(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 863 493 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
09.09.1998 Bulletin 1998/37

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

(21) Application number: **98101473.1**

(22) Date of filing: **28.01.1998**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **28.01.1997 JP 13731/97**

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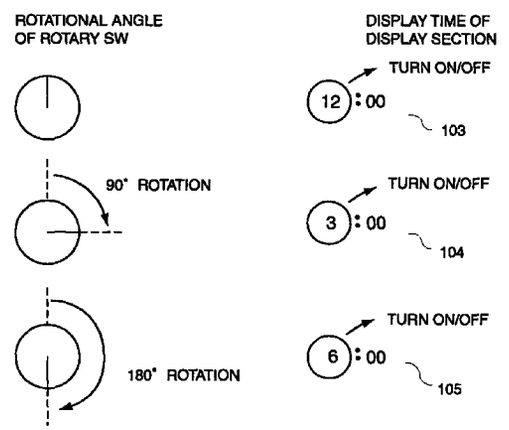
(54) Radio selection/calling receiver and data display/selection device applying thereto

(57) A data display/selection device is to display and select data which are determined by a rotational position of clock hands. The device includes a rotary type switch, display unit for displaying data, an element for causing the display unit to display data corresponding to a rotational position of clock hands, the rotational position which corresponds to a rotational position of the rotary type switch, and an element for determining a selection of the data displayed on the display unit.

FIG.3B



EP 0 863 493 A2

Description

BACKGROUND OF THE INVENTION

The present invention relates to a digital equipment such as a radio selection/calling receiver and a data display/selection device applying thereto and having a rotary type switch, and more particularly to a data display selection device for selecting a display for data when setting a clock and the like by means of a switching operation of the radio receiver for calling a selection.

The conventional radio selection/calling receiver (hereafter called as a receiver) has as a manipulation device having a plurality of push-button switches in addition to a power switch (hereafter abbreviated as SW).

The push-button switches have a plurality of functions for selection, determination and the like, respectively, and are used for setting data of time and condition of a clock.

Setting the clock may concern the display of the present time, a time-stamp of a time at receiving a message, an alarm, a timer and the like. Therefore, the necessity to set a condition of the clock at frequent occasions has strongly increased.

Setting of the clock is generally performed in the manner that a selection SW 201 is pushes to change 1, 2, ..., 10, 11, 58, 59, 60 with each push so as to select the desired number about a second, and a determination SW 202 is pushed to determine the number about the second, so that the desired numbers of time such as a minute, hour and year are set in the same manner describes above.

Fig. 5A is an outline view showing an appearance of the conventional receiver, and Fig. 5B is an explanatory view showing a clock setting method.

As shown in Fig. 5A illustrating the outline view of the radio receiver, numeral 203 denotes a display section, and setting is performed by changing the display section 203 by means of the selection SW 201 and the determination SW 202.

Further, se shown in Fig. 5B, the display section 203 is changed by O→1→2... →1→2 with each push, and the desired number is determined by pushing the determination SW 202 when the desired number is displayed.

Furthermore, selection means is disclosed in JP-A-201256 /1995, in which a jog button is used for selecting one item from a plurality of selectable items, and an encoder section is linked with the jog button to detect the rotation amount thereof.

According to the conventional SW operation in the above-described digital equipment, there is a problem that the operator does not feel a sense of linking the SW operation and display when he pushes the selection SW to put the desired number. This deteriorates the operation efficiency.

A reason thereof is that, since the selection SW is a push-button switch, the operator must repeat the operation such as pushing the button several times which makes it hard to feel the condition of the selection SW.

Further, in the case of pushing the button too many times, it is necessary to take one more round of the numbers in the device if the selection SW can only select the numbers in the forward direction. Furthermore, in a device having a selection SW capable selecting items both in the forward and backward directions, there is the problem that the operator may feel a troublesome operation because the operator must change the manner of gripping the SW button.

SUMMARY OF THE INVENTION

The objective of the present invention is to solve the above-mentioned tasks.

Moreover, the objective of the present invention is to provide a digital equipment such as a radio selection calling receiver applying to a data display selection device capable of improving an operation efficiency for switching, especially for setting data about time.

