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(54) **Time programming device**

(57) A timer programming device capable of carrying out a timer program properly according to the programmed time and date without an influence of a difference between daylight saving time and standard time, and allowing a user to verify times to carry out the program. The device comprises a program data converter (17), a display data converter (16) and a standard time

clock (13) whereby the program is carried out based on standard time. This enables the device to carry out the timer program accurately without an influence upon the programmed time and date due to the difference between daylight saving time and standard time, and allows the user to make a verification of the times to carry out the program.

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a timer programming device built into an electronic appliance such as a video cassette recorder. In particular, the invention relates to a timer programming device that can carry out a program data accurately without being influenced by programmed time and date regardless of whether it is daylight saving time or standard time.

BACKGROUND OF THE INVENTION

[0002] A timer programming device hitherto has operated in a manner that it compares a time programmed to it with time of day given by a clock built into an electronic appliance, and starts the electronic appliance to operate when two of the times match. When a change-over takes place from daylight saving time to standard time (or from standard time to daylight saving time), time of the clock built in the electronic appliance is adjusted manually by a user, or it is adjusted using a time signal transmitted by a certain broadcasting station.

[0003] The timer programming device is a device built into an electronic appliance such as a video cassette recorder, and it has a function to accept advance setting of a program for operating the electronic appliance, and to control the electronic appliance in a predetermined manner according to the preset program.

[0004] Items to be preset for operation of the electronic appliance include:

the time to start operating the electronic appliance;
the time to cease the operation of the electronic appliance; and
selection of a broadcasting channel for which video and sound recording is executed.

[0005] The above items to be preset for operation of the electronic appliance will be hereinafter referred to simply as program data.

[0006] Fig. 3 is an example of the timer programming device of the prior art built into an electronic appliance. This timer programming device comprises:

- a) a program setting unit 21 for use in setting a program data;
- b) a program data memory 22 for storing the program data provided by the program setting unit 21;
- c) a display unit 25 for displaying the program data transferred from the program data memory 22;
- d) a clock 23 for keeping the current time and date; and
- e) a controller 24 for comparing the current time and date given by the clock 23 with the program data in the program data memory 22, and controlling an operation of the electronic appliance when it comes to

the programmed time.

[0007] The timer programming device of the prior art constructed as above operates in a manner which will be described hereinafter.

[0008] A user sets a program data in the timer programming device through the program setting unit 21, without taking into consideration at all whether the date being programmed belongs in a daylight saving time period or in a standard time period. The program data set with the program setting unit 21 is forwarded to and stored in the program data memory 22. The program data memory 22 sends the program data to the display unit 25. The display unit 25 displays the program data in order for the user to verify details of the timer program. The user can store a plurality of timer programs into the program data memory 22 by repeating the steps described above.

[0009] The controller 24 inputs the current time and date from the clock 23, compares it with the program data in the program data memory 22, and carries out recording and so on, when it comes to the programmed time. The present time shown in the clock 23 is adjusted by the user manually, or by using a time signal, when time is switched over from daylight saving time to standard time (or from standard time to daylight saving time). Hence, the electronic appliance can operate correctly thereafter according to programmed time.

[0010] However, there may be cases with an electronic appliance of the foregoing structure of the prior art that it does not operate correctly according to a programmed time unless time of the clock 23 is adjusted immediately after the time is switched over from daylight saving time to standard time or vice versa, if there are a combination of program data belonging in both the daylight saving time and the standard time, in the program data memory 22. Moreover, time signals to be transmitted by certain of broadcasting stations are not transmitted at all the time. A time signal is transmitted only when it becomes a specially predetermined time. Therefore, it is not always possible to adjust time of the clock 23 at once using a time signal upon the switchover from standard time to daylight saving time (or, vice versa).

