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Description

The present invention relates to a remote-control home electronics device and to the remote-control device connected with it.

Remote-control home electronics devices, such as e.g. television sets, videorecorders, and sound reproducers, are more and more left without any local keyboards and then it is important that the remote control device is operating reliably and without any surprises. The most harmful problem in this connection is that the battery of the remote-control device will weaken and lose power when just in operation so that the use of the device to be controlled may even become impossible. The problem is deteriorated by the fact that the device itself may often operate so well that the battery of the remote control device may become exhausted without any gradually occurring symptoms to be identified.

In general, for observing the state of the battery of a portable device like a remote-control device the known arrangement is to provide e.g. a light emitting diode (LED) in connection with the battery but the disadvantage of this arrangement is that it will also add to the loads effecting the battery.

DE-A-2458866 discloses an antitheft alarm system where the sensor units are normally switched off, but are activated through a reed relay or similar when the object to be watched is moved.

The said device is different from the kind of devices to which the invention is related in that it mainly pertains to an alarm sensor. In addition, the known devices draw back that the power consumption is relatively high.

The aim of the present invention is to eliminate these problems and provide such a battery state monitoring method that is able to indicate on time how the battery is weakening, and that will not create any extra load the battery.

This objective is achieved by the characterizing portion of claim 1.

The invention is described in the following in more detail and by using an example, with reference to the annexed drawings where

Fig. 1 shows a block diagram of the arrangement according to the invention;

Figs. 2a-e show the dependence of the transmitted pulses of the condition of the battery, and Figs. 3 and 4 show the operations of the monitoring circuit processor in the form of a flow chart diagram.

In Fig. 1 the reference number 1 indicates a remote control transmitter operating with infra-red light, the number 2 indicates a respective remote-control receiver that is a part of a home electronics device 6. The receiver 2 additionally comprises, included in the device itself, an observing circuit 3 for the battery having threshold value setting means 4 and alarm

means 5.

It is obvious that the battery condition cannot be monitored e.g. by observing the amplitudes of the transmitted signal, as the amplitude or the strength of the signal is depending on the respective distance between the remote-control device and the remote-controlled electronics device. Instead, the transmitting circuit of the remote-control device 1 may be carried out so that the relative form of the signal or its relative timing, as e.g. the duration of the pulse or the spaces between the transmitted pulses etc., is changing when the input voltage is changing, i.e. depending on the condition of the battery.

This is illustrated by Fig. 2. The figure a) only shows in principle the transmission of the control signal in pulse form from the battery-driven remote-control device to the receiving apparatus. The figure b) shows the dependence of the relative pulse duration of the battery voltage and the figure c) the dependence between the battery voltage and the code length of the transmitted control message. The figure d) shows the dependence between the relative pulse duration and the code length and, finally, the figure e) shows the change of the pulse error in time when the battery is losing power.

Thus, according to the invention, the receiver, in addition to the normal receiving operations, also observes the changes caused by the ageing of the battery in the received signal and compares the measured changes with the advancement of a standardized change pattern, based on the known changes in the battery caused by its ageing. When the measured change exceeds a preset threshold value of the standardized change in circuit 4, and when the battery condition can be assumed to be near the maximum operative age, the user will receive an alarm by circuit 5 indicating the low battery condition. This alarm may be e.g. a visual display by a warning light or on a display screen or, in the case of a television set, on the television screen or by e.g. a sound signal.

Fig. 3 shows the operations of the processor of the monitoring circuits 3, 4 in the form of a flow chart. The monitoring circuit observes a selected signal parameter dependent on the voltages of the battery and gives an alarm if the parameter exceeds the permitted limit.

Fig. 4 shows the corresponding flow chart in the case when the bit durations of the transmitted control signals are under specific monitoring.

Thus, it is essential in the present invention that the indication will take place before the battery power is so low that the remote-control device will no more operate reliably. This enables the user to provide a new battery on time and assure the operation of the remote-control device without problems.