The objective of the present invention is achieved by a data display/selection device characterized in comprising a rotary type switch having change and determination means; and display means for performing a display of data corresponding to a rotational position of the switch, wherein the device further comprises means for causing the display means to display the data corresponding to the rotational position of a rotational position of clock hands corresponding to the rotational position of the rotary type switch when analog data are displayed by the rotational position of the clock hands; and means for determining a selection of the data displayed on the display means.

The data display/selection device is also characterized in that the analog data are displayed as time and/or hour data, in which a time is displayed in a manner that the rotary position of the rotary type switch corresponds to said rotary position of said clock hands.

A data selection/calling receiver can comprise the digital equipment using the data display/selection device described in any of the above two paragraphs.

According to the present invention, since the data display/selection device comprises the rotary type push button SW (commonly called a jog dial) as a SW having functions of selection and determination, the control section for detecting a rotational angle based on an output signal corresponding to a rotation of the rotary type SW, and the display control section for displaying on the display section data corresponding to the output signal, it is extremely easy to operate the device in view of sensitivity and a human engineering because it is possible to display analog data which is displayed by the rotational position of the clock hands such as the clock data by the rotational position of the rotary type switch coinciding with the rotational position of the clock hands.

Furthermore, since the digital equipment such as a

receiver applying to the above-mentioned device according to the present invention, uses the rotary type switch as the selection switch, it is possible to improve the operational efficiency because the rotational position of the rotary type switch coincides with moving of the clock hands when the clock condition is set.

BRIEF DESCRIPTION OF THE DRAWINGS

This and other objects, features and advantages of the present invention will become more apparent upon a reading of the following detailed description and drawings, in which:

Fig. 1 is a block diagram showing a receiver according to an example of the present invention;
Fig. 2 is a block diagram showing a control section 4;
Fig. 3A is an outline view showing the receiver;
Fig. 3B is a view showing a rotational angle of the rotary type SW and a display example of a time setting in the receiver according to the example of the present invention;
Fig. 4A is a view for explaining a rotational angle of the rotary type SW;
Fig. 4B is a view showing a rotation and display operation in a rotary type SW;
Fig. 5A is an outline view showing the conventional receiver; and
Fig. 5B is a view showing a time setting method of the conventional receiver.

DESCRIPTION OF THE EMBODIMENTS

A receiver as a digital equipment having a data display/selection device according to the present invention, comprises a rotary type push button SW having functions of a selection SW and determination SW capable of rotating both in the forward and backward directions, a counter section for counting pulses at contacting points by the rotation of the selection switch, a control section for recognizing a rotational angle by the pulses from the counter section, and a display control section for displaying image data on a display section based on signals recognized in the control section.

The receiver according to the present invention outputs pulses at each of certain rotational angles when a person bringing the receiver rotates the selection switch. The counter section counts the pulses so as to output the counted number to the control section at a certain time unit. The control section recognizes the rotational angle of the selection SW and which is rotated by a person bringing the receiver, based on the counted number, so as to output to the display control section display data corresponding to the rotation angle, thereby to display a time on the display unit such as LCD (liquid crystal display).

Further, there will be described a preferred embodiment of the present invention with reference to the drawings.

Fig 1 is a block diagram showing the receiver according to the preferred embodiment of the present invention.

In Fig. 1, a radio signal received by an antenna 1 is demodulated after being amplified by a radio section 2. A wave-form shaping circuit 3 transforms a demodulated signal into a wave form which can be read by a control section 4. The control section 4 compares a signal from the wave-form shaping circuit 3 with an own calling number which has been previously written in a writable read only memory (ROM) 5. Then, when both the signals coincide with each other, speaker 7 and LED 9 inform a calling from the control section to a person bringing the receiver through amplifiers 6 and 8.

In a case of receiving a message, the message is displayed through a display section driver 10 on a display section 11.

Here, there will be described in more detail the construction of the control section 4.

Fig. 2 is a block diagram showing the control section 4.

In Fig. 2, numeral 41 denotes a ROM, which is constructed from a chip such as AT27BU040 or the like, for example. The ROM 41 stores a program for operating the control section 4, and data for displaying characters such as a Chinese character and the like.

Numeral 42 denotes a RAM (random access memory), which is constructed from a chip such as MSM5256DRU or the like. The RAM stores received data.

