

AUTOMATIC DIALING

The present invention relates to automatic dialling and is concerned particularly with a paging system having an automatic dialing function.

5

Generally, in a compact paging receiver, an alert tone is generated in response to a radio calling signal from a remote station and, in this case, a telephone number of a caller may also be transmitted together with the alert tone. Data applied to the paging receiver have a specific code form, and this may be assumed to be of a POCSAG (Post Office Code Standardization Advisory Group) code. In the POCSAG code, one data batch consists of 8 frames, and each frame consists of an address code word which indicates a specific self-address of the paging receiver and a message code word to which the telephone number of the caller is conveyed.

15

Figure 1 of the accompanying diagrammatic drawings is a block diagram of a conventional paging system and Figure 2 of the accompanying diagrammatic drawings is a flow chart for showing the function of automatic dialing in the conventional paging system. A control circuit 120 drives a receiver 110 at its own frame period and the receiver 110 demodulates a received radio frequency signal to shape the waveform thereof and applies the shaped signal to the control circuit 120. The control circuit 120 is a one-chip microprocessor unit which has a program ROM (Read Only Memory), a RAM (Read Access Memory) 121 for storing received data for a time and a DTMF (Dual Tone Multi-Frequency) generator 122 for generating the stored data as a DTMF signal.

20

25

When the control circuit 120 is supplied with data from the receiver 110, the control circuit 120 checks whether or not the data are self-data (i.e. correctly addressed to the respective paging receiver that receives the data) by analyzing an address code word. If the data are self-data, the control circuit 120 stores the telephone number of the message code word into the RAM 121 by the use of a memory key 140. When a user makes a phone call under the above condition that the telephone number is stored in the RAM 121, the user depresses a read key 150. In this case, the control circuit 120 notices the depression of the read key 150 in a step 202, reads out from the RAM 121 the telephone number corresponding to the number of depressing the read key 150 and displays the telephone number on a LCD (Liquid Crystal Display) 130, through steps 204, 206 and 208 as shown in Figure 2. Thereafter, if the user confirms the telephone number and depresses a dial key 160, the control circuit 120 notices the depression of the dial key 160 in a step 210 and converts the telephone number displayed on the LCD 130 into the DTMF signal through the DTMF generator 122. Here, a speaker 170 generates the DTMF signal as a DTMF tone. The speaker 170 has to be located beside a transmitter of an electronic exchange, and the DTMF tone output from the speaker 170 is applied to the exchange through a telephone transmitter. Therefore, the user can perform dialing using the paging receiver without a dialing operation.

However, in the above system, there exist shortcomings. Because the area code of a caller or the current place of a user, etc. were not considered, in the case of using an area code, if the user performs automatic dialing with the received telephone number, the telephone call may be made to an unwanted subscriber. Therefore, a loss of time occurs because the user must use keys of the telephone without using automatic dial. Also, in the case that

an extension number of the caller in the received telephone number is included, if there is no editing function, an unnecessary DTMF signal may be generated when performing automatic dialing. Further, if power is turned off, all memorized telephone numbers may be erased, which necessitates reinput
5 of all telephone numbers.

Preferred embodiments of the present invention aim to provide an apparatus and method thereof which can generate a DTMF signal taking into account a desired area, by adding an area code of an intended caller to a
10 received telephone number when performing an automatic dialing in a paging receiver.

Another aim is to provide an apparatus and method thereof which can generate a DTMF signal after editing and removing an unnecessary telephone
15 number when performing an automatic dialing in a paging receiver.

A further aim is to provide an apparatus and method thereof which can maintain received telephone numbers by recording the received telephone numbers into a memory even if power is turned off.
20

According to one aspect of the present invention, a paging receiver for automatically dialing displays a received telephone number stored in a memory when a read key is depressed a given number of times. An area code stored in the memory is displayed when an area key is depressed a given
25 number of times, and an unnecessary extension number for automatically dialing may be erased by an editing key. Then, the area code and the telephone number are converted into a DTMF signal when a dial key is

depressed and the DTMF signal is applied to an exchange through a telephone, thereby to perform an automatic dialing function.