[0011] Fig. 4A, 4B, and 4C show states wherein an electronic appliance carries out program data in neighboring hours of time when a switchover takes place from standard time to daylight saving time. Fig. 4A shows a time scale of the standard time. Fig. 4B shows a time scale converted into the daylight saving time. Fig. 4C shows a scale of actual time in practice. As shown in these figures, 4A, 4B and 4C, 0:00 hour in standard time indicated in Fig. 4A is 1:00 hour in the converted daylight saving time shown in Fig. 4B.

[0012] In this instance, an assumption is made that the daylight saving time commences at 0:00 hour on the 1st day of April in the standard time. Another assumption is also given that there are two programs preset as fol-

lows:

a first program between 23:00 and 0:00 on the 31st of March (indicated on the standard time scale); and a second program between 1:00 and 2:00 on the 1st of April (indicated on the daylight saving time scale).

[0013] Furthermore, it is assumed that the present time set with the electronic appliance corresponds to the standard time prior to a start of the first program. In the case of the above settings, the timer programming device starts the first program when its built-in clock comes to 23 o'clock on the 31st of March (in the standard time). The first program ends one hour later at 0 o'clock on the 1st of April (in the standard time). However, the timer programming device will become incapable of executing the second program properly unless the built-in clock is switched to the daylight saving time from the standard time (changing it to 1 o'clock of the 1st of April) immediately after it becomes 0 o'clock. If there is a delay in switching the clock from the standard time to the daylight saving time, a delay will result in starting the second program for a period equal in time to the switching delay. However, there has been no alternative heretofore but to adjust the built-in clock manually, or to adjust it automatically according to a time signal. Therefore, in order to obtain proper operation, the user has been required to wait for a completion of the first program, and to make a manual adjustment of time immediately thereafter, if there is no time signal at this moment of time. As described above, the timer programming device of the prior art has had a problem that it is quite difficult to operate properly when there is a changeover to daylight saving time from standard time. Moreover, the same problem also occurs during a changeover from daylight saving time to standard time.

SUMMARY OF THE INVENTION

[0014] The present invention is to obviate the afore-stated problem of the prior art, and it aims at providing a timer programming device built into an electronic appliance that can carry out a timer program properly without being influenced by a programmed time and date regardless of whether it belongs in daylight saving time or standard time, and that can allow verification of a time to carry out the timer program.

[0015] To achieve the above object, the timer programming device of this invention to be built into an electronic appliance comprises:

- a) a program setting unit for use in setting a program data according to the time to operate the electronic appliance;
- b) a program data converter for converting the program data set with the program setting unit into a standard-time program data whose time is convert-

ed into standard time hour;

c) a program data memory for storing the standard-time program data;

d) a display data converter for inputting the standard-time program data stored in the program data memory, and converting a starting time and a finishing time into daylight saving time hour and/or standard time hour;

e) a display unit for displaying the program data expressed in daylight saving time hour and/or standard time hour, as converted by the display data converter;

f) a standard time clock for keeping the current time and date in standard time; and

g) a controller for comparing the current time and date output by the standard time clock with the standard-time program data in the program data memory, and controlling the electronic appliance when it comes to the programmed time.

[0016] The program data converter has functions of:

inputting the program data set with the program setting unit;

determining whether the starting date and time set in the program data belong in daylight saving time or standard time; and

changing the starting time and the finishing time set in the program data into standard time hours, thereby converting into the standard time hours and also an offset time that represents a difference of the starting and finishing times from the standard time hour.

[0017] Accordingly, the program data is now converted into the standard-time program data.

[0018] The program data memory stores the standard-time program data and the offset time.