Numeral 43 denotes a CPU (central processing unit), which is constructed from a chip such as T6W59D or the like. The CPU 43 controls the control section 4 corresponding to the program which has been stored in the ROM 41.

Numeral 44 denotes a decoder, which is constructed from a chip such as BU12106 or the like. The decoder 44 reads signals which are supplied from the radio section 2.

The control section 4 having the above-mentioned construction, compares the signals with the data stored in an ID-ROM, in which the signals are read by the decoder 44 after having been received, amplified and demodulated by the radio section 2. When an address of the signals coincides with an address of the data each other, informing operation is performed. The CPU 43 controls the entire control section 4, causes the data to be stored in the Ram 41, and operates an alarm and display.

The receiver is caused to be operated by a power source 12 and CLK 13. Further, numeral 14 denotes a rotary type push button SW for performing selection and determination.

Furthermore, numeral 15 denotes a counter for counting pulses which are generated by a rotation of the rotary type push button SW, which counts the pulses

from the rotary type push button SW at each of forward and backward directions, so as to output a counted number of pulses to the control section 16 with a certain time unit.

The control section 16 calculates a rotation angle of the rotary type push button SW based on the counted number of pulses which are counted by the counter in the forward and backward directions, and the section 16 displays the time corresponding to the rotation angle calculated.

Fig. 3A is an outline view showing a receiver according to an embodiment of the present invention, and Fig. 3B is a view showing the rotation angle of the rotary type push button SW and a display example of a time setting which is displayed on the display section. In the figures, numeral 101 denotes a rotary type push button SW, and 102 denotes a display section. Numeral 103 shows a time display example at 0° of the rotational angle of the rotary type SW.

Fig. 3B is the rotational angle of the rotary type push button SW and a display example of the time setting which is displayed on the display section according to the example. The time (hour and minute) which is displayed on the display section, changes in accordance with the rotational angle.

When setting the "hour", the display section displays 3:00 (104) in the case where the rotational angle is 90°, and 6:00 (105) in the case where the angle is 180°.

When setting the "minute", the display section displays fifteen minute in the case where the angle is 90°, and thirty minutes in the case where the angle is 180°.

Figs. 4A and 4B show a rotation of the rotary type SW and a display operation according to an embodiment of the present invention, respectively.

In Fig. 4A, numeral 111 denotes a rotational angle of the rotary type SW, in which it is assumed that the angle is a one-pulse/30° for the sake of an explanation.

In Fig. 4B, numeral 112 denotes a wave form of output pulses when the rotary type SW is rotated in the forward direction, and numeral 113 denotes a wave form of the output pulses when the rotary type SW is rotated in the backward direction. Furthermore, numeral 114 denotes shows a timing at which the counted number of pulses is detected, in the manner that the counted value is detected at each of pulses in the forward and backward directions, respectively, so as to be reset.

It is now assumed that there is a time setting mode, since the rotary type SW has not been rotated yet at (1)115, the counted values are zero both in the forward and backward directions, and the hour of "12:00" is continued to be displayed (120).

Next, at (2)116, since the rotary type SW is rotated in the forward direction with two pulses, the control section controls the display to "2:00" (121). In the same manner, the hour of "5:00" is displayed at (3)117, and the hour of "4:00" is displayed at (4)118 in the backward direction.

Furthermore, in Fig. 4B, numeral 119 denotes a detection timing (5), 122 denotes a display example at detection timing (3), 123 denotes a display example at detection timing (4), and 124 denotes display example at detection timing (5).

According to the above-mentioned method, the desired time is set, and the determination SW is turned on by means of pushing down the rotary type SW, so as to be able to decide the time setting. Furthermore, a detection timing t of 114 is set to the value corresponding to a processing efficiency of the display control section (about several ten mS : a speed on which the display changes without a sense of incongruity by human eyes).

Furthermore, there will be described in detail another embodiment providing means for displaying on the display section a figure of the clock or watch which is displayed according to a rotational position of the rotary type SW.

In order to perform such a display, it is possible to easy utilize the display by means of a memory and a microcomputer, in which the memory such as the control section 16 has previously stored the figure of the clock as the data, and the microcomputer controls to change a display position of clock hands according to the rotational position of the rotary type SW.