According to another aspect of the present invention, there is provided
5 a method for automatic dialing in a paging system having a memory for
storing a specific self-address in a first area, a received telephone number in
a second area and an area code in a third area, wherein said received
telephone number is stored into said second area if received with an address
which is coincident with said specific self-address and thereafter, the stored
10 telephone number is selected by depressing first to fourth keys and a dual tone
multi-frequency (DTMF) signal is generated through a telephone transmitter,
the method comprising the steps of:

selectively displaying on display means, when said first key is
15 depressed a telephone number corresponding to a number of depressions of
said first key, said telephone number being stored in said second area of said
memory;

selectively displaying on said display means, when said second key is
20 depressed, an area code corresponding to a number of depressions of said
second key, together with said telephone number, said area code being stored
in said third area of said memory;

optionally editing a telephone number to be transmitted by erasing a
25 character which is indicated by a cursor among the telephone number
displayed on said display means, when said third key is depressed; and

converting the edited telephone number into a dual tone multi-frequency (DTMF) signal when said fourth key is depressed, and transmitting said dual tone multi-frequency (DTMF) signal to the telephone transmitter.

- 5 Preferably, said memory is an electrically erasable and programmable read only memory (EEPROM) capable of protecting stored data when power is turned off.

10 According to another aspect of the present invention, there is provided a method for automatic dialing in a paging system having a read key, an area key, a dial key and a memory for storing a specific self-address, a received telephone number and an area code in first to third areas, the method comprising the steps of:

- 15 selecting first data corresponding to a number of depressions of said read key as a telephone number, when said read key is depressed, said first data being stored in said second area of said memory;

- 20 selecting second data corresponding to a number of depressions of said area key as an area code, when said area key is depressed, said second data being stored in said third area of said memory; and

- 25 converting said selected area code and telephone number into a dual tone multi-frequency (DTMF) signal when said dial key is depressed and transmitting said selected area code and telephone number to a telephone transmitter.

Preferably, said memory is an electrically erasable and programmable read only memory (EEPROM) capable of protecting stored data when power is turned off.

5 According to a further aspect of the present invention, there is provided a paging receiver for automatically dialing a received telephone number of a caller by analyzing a received radio frequency signal, the receiver comprising:

receiver means for demodulating the received radio frequency signal,
10 shaping waveforms thereof, and converting the shaped signal into a digital signal;

control circuit means connected to said receiver means for controlling automatic dialing function according to key instructions and having a first
15 memory for storing said received telephone number and dual tone multi-frequency (DTMF) generator means for converting a transmitting telephone number into a dual tone multi-frequency DTMF signal;

display means connected to said control circuit means for displaying
20 said received telephone number according to a control signal of said control circuit means;

a second memory connected to said control circuit means, for storing first and second specific self-addresses in a first area, said received telephone
25 number in a second area and an area code in a third area;

read key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to select successively said telephone numbers stored in said second area;

- 5 area key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to select successively said area code stored in said third area;

- 10 dial key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to convert a selected area code and telephone number into a dual tone multi-frequency (DTMF) signal by driving said dual tone multi-frequency (DTMF) generator;

- 15 editing key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to erase unnecessary extension numbers for dialing except for said area codes and said telephone numbers; and

- 20 speaker means connected to said control circuit means, for converting said dual tone multi-frequency (DTMF) signal output from said dual tone multi-frequency (DTMF) generator of said control circuit means into a dual tone multi-frequency (DTMF) tone and supplying said dual tone multi-frequency (DTMF) tone to a telephone transmitter;

- 25 whereby, in use, a desired telephone number is selected by said read key, said area code of the selected telephone number is selected by said area key, and said area code and said telephone number are converted into a dual tone multi-frequency (DTMF) signal by said dial key.

According to another aspect of the present invention, there is provided, in a paging receiver, means for automatically dialing a telephone number, comprising first memory means for storing telephone numbers, second memory means for storing area codes, first selection means for selecting a desired one of said stored telephone numbers, second selection means for selecting a desired one of said stored area codes, and dialing means for generating a dialing signal representing an area code and telephone number selected by said selection means.

10 For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to Figures 3 to 5 of the accompanying diagrammatic drawings, in which:

Figure 3 is a schematic block diagram showing one example of a
15 paging system embodying the present invention;

Figure 4 is a map diagram of a memory 40 of the system of Figure 3;
and

20 Figure 5 is a flow chart for describing one example of the function of automatic dialing in a paging system embodying the present invention.