[0019] The structure as described above eliminates the necessity of changing time of the standard time clock when a changeover takes place from standard time to daylight saving time and vice versa, since it carries out the program based on the standard time thereby avoiding an influence from a difference in the programmed time and date between the daylight saving time and the standard time. As a result, the present invention realizes the timer programming device that functions in a manner to operate the electronic appliance properly according to the programmed time, and that can allow verification of the time to carry out the program.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

Fig. 1 is a general view depicting an example of an electronic appliance equipped with a built-in timer programming device of a first exemplary embodi-

ment of the present invention;

Fig. 2 is a block diagram showing a configuration of the timer programming device of the first exemplary embodiment of this invention;

Fig. 3 is a block diagram showing a configuration of a timer programming device of the prior art;

Fig. 4A is a diagrammatic representation showing a time scale converted into standard time;

Fig. 4B is another diagrammatic representation showing a time scale converted into daylight saving time; and

Fig. 4C is still another diagrammatic representation showing an actual scale of time in effect when a switchover takes place from standard time to daylight saving time.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] With reference to accompanying figures, exemplary embodiments of a timer programming device of the present invention will be described hereinafter.

(First Exemplary Embodiment)

[0022] Fig. 1 is a general view depicting an example of an electronic appliance equipped with a timer programming device of a first exemplary embodiment of this invention. Fig. 2 is a block diagram depicting a configuration of the timer programming device of the first exemplary embodiment of this invention.

[0023] As shown in Fig. 1, the timer programming device 10 of the first exemplary embodiment of this invention is built into the electronic appliance 1. Further, as shown in Fig. 2, the timer programming device 10 built into the electronic appliance in this exemplary embodiment of the invention comprises:

a) a program setting unit (hereinafter simply referred to as "PSU") 11 for use in setting a program data according to the time to operate the electronic appliance;

b) a program data converter (hereinafter simply referred to as "PDC") 17 for converting the program data set with the PSU 11 into a standard-time program data whose time is converted into standard time hour;

c) a program data memory (hereinafter simply referred to as "PDM") 12 for storing the standard-time program data;

d) a display data converter (hereinafter simply referred to as "DDC") 16 for inputting the standard-time program data stored in the PDM 12, and converting a starting time and a finishing time into daylight saving time hours and/or standard time hours;

e) a display unit 15 for displaying the program data expressed in daylight saving time hours and/or standard time hours, as converted by the DDC 16;

f) a standard time clock 13 for keeping the current time and date in standard time; and

g) a controller 14 for comparing the current time and date output by the standard time clock 13 with the standard-time program data in the PDM 12, and controlling the electronic appliance when it comes to the programmed time.

[0024] The PDC 17 has functions of:

inputting the program data set with the program setting unit 11;

determining whether the starting date and time set in the program data belong in daylight saving time or standard time; and

changing a starting time and a finishing time set in the program data into standard time hours, thereby converting them into the standard time hours and also an offset time that represents a difference of the starting time and the finishing time from the standard time hours.

[0025] In this instance, the determining as to whether the starting date and time belong in daylight saving time or standard time is made by comparing them with a switch-over date and time (from daylight saving time to standard time, and vice versa) stored beforehand in a memory.

[0026] If the times the electronic appliance is operated belong in standard time, the offset time is zero. On the other hand, the offset time is a difference between standard time and daylight saving time, if the times the electronic appliance is operated belong in daylight saving time.

[0027] The program data is thus converted into the standard-time program data in the above manner. The standard-time program data is managed based on standard time.

[0028] The PDM12 stores the standard-time program data and the offset time.

[0029] The timer programming device 10 configured as shown in Fig. 2 operates in a manner which will be described hereinafter. A user sets a program data with the PSU 11 without taking into consideration at all whether the date being programmed belongs in a daylight saving time period or in a standard time period. The program data set with the PSU 11 is forwarded to the PDC 17. The PDC 17 determines whether the program data it received belongs in daylight saving time or standard time, according to time and date set in the program data. The PDC 17 then changes the starting time and the finishing time in the program data into standard time hours, and converts the program data into a standard-time program data. The converted standard-time program data is forwarded to the PDM 12. The PDM 12 stores therein the forwarded standard-time program data, and sends the once stored standard-time program data to the DDC 16. The DDC 16 receives the standard-