Claims

1. A remote-control home electronics device, controllable with a separate battery-operated remote control-device **characterized** in that in order to avoid additional loading of the battery a condition monitoring circuit (3, 4) for the battery of the remote-control device (1), is provided in the electronics device (6) itself, said circuit observing the battery power condition on the basis of the form of the signal of the remote-control device, and/or the duration of the transmitted pulses and/or the intervals between the pulses. 5
2. A home electronics device according to claim 1, **characterized** in that it comprises a visual display showing too low battery voltage. 15
3. A home electronics device according to claim 1 or 2, **characterized** in that a too low battery charge is indicated by a sound signal. 20
4. A remote-control device of a home electronics device according to claim 1, **characterized** in that the signal transmitter circuit (10) thereof is designed so that the signal form, e.g. the duration of and/or the intervals between the transmitted control pulses, varies with the voltage of the battery of the remote-control device (1). 25

Revendications

1. Commande à distance d'un dispositif électronique domestique que l'on peut commander par un dispositif de commande à distance fonctionnant séparément avec une batterie caractérisée en ce que, pour éviter une charge supplémentaire de la batterie, un circuit de surveillance de l'état (3, 4) pour la batterie du dispositif de commande à distance (1), est disposé dans le dispositif électronique (6) lui-même, le dit circuit observant la situation de puissance de la batterie sur la base de la forme d'un signal du dispositif de commande à distance et/ou de la durée des impulsions transmises et/ou des intervalles entre les impulsions.
2. Un dispositif électronique domestique, selon la revendication 1, caractérisé en ce qu'il comprend un affichage visuel qui met en évidence le voltage trop bas de la batterie.
3. Un dispositif électronique domestique, selon la revendication 1 ou la revendication 2, caractérisé en ce qu'une charge trop basse de la batterie est indiquée par un signal sonore.
4. Un dispositif de commande à distance d'un dispositif électronique domestique, selon la revendication 1, caractérisé en ce que le circuit de transmetteur de signal (10) de celui-ci est conçu de sorte que la forme du signal - c'est-à-dire la durée et/ou les intervalles entre les impulsions de commande transmises - varie en fonction du voltage de la batterie du dispositif de commande à distance (1).

Patentansprüche

1. Ferngesteuerte elektronische Heimvorrichtung, steuerbar mit einer getrennten, batteriebetriebenen Fernsteuervorrichtung, dadurch gekennzeichnet, daß zum Vermeiden eines zusätzlichen Belastens der Batterie eine Zustandsüberwachungsschaltung (3, 4) der Batterie der Fernsteuervorrichtung (1) in der elektronischen Vorrichtung (6) selbst vorgesehen ist, und daß die Schaltung den Batterie-Leistungszustand auf der Basis der Gestalt des Signales der Fernsteuervorrichtung beobachtet, und/oder der Zeitdauer der übertragenen Impulse und/oder der Intervalle zwischen den Impulsen. 35
2. Elektronische Heimvorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß diese ein visuelles Display aufweist, das eine zu niedrige Batteriespannung anzeigt. 40
3. Elektronische Heimvorrichtung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß eine zu niedrige Batterieladung durch ein Schallsignal angezeigt wird. 45
4. Fernsteuervorrichtung einer elektronischen 50

Heimvorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß deren Signaltransmitterschaltung (10) derart gestaltet ist, daß die Signalform, z.B. die Zeitdauer und/oder die Intervalle zwischen den übertragenen Steuerimpulsen, sich mit der Spannung der Batterie der Fernsteuervorrichtung (1) ändern.