According to this embodiment, an illustration of the clock is shown in the display section, and a movement of the clock hands is connected with the rotational position of the rotary type SW, so as to improve visual understandings, thereby enabling the time setting to be easy.

The effect of the present invention resides in a merit of improving an operation efficiency by means that it is possible to sensitively understand the rotation of the rotary type push button SW and the display of the set time when setting the clock relevant thereto.

The reason of the merit is to provide an easiness for a person having the digital equipment because the rotational angle of the rotary type SW and the set time on the display section coincide with the movement of the clock hands.

Accordingly, since the present invention comprises the rotary type push button SW (commonly called a jog dial) having functions of selection and determination, the control section for detecting the rotational angle of the rotary type SW based on output signals corresponding to the rotation thereof, the display control section for displaying data corresponding to the output signals on the display section, when analog data are displayed by the rotational position of the clock hands, it is possible for the rotational position of the rotary type switch to coincide with the rotational position of the clock hands to display the time, thereby extremely improving the operation efficiency in view of the sensitivity and human engineering.

Furthermore, in the digital equipment applying the device such as the receiver according to the present

invention, since the rotary type SW is used as the selection SW, it is possible to improve the operation efficiency because the rotational position of the rotary type SW is caused to coincide with the movement of the clock hands when setting the clock relevant thereto.

Claims

1. A data display/selection device for displaying and selecting data which are determined by a rotational position of clock hands, comprising:

   a rotary type switch;
   display means for displaying data;
   means for causing said display means to display data corresponding to a rotational position of clock hands, said rotational position which corresponds to a rotational position of said rotary type switch; and means for determining a selection of said data displayed on said display means.

2. The data display/selection device as set forth in claim 1, wherein hour and/or time data as said data are displayed in a manner that said rotational position of said rotary type switch corresponds to said rotational position of said clock hands, so as to display the time data.

3. The data display/selection device as set forth in claim 2, further comprising:

   means for causing said display means to display a figure of a clock which is connected with a movement of said rotational position of said rotary type switch.

4. A digital equipment comprising said data display/selection device as set forth in claim 1.

5. A data display/selection device, comprising:

   a rotary type switch having change and determination means; and
   display means for performing a display of data corresponding to a rotational position of said rotary type switch:

   said data display/selection device comprising:

   means for causing said display means to display data corresponding to said rotational position of said rotary type switch, said rotational position which corresponds to a rotational position of clock hands when displaying analog data performing a data display by said rotational position of said clock hands; and
   means for determining a selection of said data which have been displayed.

6. The data display/selection device as set forth in claim 5, wherein hour and/or time data as said analog data are displayed in a manner that said rotational position of said rotary type switch corresponds to said rotational position of said clock hands, so as to display a time.

7. A radio selection/calling receiver, comprising:

   a rotary type switch;
   display means;
   means for causing said display means to display time data in a manner that a rotational position of said rotary type switch corresponds to a rotational position of clock hands when said time data are set; and
   means for performing a determination of time setting.

8. The radio selection/calling receiver as set forth in claim 7, wherein said rotary type switch is a rotary type push button switch having a selection switch rotating in forward and backward directions, and a determination switch for determining said time setting:

   wherein said radio selection/calling receiver further comprises:

   a counter section for counting pulses at contact points of said selection switch through a rotation;
   a control section for recognizing a rotation angle according to said pulses of said counter section; and
   a display control section for displaying said data on said display means, based on a signal which is recognized by said control section.

9. The radio selection/calling receiver as set forth in claim 7, further comprising:

   means for causing said display means to display a figure of a clock which is connected with said rotational position of said rotary type switch.

10. A method for displaying/selecting data in a digital equipment and which are determined by a rotational position of clock hands, comprising:

    a step of rotating a rotary type switch in forward and backward directions;
    a step of displaying data corresponding to a rotational position of said rotary type switch and which corresponds to said rotational position of said clock hands;

a step of determining a selection of said data which have been displayed.

11. The method for displaying/selecting data as set forth in claim 10, wherein said step of displaying said data further comprises:

a step of counting pulses at contact points of said rotary type switch through a rotation;
a step of recognizing a rotational angle of said rotary type switch, based on a count of said pulses; and
a step of displaying data corresponding to a rotational position of clock hands and which corresponds to said rotational position of said rotary type switch.