Referring to Figure 3, a receiver 10 demodulates a radio frequency signal to shape the waveform thereof and, thereafter, convert the shaped

signal into a digital signal. A control circuit 20, which controls the entire operation of a paging receiver, includes a DTMF generator 22 for converting a transmitting telephone number into a DTMF signal and a RAM 21 for storing a received telephone number. An LCD 30 displays received telephone numbers under control of the control circuit 20. A memory 40 which is an EEPROM (Electrically Erasable and Programmable Read Only Memory) stores first and second specific self-addresses in a first area, telephone numbers in a second area and area codes in a third area. A read key 50 and an area key 60 supply key instructions to the control circuit 20 so as to select successively the telephone numbers stored in the second area of the memory 40 and the area codes stored in the third area of the memory 40, respectively. A dial key 70 supplies a key instruction to the control circuit 20 so as to generate a selected area code and telephone number as a DTMF signal by driving the DTMF generator 22. An editing key 80 supplies a key instruction to the control circuit 20 so as to erase unnecessary extension numbers for dialing except for the area code and the telephone number. A speaker 90 generates the DTMF signal output from the DTMF generator 22 in the control circuit 20 as a DTMF tone, and a buzzer 100 generates an alert signal output from the control circuit 20 as an alert tone.

20

Referring to Figure 4, a first area 4A of the memory 40 is an area for storing first and second specific self-addresses. A second area 4B is an area for storing telephone numbers stored in the RAM 21 and can store data of 12 digits. A third area 4C is an area for storing area codes.

25

Referring briefly to Figure 5, in a paging system for performing automatic dialing, after performing a normal operation, whether or not the read key 50 is depressed is monitored and the telephone number of the

memory corresponding to the number of depressions of the read key 50 is displayed if the read key is depressed. Then, whether or not the area key 60 is depressed is monitored and the area code of the memory corresponding to the number of depressions of the area key 60 is displayed together with the
5 telephone number if the area key is depressed. Thereafter, whether or not the editing key 80 is depressed is monitored and any unnecessary number for dialing among the displaying telephone number may be erased if the editing key 80 is depressed. Next, whether or not the dial key 70 is depressed is monitored and the displaying area code and telephone number are successively
10 converted into DTMF signals if the dial key 70 is depressed.

An example of operation of the above-described embodiment of the invention will now be described in detail with reference to Figures 3 to 5.

15 First, a radio frequency signal is applied to the receiver 10 in a POCSAG code form and the control circuit 20 controls the operation of the receiver 10 so as to receive the radio frequency signal at its own frame period. The receiver 10 demodulates the received radio frequency signal to shape the waveform thereof and convert the shaped signal into a digital signal.
20 In this case, the received one frame data consists of an address code word and a message code word. The control circuit 20 receiving the signal output from the receiver 10 compares a specific self-address (customer administration penal code; CAP code) stored in the first area 4A of the memory 40 with the received address code word, to check whether the received signal is addressed
25 to the specific paging receiver. If they are the same, the control circuit 20 stores the message code word in a predetermined area of the RAM 21 as the received telephone number of a caller, at the same time, displays it on the LCD 30 and notifies a user that a message has been received by driving the

buzzer 100. Further, the control circuit 20 stores a message stored in the RAM 21 of the control circuit 20 in the second area 4B of the memory 40 for protecting the received message if power is turned off. The above paging receiver has a plurality of memories (which are 240 or 360 digits memory for example), and repeatedly performs the above-mentioned operation when it is in a normal operation mode.

Turning to the schematic diagram of the map of the memory 40, the memory 40 uses a commercially available EEPROM and, here, an EEPROM of 4096 bits (256 words $\times$ 16 bits) will be described as an example.