time program data, converts the starting time and the finishing time into times actually corresponding to the programmed time and date, and forward them to the display unit 15. The display unit 15 displays them in time and date corresponding to the programmed data. In this way, the user is able to make a verification of the times he programmed. The user can store a plurality of program data in the PDM 12 by repeating the steps described above. The controller 14 inputs the current time and date from the standard time clock 13, compares them with the standard-time program data stored in the PDM 12, and carries out recording and so on when it comes to the programmed time. The standard time clock 13 moves in the standard time. Therefore, the timer programming device of this exemplary embodiment requires no adjustment of the present time either manually or with a time signal, even when a changeover takes place from daylight saving time to standard time or from standard time to daylight saving time. Hence, the timer programming device of this exemplary embodiment can operate the electronic appliance accurately all the time according to the programmed times.

[0030] According to the present exemplary embodiment as described, the electronic appliance operates precisely at the programmed times without even changing time of the standard time clock upon a changeover from standard time to daylight saving time and vice versa. Furthermore, the user can confirm the times at which the electronic appliance executes the program data.

[0031] What has been described in the above is an example wherein the PSU 11 is incorporated within a main unit of the timer programming device 10. However, the PSU 11 can be separated from the timer programming device built in the electronic appliance, as it may be included in a remote controller. If such is the case, program data can be transmitted from a program setting unit built in the remote controller to the PDC 17 built in the timer programming device by means such as infrared rays. Subsequently, the timer programming device carries out the foregoing operation upon receiving the program data. In addition, the same can be achieved if the PSU 11 and the PDC 17 are built into a separate remote controller, from which data is transmitted to the RDM12 built in the timer programming device by means of infrared rays and the like.

[0032] According to this exemplary embodiment as described above, the electronic appliance operates accurately at the programmed times, without changing time of the standard time clock upon the changeover from standard time to daylight saving time and vice versa. Furthermore, the user can confirm the times at which the electronic appliance executes the program data.

[0033] As has been described, the timer programming device of the present invention provides such remarkable advantages that time and date to carry out a program is not influenced by a difference between daylight saving time and standard time, the standard time clock requires no adjustment of time, and it allows the user to confirm

the times the electronic appliance executes the program.

[0034] The timer programming device of this invention is adaptable to other types of electronic appliance such as a set-top boxes (STB), a digital video disk (DVD) recorder and the like, besides a video cassette recorder, for setting a starting time and a finishing time of operation, and so on.

Claims

1. A timer programming device to be built into an electronic appliance, said device comprising:

- a) a program setting unit for use in setting a program data including a starting time and a finishing time;
- b) a program data converter for converting the program data set with said program setting unit into a standard-time program data;
- c) a program data memory for storing the standard-time program data;
- d) a standard time clock for keeping the current time and date in standard time; and
- e) a controller for comparing the current time and date output by said standard time clock with the standard-time program data stored in said program data memory, and for carrying out the program.

2. The timer programming device according to claim 1, wherein said program data converter carries out the processes of:

- inputting the program data representing any of daylight saving time and standard time, set with said program setting unit;
- determining whether the program data belongs in daylight saving time or standard time according to the starting date and time set in the program data; and
- converting the starting time and the finishing time into standard time hours and an offset time representing a difference of the starting and the finishing times from the standard time hours, and
- said program data memory stores the standard-time program data and the offset time.

3. The timer programming device according to claim 2 further comprising:

- a display data converter for inputting the standard-time program data and the offset time stored in said program data memory, and converting the standard-time program data and the offset time into the starting time and finishing

time of the original program data; and
a display unit for displaying the original program data converted by said display data converter.

