND TO TRANSMITTER ENCRYPTED AUTHORIZATION REQUEST, ADDRESS, PROCESS NAME AND SIZE, AND SECURE CRC
636
AUTH. VALID ?
Y
N
638
E
PROCESS EXECUTED
616
ENCRYPTED AUTHORIZATION REQUEST TRANSMITTED
640
C
PROCESS EXECUTION DENIED
618
AUTH. RECEIVED ?
Y
N
620
AUTH. GIVEN ?
N
C
642
PROCESS DISCARDED FROM MEMORY AND ALERT
628
TMO EXPIRED ?
N
Y
622
CHOOSE RANDOM BYTES FOR POLYNOMIAL GENERATOR
B
630
RETRYS EXCEEDED ?
N
D
624
GENERATE CRC FOR PROCESS USING RANDOM CRC GENERATOR
Y
632
PROCESS EXECUTION DENIED; USER ALERTED
B
626
STORE ADDRESS POINTERS, PROCESS NAME AND SIZE, RANDOM CRC AND EXPIRATION TIME ENCRYPTED WITH SECURE POLYNOMIAL GENERATOR
E

FIG. 7