

WIRELESS SWITCH FOR A TELEMETRIC RECEIVER

The present invention relates to a wireless switch for a telemetric receiver.

Telemetric data transmission is well-known, see e.g. FI Patent 68734, which discloses a telemetric measuring device for measuring pulse and ECG signals. Such a telemetric transmitter mainly comprises transmitter electronics enclosed in a casing and secured e.g. by two press studs to a belt keeping the transmitter in position, and electrodes connected electrically to the transmitter electronics and attached to the belt on the side facing the user's skin on both sides of the transmitter electronics (two electrodes).

Receivers known from the prior art usually comprise not only a pulse measuring function but also clock and timing functions and various programming possibilities for alarm signalling and the like. Therefore it has been necessary to provide a casing, which is as small as possible (equal in size to a wrist watch), with several press buttons so as to be able to use all the features of the measuring device. One press button is usually reserved solely for the actuation of the basic function, that is, the pulse measuring, the device being switchable e.g. between the clock mode and the pulse measuring mode by pressing the button. It is obvious that it should be possible to activate and terminate the pulse measuring function as easily as possible by a single press button, and so very many other functions cannot be arranged to be actuated by this button.

The provision of a great number of press buttons in a casing equal in size to a wrist watch is difficult as well as contradictory to an attempt to minimize the size of the casing, which as such is possible from the electronic point of view. For ease of use, the size of the press buttons cannot be reduced without limits, nor can they be embedded in the structure so that they could not be pressed by finger

tips alone. The device is an accessory means for e.g. a sportsman, and so it should be as simple and rapid to use as possible.

The object of the present invention is to provide a wireless switch for a telemetric receiver unit which avoids the above-mentioned disadvantages. To achieve this, the switch according to the invention comprises a means for detecting the intensity of a telemetric signal received in a telemetric receiver and for actuating a desired function of a pulse meter when the signal exceeds a predetermined threshold value, wherein the inductance by means of which the receiver of the pulse meter establishes an inductive coupling with a transmitter in pulse meter is used as a detector in the means for detecting the intensity of the telemetric signal.

According to the invention, the press buttons for e. g. switching the device on and off need not be provided in the casing of the receiver. So one advantage of the invention is that the starting takes place nearly automatically, instinctively, which is of advantage especially in intra-performance startups where the sportsman has to fix his eyes and center his attention strictly to the course of the game or performance. Another advantage is that other desired functions may be actuated when the pulse measuring function has already been switched on.

Preferred features of the invention are set out in the attached dependent claims.

A preferred embodiment of the invention will be described in greater detail, by way of example, with reference to the attached drawings, in which:

Figure 1 shows a block diagram illustrating the main components of a telemetric receiver and transmitter; and

Figure 2 illustrates a telemetric wireless switch according to the invention.

Figure 1 shows an ECG preamplifier 1 provided in a transmitter, electrodes (not shown) sensing the pulsation of the heart being connected to the preamplifier. The signal of the preamplifier 1 is amplified in an AGC amplifier 2 and further in a power amplifier 3. The amplified signal is applied to a transmitter coil 4 creating a magnetic field which is detected by a receiver coil 5. The received signal is amplified by means of an amplifier circuit 6. The amplified signal is applied to a microprocessor 8, to which a memory 9 and a display device 10 are connected, as described in FI Patent 68734 referred to above. The receiver usually also comprises a small loudspeaker 11 for forwarding pace or alarm signals to the user. The structure and operation of a wireless switch circuit 7, which is an essential part of the invention, will be described more closely below.