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Fig.1

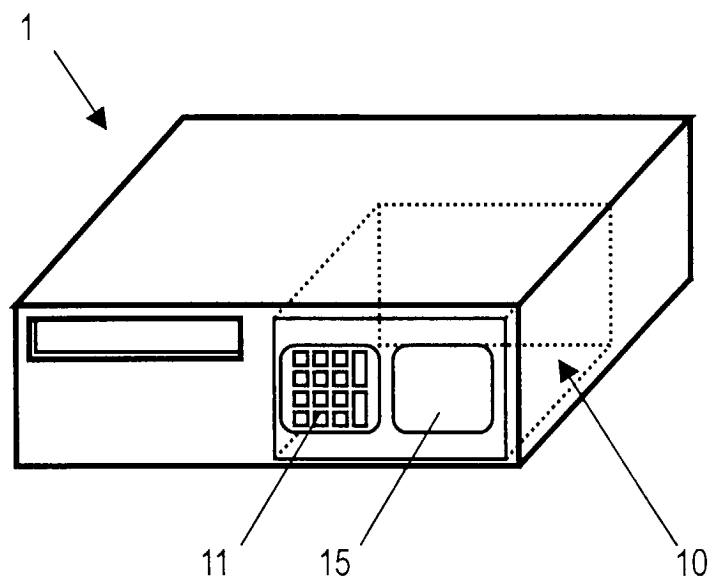


Fig.2

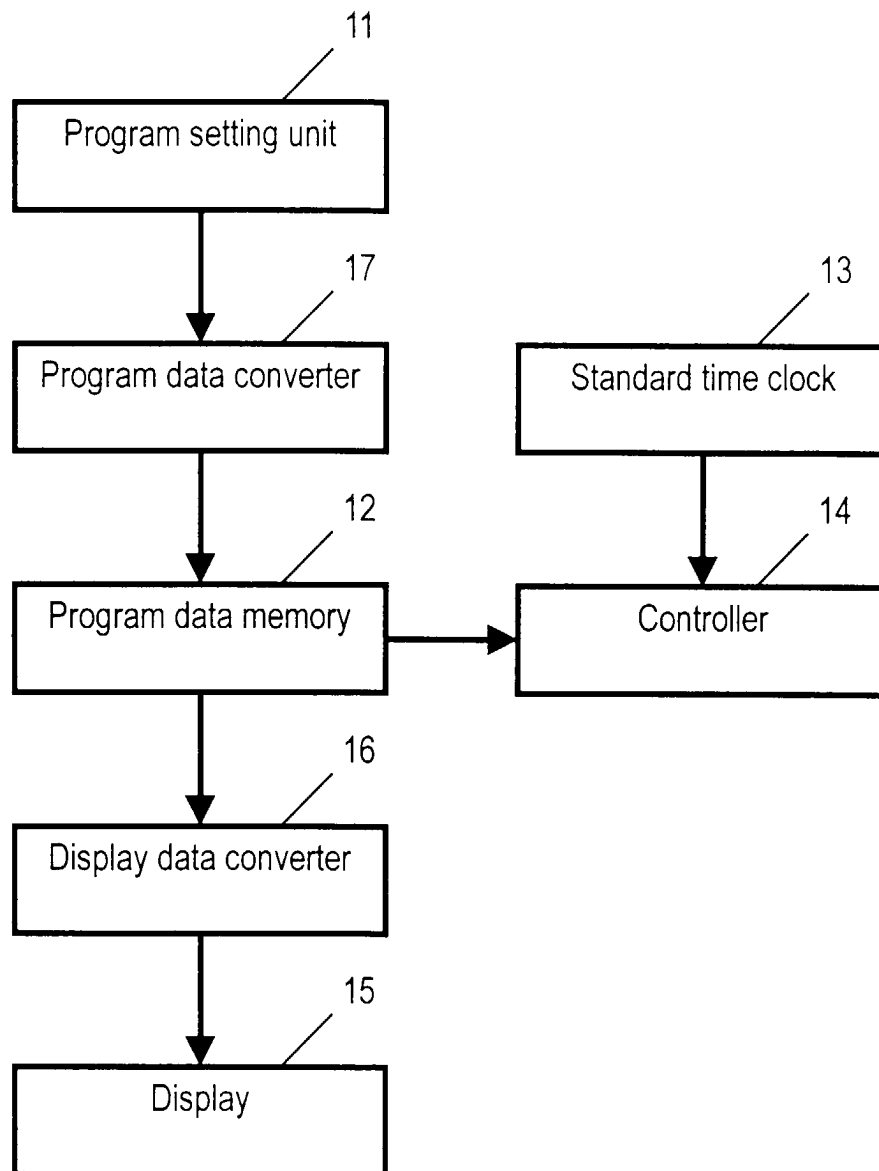


