

Elderly Person Monitor - Take Care

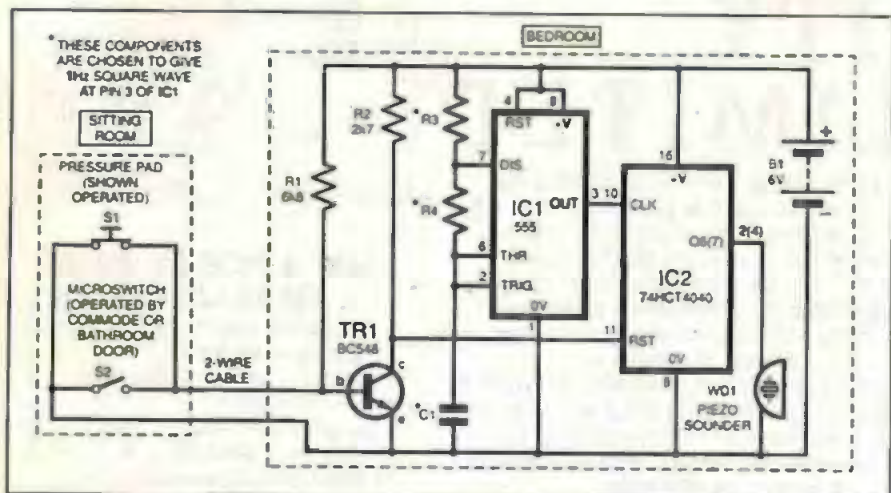


Fig.2. Circuit diagram for an Elderly Person Monitor.

AN ELDERLY relative who resides with us occasionally falls accidentally, and has laid there for some time in a distressed state without being able to summon help. Consequently, a simple independent alarm was designed and the resulting circuit is shown in Fig.2.

Unless a "reset" operation is applied before a certain time period has elapsed the alarm will automatically sound. The principle of operation can be adapted as required and may inspire other ideas.

While the person is in bed a pressure pad (S1) under the mattress is held in the closed circuit condition. This maintains the 4040 12-Stage Ripple Counter IC2 in its reset state via transistor TR1 and so the piezo sounder WD1 is disabled.

Clock pulses of approximately 1Hz frequency are fed continually from the 555 timer IC1 (pin 3) to the counter input of IC2 at pin 10 (CLK), but have no effect until the person gets out of bed (in our case, to use a commode but it could be adapted to be reset by, say, a bathroom door) at which point the counter is enabled and begins counting.

If the time taken to get from the bed to the

commode or bathroom (where a seat or door-activated microswitch, S2, automatically resets the counter again) is long enough for counter output Q6 (or Q7 perhaps) to go high, the alarm WD1 sounds in a neighbouring room so that one can investigate and check that the person is all right.

A delay of between one and two minutes was selected to allow the elderly person sufficient time and also because in practice the microswitch S2 wasn't always operated. In our case the switch opens when the person leaves the commode, and so IC2 begins counting.

If the time taken for the person returning to bed (which resets the counter) is again long enough for the alarm to sound, then that person is standing up, or returning to bed or has fallen. Since an elderly person is unlikely to remain standing for more than (say) two minutes and is also unlikely to take more than two minutes to return to bed, it is probable that the person has fallen.

The prototype operated from a safe 6V battery, which could be rechargeable.

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Rechargeable PP9 Battery - Energy Saver

IF YOU discard exhausted PP9 layer-type batteries this can become an expensive process as these batteries cost about three pounds each. It was decided to provide an alternative using Nickel Cadmium cells together with an extremely simple

charging circuit which is built within the housing of an exhausted PP9 battery. The circuit diagram is shown in Fig. 3.

The power for the charging circuit is provided by an external 12V to 15V d.c. power supply capable of providing 50mA or so. This is hooked up via a d.c. power socket SK1 which is also fitted into the battery housing.

In this circuit IC1 is configured as a constant-current (not voltage) regulator, and the current flowing is limited by the series resistor R1. The current I is $I = 1.25/R1$, hence for a 50mA current R1 is about 24 ohms (220 ohms in parallel with 27 ohms will do).

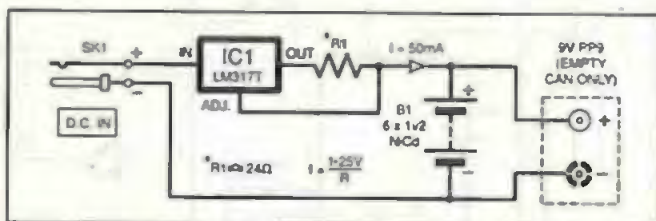


Fig.3. Rechargeable PP9 circuit. Note all components are housed inside the discarded PP9 casing.

Six 1.2V NiCad cells are placed in series and wired across the PP9 battery terminals and they will be charged by the constant current of IC1. The on-load voltage of a fully charged set of six cells was measured at just under 10V with an average current of 25mA being drawn.

A steel-cased PP9 should be prised apart and its contents carefully disposed of as chemical waste, then the circuit built inside and the case folded back together again. My present rechargeable PP9 has undergone about 40 charging cycles during its existence and anticipate many more - what a saving!

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