FIG.1

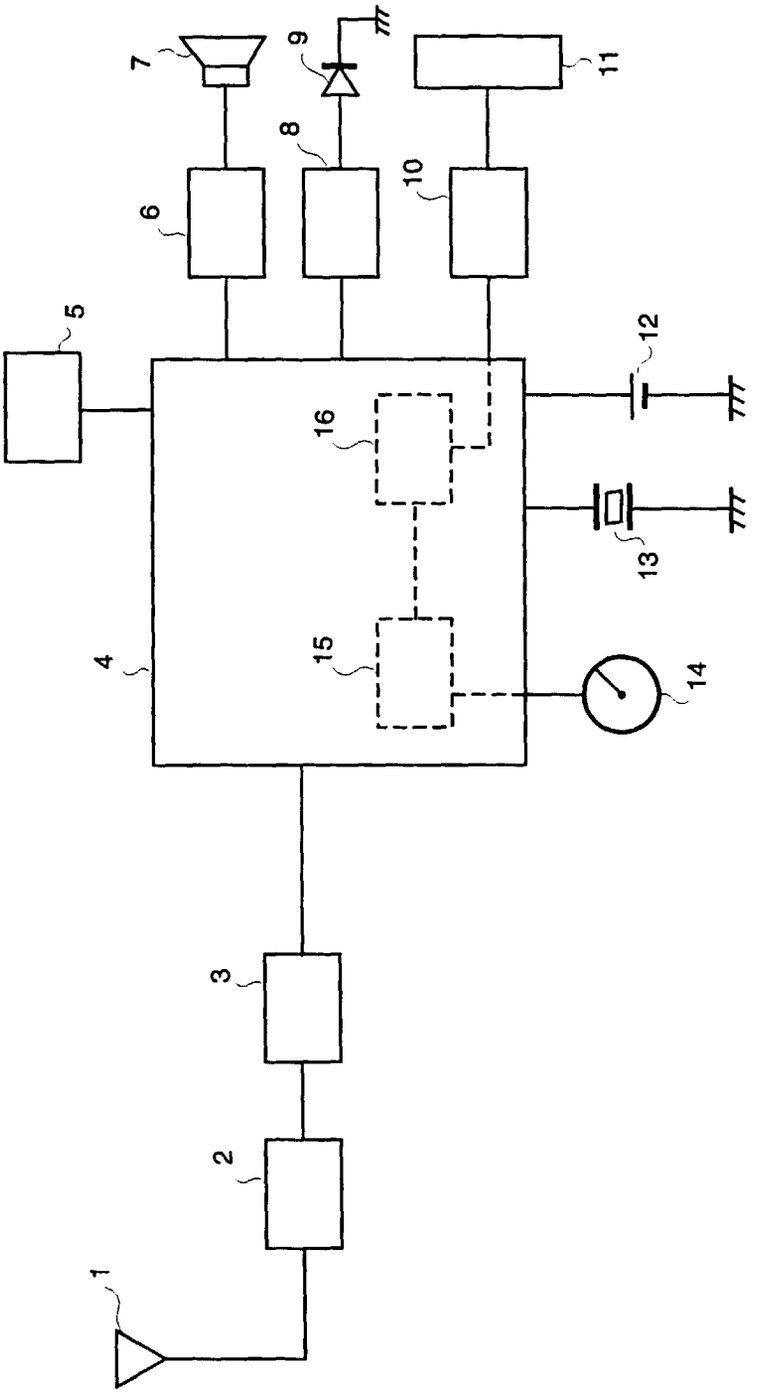


FIG.2

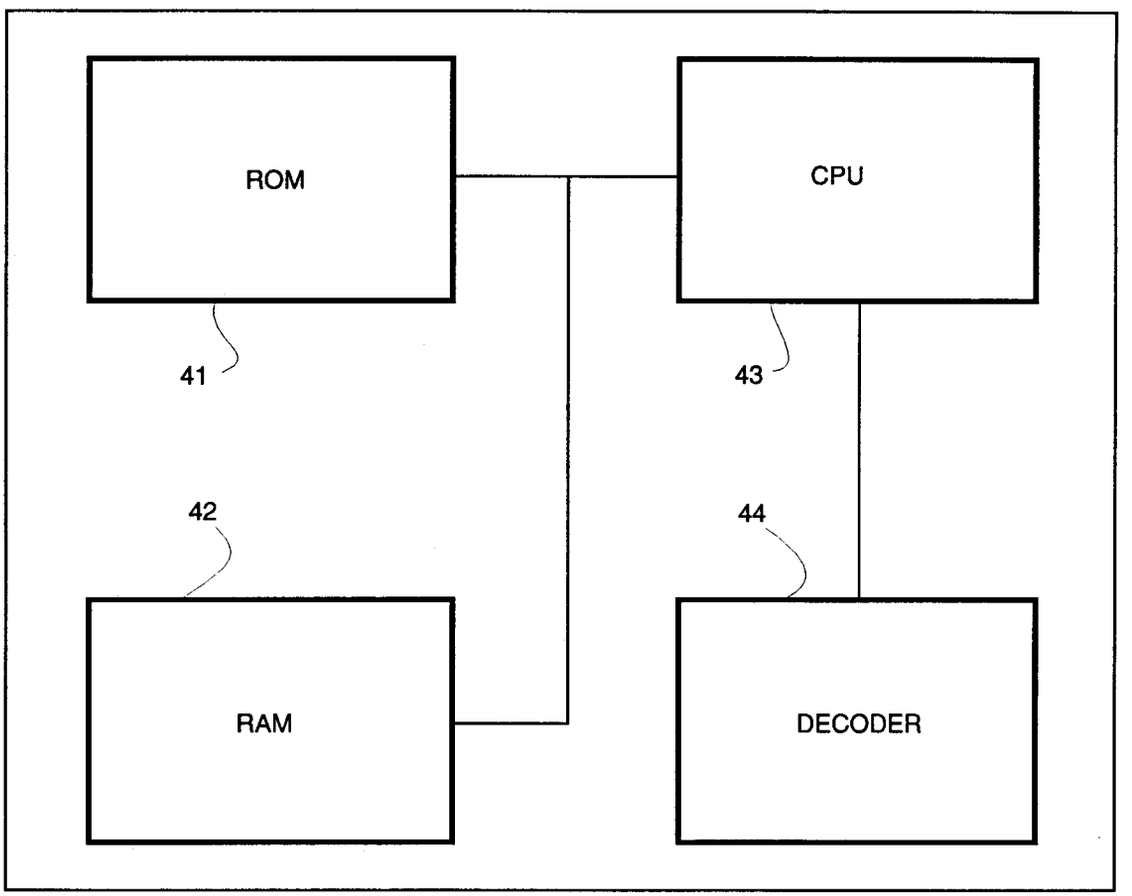


FIG.3A

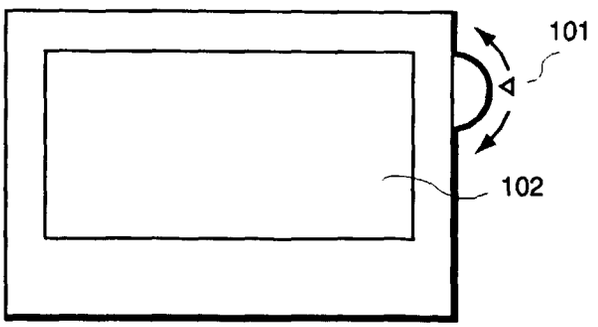

101
102

FIG.3B

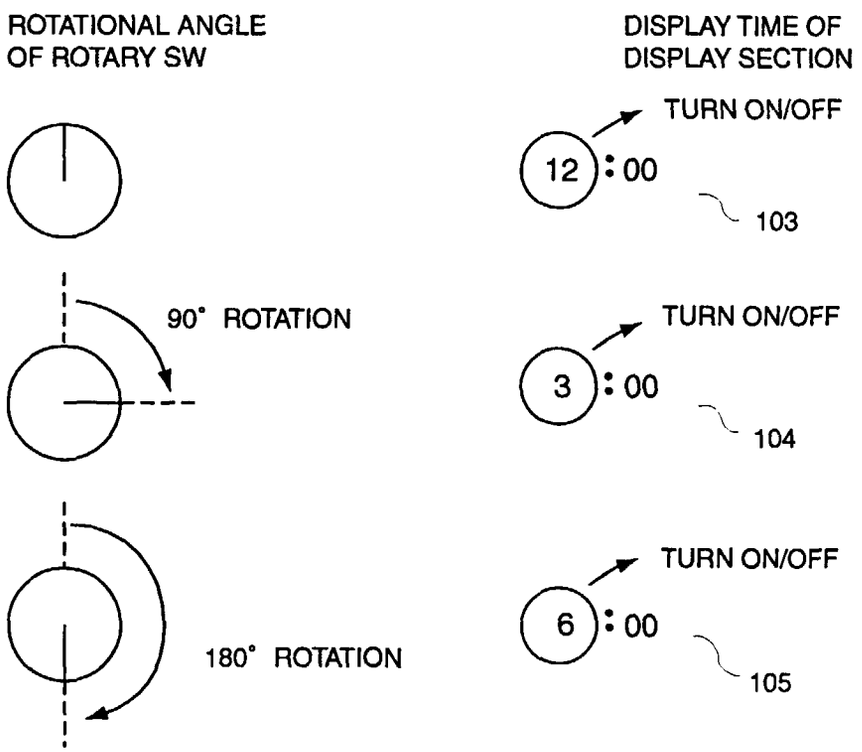
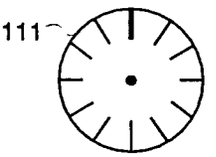

ROTATIONAL ANGLE
OF ROTARY SW
DISPLAY TIME OF
DISPLAY SECTION
TURN ON/OFF
12 : 00
103
90° ROTATION
TURN ON/OFF
3 : 00
104
TURN ON/OFF
6 : 00
105
180° ROTATION