In the first 32 bits area of the first area 4A, first address data of 18 bits such as A1 area and frame data of 3 bits such as A2 area are recorded and, in the second 32 bits area, second address data of 18 bits such as A3 area and frame data of 3 bits such as A4 area are recorded. These addresses recorded in the A1 area and the A3 area are specific self-addresses. Let it be assumed that a CAP code is "0014588", the "quotient" is used as address and the "remainder" is used as frame by dividing the CAP code by 8 in the paging system ($0014588 \div 8 = 1823.5$). In the above, the positive number of the quotient, "1823" is used for an address and the decimal fraction thereof, "0.5" multiplied by "8" is for a frame ($0.5 \div 8 = 4$). Therefore, in case of using the CAP code "0014588" as the first address, "1823" of 18 bits is recorded as a first specific self-address in the A1 area and "4" of 3 bits is recorded as frame data in the A2 area. The first address is a single self-address and the second address is a group address which belongs to its group.

In the second area 4B, the received telephone numbers are recorded. That is, the received telephone numbers as a message are stored in the RAM

21 and, at the same time, are successively recorded in the address area of the second area 4B corresponding to the RAM 21 so as to protect the message even if power is turned off. In this case, 48 bits which can store 12 digits are assigned in one telephone number area.

5

In the third area 4C, a plurality of area codes are recorded. The third area 4C is an area for selecting the area code of the caller when performing automatic dialing, and a size which can store at least a number above 4 bits is assigned because the digit numbers of the area code may differ between areas.

10

In the case that a user confirms a received telephone number and performs automatic dialing under the above condition, first, the user depresses the read key 50 to confirm the telephone number. Then, the control circuit
15 20 counts the number of depressions of the read key 50 and displays the corresponding telephone number stored in the RAM 21 on the LCD 30. When a desired telephone number is displayed on the LCD 30, the user depresses the dial key 70. In that case, a DTMF signal is generated through the control circuit 20. The DTMF signal is applied to the telephone
20 transmitter through the speaker 90 and the DTMF tone output from the telephone transmitter is applied to the exchange.

If it is necessary for the user to consider an area code of the telephone number, the user selects a desired telephone number on the LCD 30 by using
25 the read key 50 and depresses the area key 60. Then, the control circuit 20 displays an area code corresponding to the number of depressions of the area key 60 together with the telephone number on the LCD 30 by selecting the area code in the third area 4C of the memory 40. Next, if the user depresses

the dial key 70, a desired telephone number and an area code are successively generated as the DTMF signal. Further, in the case that the telephone number includes an unnecessary extension number for dialing, it may be necessary for the user to erase the unnecessary telephone extension number by using the editing key 80. That is, when depressing the editing key 80 briefly, the cursor on the LCD 30 is shifted, and when depressing the editing key 80 for longer after stopping the cursor at a digit location which should be erased, the digit is erased. Here, the editing key 80 must be depressed for more than a few seconds.

10

Turning to the performance of automatic dialing, the control circuit 20, if a key instruction is not sensed, analyzes frame data received through the receiver 10 and successively records the contents of the message code word at a corresponding address location among the RAM 21 and the second area 4B of the memory 40, when the contents of the address code word coincide with the data of the first address or the second address stored in the first area 4A of the memory 40.

Under the above described normal operation condition, if depression of the read key 50 is sensed, the control circuit 20 notifies this in a step 502, checks whether the telephone number stored in the RAM 21 exists or not in a step 504, and if it exists, reads out the finally received telephone number among the stored telephone numbers through a step 506 and displays it on the LCD 30. The user confirms the display of the finally stored message as above described and depresses the read key 50 continuously to select a wanted telephone number. Then, the control circuit 20 counts the number of depressions of the read key 50 in the step 506 and displays the telephone number of the RAM 21 corresponding to the number of depressing the read

key 50 on the LCD 30 in a step 508. Therefore, on the LCD 30, the telephone number read out from the RAM 21 corresponding to the number of depressions of the read key 50 is displayed whenever the read key 50 is depressed.

5

In this case, if the user should like to call the telephone number displayed on the LCD 30 by automatic dialing, the user must determine whether or not the telephone number should be considered as regional or local. The regional or local characteristic is determined by considering the
10 respective locations of the caller and the user when paging by a radio call. Therefore, if the user depresses the area key 60, the control circuit 20 notifies this in a step 510, reads out an area code which corresponds to the number of depressions of the area key 60 in the third area 4C of the memory 40 in a step 514 after counting the number of depressions of the area key 60 in a step
15 512, and displays the corresponding area code together with the respective telephone number on the LCD 30. Accordingly, when considering the regional or local characteristic after selecting a desired telephone number by using the read key 50, the user selects the corresponding area code in the third area 4C of the memory 40 by using the area key 60, and then, the area
20 code is displayed together with the telephone number on the LCD 30. In this case, on the LCD 30, since a display area of the area code and the telephone number are assigned separately, the displaying location becomes the area code + telephone number.

