

"CIRCUIT ARRANGEMENT FOR AN APPARATUS WITH A PICTURE AND/OR A
SOUND SIGNAL CHANNEL"

The invention relates to a circuit arrangement for an apparatus with a picture and/or a sound signal channel, which
5 comprises a muting stage for increasing the signal attenuation in that signal channel.

When home-entertainment apparatus, such as a radio, a TV receiver, a record player or a recorder, is sold, this is generally done with the guarantee that within a specific period after the
10 sale, defective apparatus will be repaired free of charge. The bill or a separate guarantee certificate then serves as proof for this guarantee. However, these documents may be mislaid or altered.

It is the object of the invention to provide a possibility of
15 ascertaining the date of the first use of the apparatus.

Starting from a circuit arrangement of the type specified in the opening paragraph, this object is achieved in that there is provided a non-volatile date memory which can be programmed by a user of the apparatus and, coupled thereto, a timer which can be
20 activated by switching on the supply voltage of the apparatus, and the date memory and the timer cause the muting stage to increase the signal attenuation after a predetermined time interval defined by the timer if the memory has not been programmed, whilst the muting stage is not influenced by the timer if the memory has been
25 programmed.

If the date of first use of the apparatus has been entered or programmed into the date memory, the apparatus will operate normally. However, if the date memory has not been so programmed, the timer is activated when the apparatus is switched on and begins
30 to time out. After a fixed time determined by the timer - generally a few minutes - the timer activates the muting stage so that the sound and/or picture practically disappear(s). Temporary normal operation may then be restored by switching off and subsequently switching on the apparatus, but this renders the
35 apparatus practically useless. Therefore, a user has to record the

date on which the apparatus is put into proper normal operation for the first time by programming the date memory. By means of this date memory, which forms part of the apparatus, it can then be ascertained whether the guarantee period has already expired.

5 Since the timer allows a short period of operation, final inspection during manufacture or pre-sale testing at the dealer remains possible.

 Such a circuit arrangement is not expensive because the only additional parts are a date memory and a timer, which can be
10 manufactured comparatively cheaply; a muting stage for increasing the signal attenuation is already present in some form or other in most apparatuses.

 A date memory can be constructed in various ways. In a first embodiment, the date memory comprises an input terminal and an
15 output terminal which are interconnected via at least one conductor arranged on a board and constituting an energising connection for the timer. For severing the conductor, the board is formed with a plurality of holes at the location of the conductor, which holes correspond to various dates. The date is then stored mechanically
20 in that the conductor or the conductors is/are severed at the location of the hole(s) corresponding to the date of first use of the apparatus, to break the energising connection for the timer.

 In another embodiment the date memory is an electrical non-volatile digital memory, which can be programmed by means of an
25 input unit via a digital control device, and the control device is constructed so that if the memory has not been programmed the timer is activated when the power supply is switched on and causes the attenuation of the muting stage to increase when a predetermined time interval has elapsed. In this case a digital electronic
30 memory is employed, for example a PROM, or the like.

 Embodiments of the invention will now be described in more detail, by way of example, with reference to the drawings. In the drawings:-

 Figure 1 shows a first embodiment of the invention,
35 Figure 2a shows the associated memory,

Figure 2b shows the same memory with the cover removed,
Figure 3 shows an embodiment comprising a micro-computer, and
Figure 4 is a flow chart of a part of the program for this
micro-computer.

5 Figure 1 shows schematically the block diagram of a radio
receiver comprising an aerial 1, a mixer stage 2, which mixes the
aerial signal with the signal from a tunable oscillator 3, an IF
and demodulator stage 4, a muting stage 5, by means of which the
attenuation for the demodulated signal can be changed, an audio
10 amplifier 6 and a loudspeaker 7. When the apparatus is switched on
by closing a switch 8, the parts 2 to 6 are connected to a supply
voltage source 9 via a supply line 19. The radio receiver is so
far known.

It accordance with the invention a control input of the muting
15 stage 5 is connected to the collector of a transistor 101, which is
also connected to the supply line 19 via a collector resistor 102.
A resistor 103 connects the base of the transistor to the output of
a timer 10, whose supply line 13 is connected to the output of a
date memory 11, whose input is also connected to the supply line
20 19. The timer 10 is constructed so that it starts to time out as
soon as an energising voltage is applied to it. In its initial
reset condition it generates a low direct voltage on its output,
which voltage turns off the transistor 101. The stage 5
consequently has a low attenuation. When a specific time interval,
25 for example a few minutes determined by the timer 10, has elapsed,
the timer 10 is set, causing a high direct voltage to appear on its
output, by means of which high direct voltage the transistor 101 is
turned on so that the attenuation of the stage 5 is switched over
to a high value via the transistor 101.

30 The timer 10 may be constructed in a simple manner, preferably
by means of an integrated circuit, for example of the type NE555,
and may also comprise a suitable matching stage, which generates
the voltages required for the correct operation of the muting
stage.