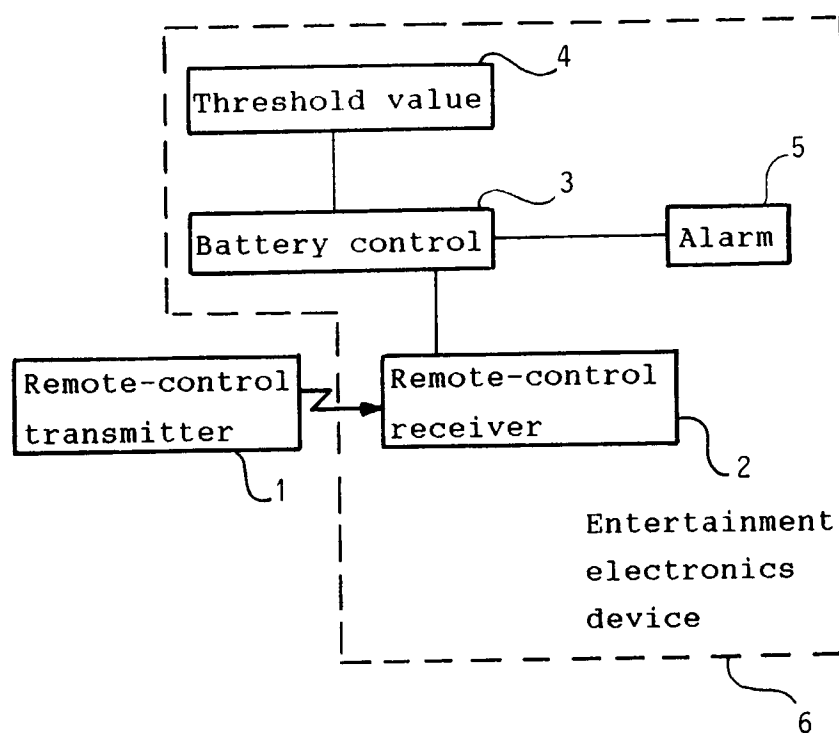


Fig. 1