25

Furthermore, in the case that unnecessary extension numbers, etc., for dialing are included in the telephone number, these extension numbers should be removed. As described above, the unnecessary data for dialing may be erased using the editing key 80, and, in such a case, this may be used only if

the user quickly depresses the editing key 80 within a predetermined time. Then, the cursor on the LCD 30 can be shifted, and if the cursor is located at the unnecessary data displayed on the LCD 30, the data may be erased only if the user depresses the editing key 80 for more than the predetermined time.

5 Hence, if the control circuit 20 senses the input of the editing key 80 for more than the predetermined time in step 516, it erases the data at which the cursor is currently located now on the LCD 30 in a step 518.

10 To perform automatic dialing after erasing unnecessary data contained among the telephone number and the area code, the user depresses the dial key 70. Then, the control circuit 20 notifies this in a step 520 and converts the telephone number displaying on the LCD 30 presently into a DTMF signal by driving the DTMF generator 22 in a step 522. The DTMF signal output from the DTMF generator 22 is converted to a DTMF tone through the
15 speaker 90 and applied to the telephone exchange through a local telephone transmitter (e.g a handset).

In the above processes for performing automatic dialing in a paging receiver, first, the user selects the telephone number to be dialed by using the
20 read key 50 and erases the unnecessary data when adding the area code and performing a dialing by using the area key 60 or the editing key 80. Here, the input order of the area key 60 and the editing key 80 do not matter even if they have the input order changed. When a desired telephone number is selected, it is converted to a DTMF signal through the dial key 70, which can
25 bring the same effect as an automatic dialing function.

Now, by way of example, assume that the data in the second area 4B and the third area 4C of the memory 40 are as in Table 1 below.

- Table 1 -

	the second area (maximum 12 digits)	the third area (maximum 4 digits)
1	263 - 1627	00
2	728 - 8169	02
3	568 - 4345	032
4	745 - 008432	0331
5	461 - 8038	0546
6	30 - 3344	0681
.	.	.
.	.	.

Assume that the user selects the number of 0331 (an area code) + 745 (a telephone office number) + 0084 (a telephone number) + 32 (an extension number) for automatic dialing. In this case, it is assumed that, in the second area 4B of the memory 40, the telephone number is applied and stored thereto, and, in the third area 4C of the memory 40, the area code is set as shown in Table 1.

First, the user confirms the telephone number stored in the RAM 21 by depressing the read key 50. Here, in the RAM 21, the same telephone number with the stored telephone number in the second area 4B of the memory 40 is in a stored condition. Therefore, the control circuit 20 displays the telephone number corresponding to the number of depressions of the read key 50, and, in the "4"th position, the number, 745 - 008432 is displayed on the LCD 30. Then, the user edits the number to the desired telephone number by depressing the area key 60 or the editing key 80. When the user

depresses the area key 60, the control circuit 20 displays the corresponding area code in the third area of the memory 40 together with the telephone number on the LCD 30. Therefore, the area code and the telephone number of "0331 745-008432" are displayed on the LCD 30. In this case, since the
5 extension number "32" is unnecessary data for dialing, it should be removed by using the editing key 80. Here, the editing key 80 is used in two modes and if it is depressed above a predetermined time, it serves as a erasing function, and if depressed far less than the predetermined time, it serves as a cursor shift key. Accordingly, the extension number "32" is erased by using
10 the editing key 80. When performing the above processes, the number, "0331 745-0084", is displayed. Here, if the user depresses the dial key 70, the DTMF generator 22 is driven and the telephone number displaying on the LCD 30 is converted as a DTMF signal.

15 As above described, in a paging receiver, in the case of confirming a received telephone number and performing automatic dialing of the confirmed telephone number, by considering a desired area code and erasing unnecessary data contained in the telephone number, errors generated during dialing can be minimized and the stored telephone number can be maintained even if power
20 is turned off, thereby improving reliability.