Fig.3

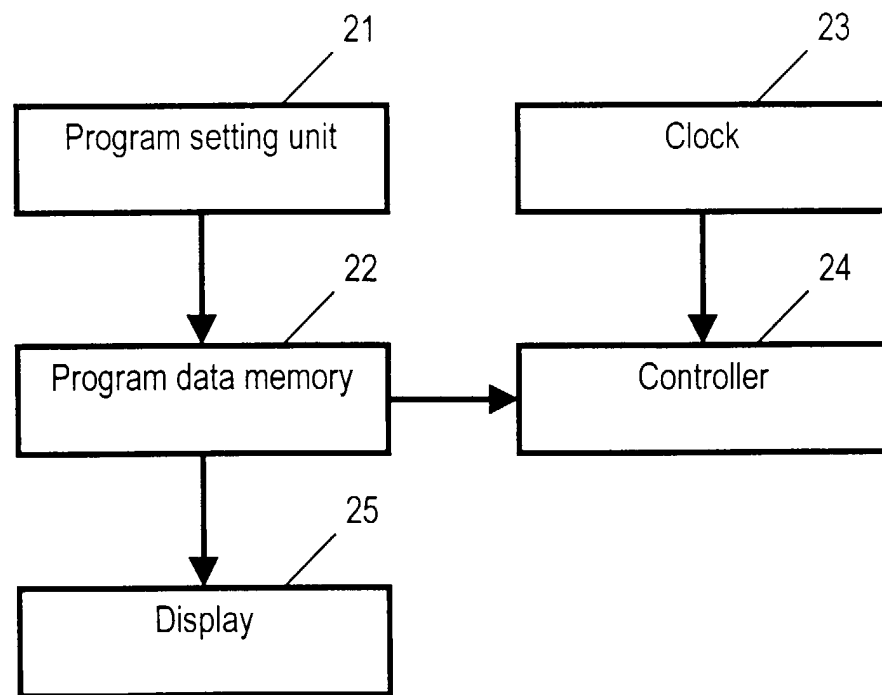


Fig.4A

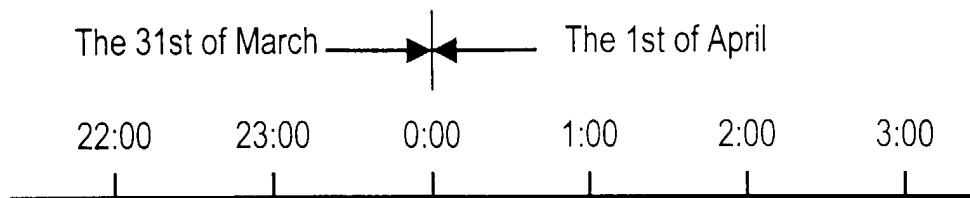


Fig.4B

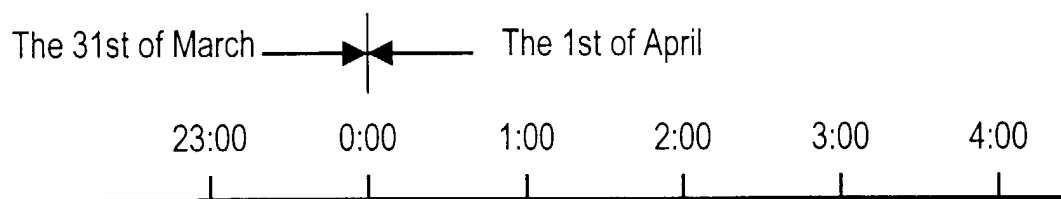


Fig.4C