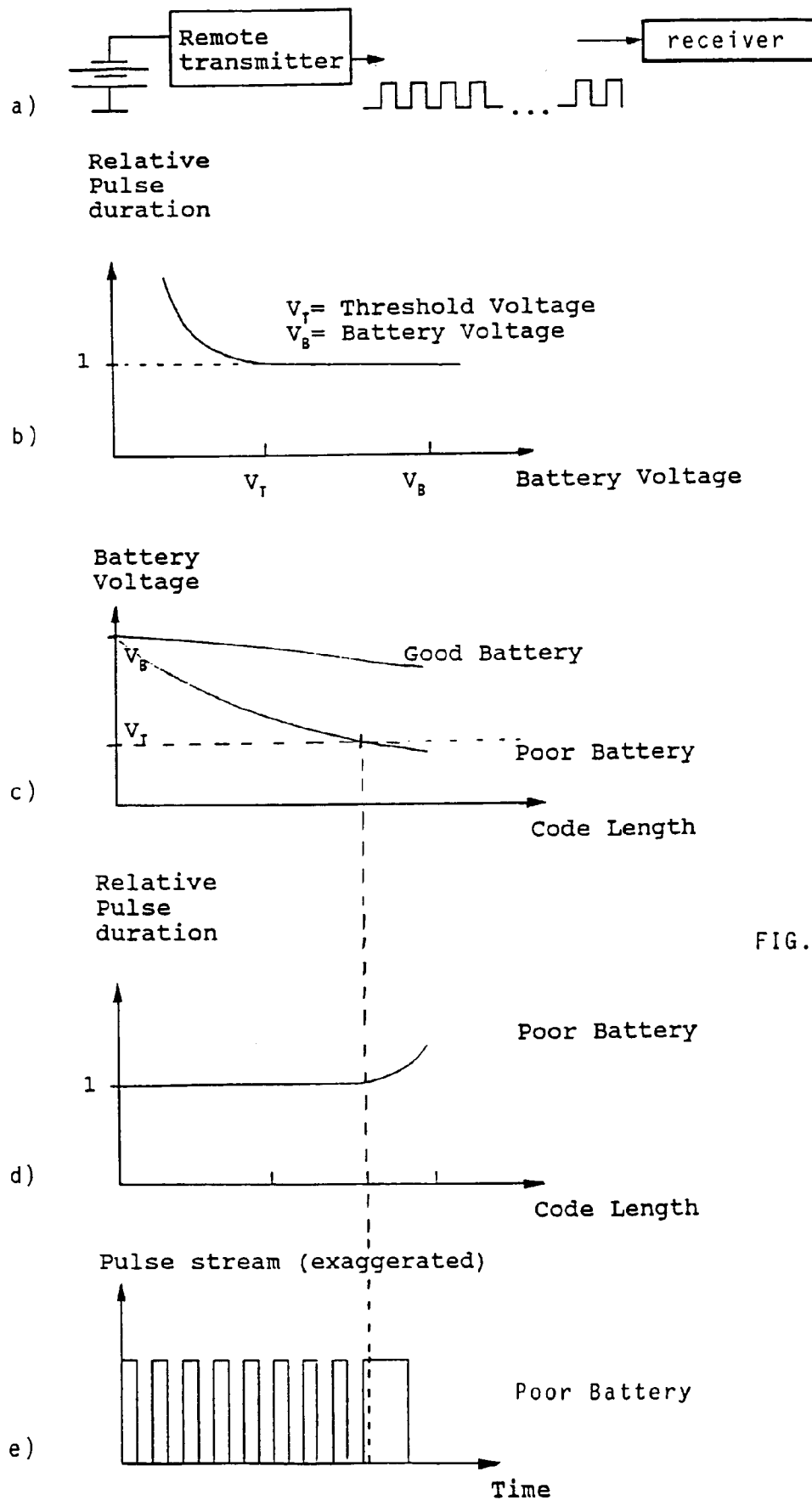


FIG. 2

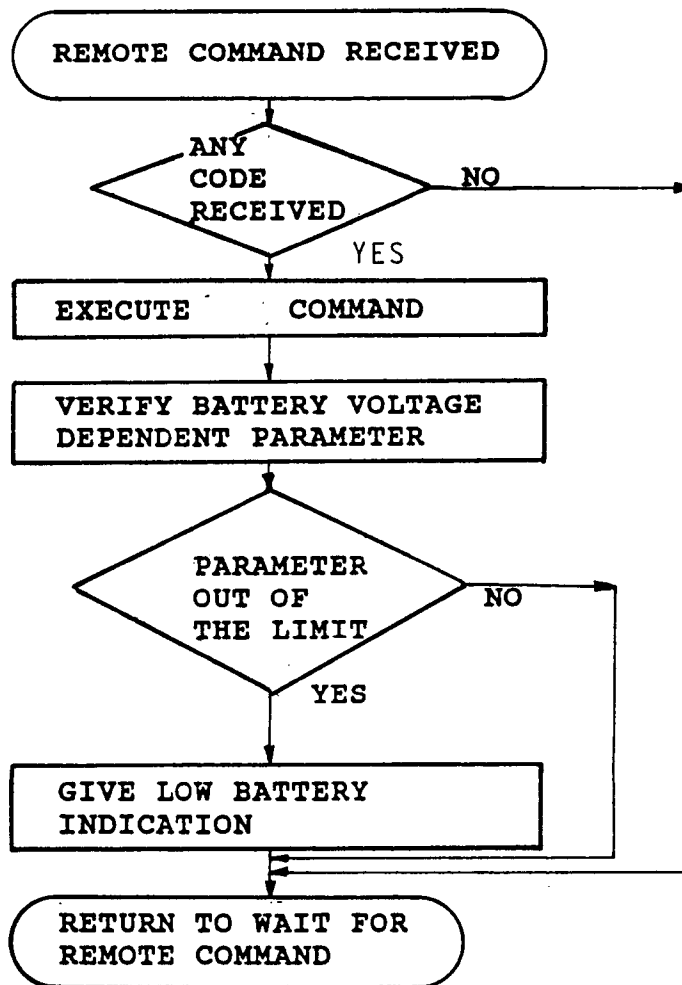