While a preferred embodiment of the invention has been particularly shown and described, it will be understood by those skilled in the art that modifications in detail may be made without departing from the spirit and
25 scope of the invention.

CLAIMS

1. A method for automatic dialing in a paging system having a memory for storing a specific self-address in a first area, a received telephone number
5 in a second area and an area code in a third area, wherein said received telephone number is stored into said second area if received with an address which is coincident with said specific self-address and thereafter, the stored telephone number is selected by depressing first to fourth keys and a dual tone multi-frequency (DTMF) signal is generated through a telephone transmitter,
10 the method comprising the steps of:

selectively displaying on display means, when said first key is depressed a telephone number corresponding to a number of depressions of said first key, said telephone number being stored in said second area of said
15 memory;

selectively displaying on said display means, when said second key is depressed, an area code corresponding to a number of depressions of said second key, together with said telephone number, said area code being stored
20 in said third area of said memory;

optionally editing a telephone number to be transmitted by erasing a character which is indicated by a cursor among the telephone number displayed on said display means, when said third key is depressed; and
25

converting the edited telephone number into a dual tone multi-frequency (DTMF) signal when said fourth key is depressed, and transmitting said dual tone multi-frequency (DTMF) signal to the telephone transmitter.



2. A method according to claim 1, wherein said memory is an electrically erasable and programmable read only memory (EEPROM) capable of protecting stored data when power is turned off.

5 3. A method for automatic dialing in a paging system having a read key, an area key, a dial key and a memory for storing a specific self-address, a received telephone number and an area code in first to third areas, the method comprising the steps of:

10 selecting first data corresponding to a number of depressions of said read key as a telephone number, when said read key is depressed, said first data being stored in said second area of said memory;

15 selecting second data corresponding to a number of depressions of said area key as an area code, when said area key is depressed, said second data being stored in said third area of said memory; and

20 converting said selected area code and telephone number into a dual tone multi-frequency (DTMF) signal when said dial key is depressed and transmitting said selected area code and telephone number to a telephone transmitter.

4. A method according to claim 3, wherein said memory is an electrically erasable and programmable read only memory (EEPROM) capable of
25 protecting stored data when power is turned off.



5. A paging receiver for automatically dialing a received telephone number of a caller by analyzing a received radio frequency signal, the receiver comprising:

5 receiver means for demodulating the received radio frequency signal, shaping waveforms thereof, and converting the shaped signal into a digital signal;

10 control circuit means connected to said receiver means for controlling automatic dialing function according to key instructions and having a first memory for storing said received telephone number and dual tone multi-frequency (DTMF) generator means for converting a transmitting telephone number into a dual tone multi-frequency DTMF signal;

15 display means connected to said control circuit means for displaying said received telephone number according to a control signal of said control circuit means;

20 a second memory connected to said control circuit means, for storing first and second specific self-addresses in a first area, said received telephone number in a second area and an area code in a third area;

25 read key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to select successively said telephone numbers stored in said second area;



area key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to select successively said area code stored in said third area;

5 dial key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to convert a selected area code and telephone number into a dual tone multi-frequency (DTMF) signal by driving said dual tone multi-frequency (DTMF) generator;

10 editing key means connected to said control circuit means, for supplying a key instruction to said control circuit means so as to erase unnecessary extension numbers for dialing except for said area codes and said telephone numbers; and

15 speaker means connected to said control circuit means, for converting said dual tone multi-frequency (DTMF) signal output from said dual tone multi-frequency (DTMF) generator of said control circuit means into a dual tone multi-frequency (DTMF) tone and supplying said dual tone multi-frequency (DTMF) tone to a telephone transmitter;

20

whereby, in use, a desired telephone number is selected by said read key, said area code of the selected telephone number is selected by said area key, and said area code and said telephone number are converted into a dual tone multi-frequency (DTMF) signal by said dial key.

25

6. In a paging receiver, means for automatically dialing a telephone number, comprising first memory means for storing telephone numbers, second memory means for storing area codes, first selection means for selecting a



desired one of said stored telephone numbers, second selection means for selecting a desired one of said stored area codes, and dialing means for generating a dialing signal representing an area code and telephone number selected by said selection means.

5

7. An automatic dialing means substantially as hereinbefore described with reference to Figures 3 to 5 of the accompanying drawings.