FIG.4A



ROTARY TYPE SW

ROTATIONAL ANGLE IS SET TO ONE PULSE/30°

FIG.4B

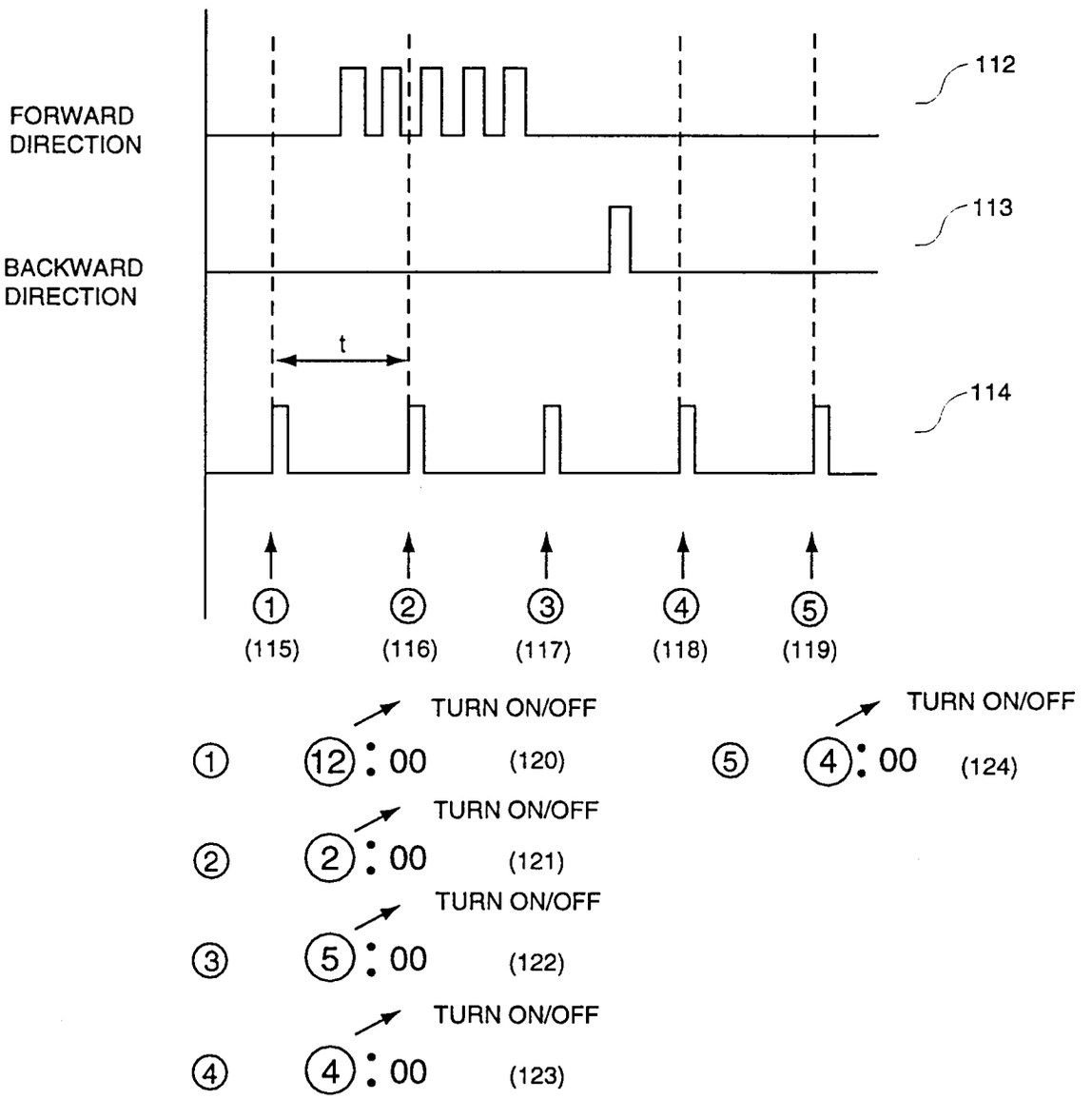


FIG.5A

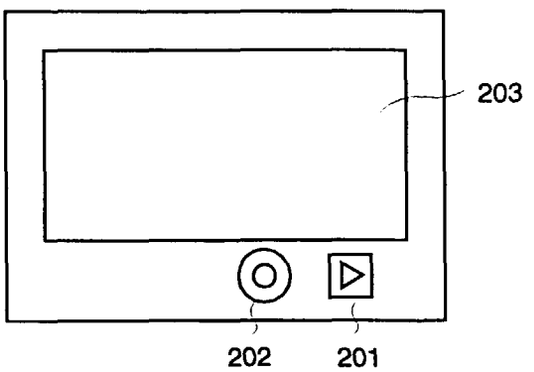