35 The date memory 11 is shown in Figures 2a and 2b. It

comprises a board 14 of plastics material to which input and output lines 12 and 13 are connected. These two lines are conductively connected to each other via three printed copper tracks 15, 16 and 17. The copper tracks extend across a plurality of holes 18 in the board, in such a way that only one of the three tracks extends across each hole. As can be seen in Figure 2a, the board is provided with a cover with a legend, which cover exposes the holes and is divided into three areas 150, 160 and 170. The area 150 which corresponds to the days of a month, contains the holes across which the copper track 15 extends, the area 160, which corresponds to the months, contains those across which the copper track 16 extends, and the area 170, which corresponds to the years, contains those across which the copper track 17 extends. When in each of the three areas a hole is pierced by means of a suitable object, for example a screwdriver, a specific date is stored (for example 05.03.1983 in Figure 2a) and the electrical connection between the lines 12 and 13 is interrupted. When this memory is used, the receiver shown in Figure 1 operates as follows:-

If the data memory has not been programmed as described above, the supply voltage is applied to the timer 10 via the input line 12 and the output line 13 when the receiver is switched on, and the timer starts to time out, with transistor 101 turned off. This causes a comparatively high voltage to appear on the collector of this transistor, so that the muting stage is rendered inoperative, i.e. has a low attenuation. After the timer has timed out, it is set, causing transistor 101 to be turned on and the muting stage 5 to become operative, so that the loudspeaker 7 produces no sound. However, if the memory 11 has been programmed by severing the copper tracks at the location of the relevant hole in each of the areas 150, 160 and 170, the connection between the lines 12 and 13 is interrupted. The timer 10 then receives no energising voltage and thus remains reset and transistor 101 remains cut off, so that a high voltage is applied to the control input of the muting stage and this stage is set to a low attenuation.

It is alternatively possible to connect the supply voltage

input of the timer 10 directly to the switch 8 and to connect the output of the timer 10 to the control input of the muting stage via the memory 11, in which case the matching circuit 101 ... 103 may be dispensed with.

5 Instead of being coupled to the muting stage the timer may alternatively be coupled to a stand-by circuit by means of which sound reproduction can be discontinued. Also, it is possible to disconnect the supply voltage from the audio channel via the timer 10 or the memory 11. In all these cases it is essential only that
10 there is a stage whose attenuation or gain can be set from a low to a high value by means of a control voltage.

Figure 1 shows the invention applied to a radio receiver. In a similar way it may be employed in other equipment comprising an audio channel, for example a record player, a recorder or a
15 television receiver. In a television receiver it is also (or alternatively) possibly to control the video channel in a similar way.

Figure 3 shows the block diagram of a radio receiver in accordance with the invention in which the receiver is controlled
20 by a control device in the form of a micro-computer 21. The muting stage 5, or a stage whose attenuation can be controlled by means of a direct voltage, is connected to the output of the timer 10 over a line 25 and to an output of the micro-computer 21 over a line 26. The micro-computer is connected to a non-volatile digital memory,
25 for example of the EAROM-type, in which the date of putting into operation can be stored with the aid of a keyboard 23 via the micro-computer. The micro-computer also controls a display 22 by means of which inter alia the contents of memory 20 can be displayed.

30 How the micro-computer co-operates with the devices 5, 10, 20, 21, 22 and 23 follows from the flow-chart of a part of the program shown in Figure 4, which program is performed each time that the supply voltage is switched on and each time that an entry destined for the memory 20 is keyed in. In interrogation block 30 it is
35 ascertained whether the memory 20 has been programmed or not, i.e.

whether its contents differs from zero. If this is not the case, the program branches to block 31, causing the timer 10 to be activated, so that after a predetermined time interval has elapsed the sound reproduction is muted by means of a control signal over the line 25. Moreover, the user is instructed to enter the date into the memory (block 32) in a suitable manner, for example by blinking of the display 22 or by a beep tone.

However, if the contents of the memory 20 is not zero, i.e. if the memory has been programmed, the program proceeds to block 33, in which the muting circuit 5 is rendered inoperative (low attenuation) by means of a control signal over the line 26 and the micro-computer 21 enters no further dates into the memory 20. This is in order to prevent a date which has already been entered from being altered, which in principle is possible in the case of memories of the EAROM-type. This step is not necessary if instead a memory of the PROM type is used, but this demands the use of a suitable interface for programming such a memory.

If it is taken into account that in a receiver controlled by a micro-computer the devices 21, 22 and 23, and generally also the memory 20, are needed anyway for other control purposes, it will be evident that the additional cost for the invention mainly resides in the timer 10 and in the change of the micro-computer program as shown in Figure 4. If desired, the timer function may also be carried out by the micro-computer.



CLAIMS:-

1. A circuit arrangement for an apparatus with a picture and/or a sound signal channel, which comprises a muting stage for increasing the signal attenuation, characterised in that there is provided a non-volatile date memory which can be programmed by a user of the apparatus, and coupled thereto, a timer which can be activated by switching on a supply voltage of the apparatus, and the date memory and the timer cause the muting stage to increase the signal attenuation after a time interval defined by the timer has elapsed if the memory has not been programmed, whilst the muting stage is not influenced by the timer if the memory has been programmed.

2. A circuit arrangement as claimed in Claim 1, characterised in that the date memory comprises an input terminal and an output terminal which are interconnected via at least one conductor arranged on a board and, for severing the conductor, the board is formed with a plurality of holes at the location of the conductor, which holes correspond to various dates.

3. A circuit arrangement as claimed in Claim 2, characterised in that the timer controls the muting stage and is connected to the supply voltage via the date memory.

4. A circuit arrangement as claimed in Claim 2, characterised in that the timer is connected to the muting stage via the date memory.

5. A circuit arrangement as claimed in Claim 1, characterised in that the date memory is an electrical non-volatile digital memory, which can be programmed by means of an input unit via a digital control device, and the control device is constructed so that if the memory has not been programmed the timer is activated when the supply voltage is switched on and causes the attenuation of the muting stage to increase when a predetermined time interval has elapsed.

6. A circuit arrangement substantially as hereinbefore described with reference to Figures 1 and 2 or Figures 3 and 4 of the accompanying drawings.