FIG. 3

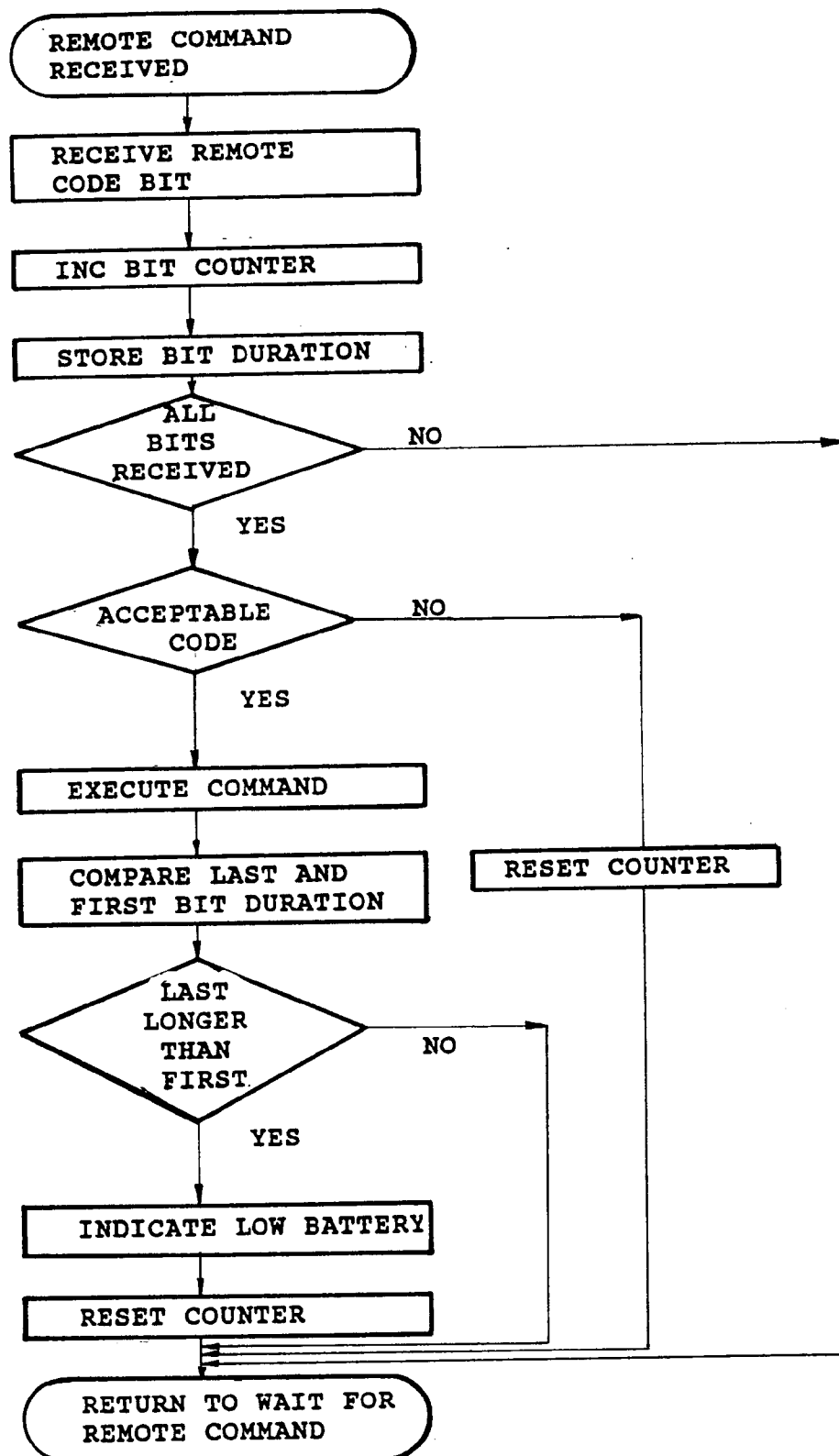


FIG. 4