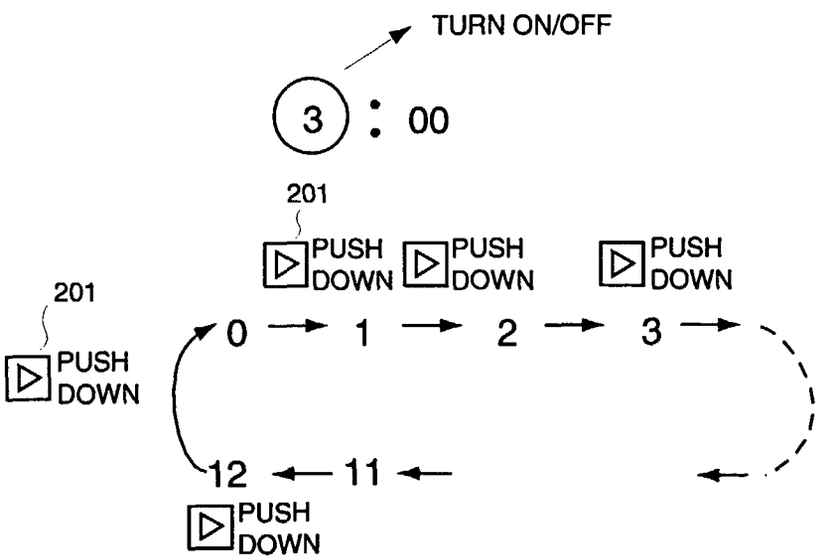

203
202
201

FIG.5B


TURN ON/OFF
3 : 00
201
PUSH DOWN
PUSH DOWN
PUSH DOWN
201
PUSH DOWN
0 → 1 → 2 → 3
12 ← 11
PUSH DOWN