Figure 2 shows the detection and amplification stage of the receiver in greater detail, a wireless switch circuit 12 according to the invention being connected to it. An ASIC amplifier circuit 13 comprises the required amplifier stages of the receiver, and its output 16 is directly connectable to the microprocessor controlling the receiver. However, the most important feature is the operation of the circuit 12, which may also be integrated in the ASIC circuit 13. In principle, the circuit 12 comprises a transistor Q1 detecting the exceeding of a predetermined threshold value of the intensity of the signal of the receiver coil L1, to which the base of the transistor is connected. When the signal generated by the inductance of the receiver coil L1 is of sufficient intensity to actuate a desired function of the pulse meter, the semi-conductor switch is switched on and generates a voltage level to a terminal 14 for actuating the pulse measuring function of the pulse meter, for instance. The operating voltage (VCC) of the circuit is

supplied from a terminal 15. To be sufficient to start the pulse meter, the signal intensity should be substantially higher (minimum level being of the order of 100 mV, for instance) than the signal intensity required for the actual measurement (such as 10-20 μ V). This is achieved by bringing the transmitter close enough to the receiver or in contact with it. In this way the difference between the signals will be several orders of magnitude, which is important for the operability and reliability of the device.

When the pulse measuring function is on, it can be switched off or changed into e.g. the clock function correspondingly by bringing the receiver close enough to the transmitter so that a signal exceeding the threshold value is obtained in the inductance of the receiver. Additional functions to be actuated by the switch according to the invention during the pulse measuring include display of time for a few seconds, starting of a stopwatch function, etc. This double operation is possible as the switch 12 and the actual receiver circuit 13 have separate couplings (14 and 16) to the processor (not shown) controlling the operation of the receiver, and so the signal intensities below and above the threshold value can be recognized separately during measuring as well. The device can also be advantageously switched off by the processor after a predetermined time-out period (e.g. 10-15 min) from the last detected pulse signal or the last pressing of a button. In addition, the loudspeaker 11 included in the receiver (Figure 1) may give an acoustic signal whenever the pulse measuring function is switched on/off or a desired additional function is actuated. This function is easy to program into the receiver if the receiver already comprises a loudspeaker. This has the advantage that the user need not look at the display to ensure that the pulse meter or a desired additional function has been actuated.

It is obvious to one skilled in the art that the different embodiments of the invention are not restricted to the above examples, but they can be varied freely within the scope of the attached claims.

CLAIMS



1. A wireless switch for a telemetric receiver in a pulse meter, comprising means for detecting the intensity of a telemetric signal received in the telemetric receiver and for actuating a desired function of the pulse meter when the signal exceeds a predetermined threshold value, wherein the telemetric receiver establishes an inductive coupling with a transmitter in the pulse meter and the inductance of the inductive coupling is used as a detector in the intensity detecting means.
2. A wireless switch according to claim 1, wherein the signal intensity sufficient to control the operation of the pulse meter is substantially greater than the signal intensity required for the actual pulse measurement.
3. A wireless switch according to claim 2, wherein in use the receiver is arranged close enough to the transmitter to produce a signal intensity sufficient to control the operation of the pulse meter.
4. A wireless switch according to any of claims 1 to 3, comprising a semiconductor switch comprising a transistor having its base connected to the inductance of the receiver so that when the intensity of the signal generated by the inductance is sufficient to control the operation of the pulse meter, the semiconductor switch is switched on and generates a pulse for actuating a desired function of the pulse meter.
5. A pulse meter, comprising a telemetric transmitter and a telemetric receiver, the telemetric receiver comprising a wireless switch according to any of claims 1 to 4.
6. A pulse meter according to claim 5 wherein when the telemetric signal detected by the inductance exceeds said



threshold value, it causes the pulse measuring function to be actuated in the receiver.

7. A pulse meter according to either of claims 5 or 6, wherein when the pulse measuring function is on, it can be terminated by causing a signal exceeding said threshold value to reoccur in the inductance of the receiver.

8. A pulse meter according to any of claims 5 to 7, wherein when the pulse measuring function is on, the operating mode of the receiver is changeable by causing a signal exceeding said threshold value to reoccur in the inductance of the receiver.

9. A pulse meter according to any of claims 5 to 8, wherein the receiver comprises a loudspeaker, the loudspeaker giving an acoustic signal when the pulse measuring function is switched on/off or when the operating mode of the receiver changes.

10. A wireless switch substantially as herein described with reference to the accompanying drawings.