FRONT DOOR GUARD

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Here is a circuit to thwart the attempt of burglary in your home. When an intruder tries to open the door of your house, it sounds a loud alarm and switches on the porch light. The alarm disables only when the door is closed again or S2 is switched off. The circuit is failproof and reliable and, unlike IR- or 555 timer-based burglar alarms, overcomes the problem of false triggering.

The circuit is based on the triggering action of the low-power monostable/astable multivibrator IC CD4047 (IC1). It is wired in the monostable mode to set and reset IC CD4027 (IC2). The output pulse width of IC1 depends on the external R3-C2 network connected to its pins 1, 2 and 3.

Monostable operation is achieved when IC1 is triggered by low-to-high transition of the positive trigger input (pin 8). It can be retriggered by another low-to-high transition of pin 8. When the master reset input (pin 9) is high, Q output (pin 10) goes low and $\overline{Q}$ output (pin 11) goes high. Here the monostable configuration of IC1 has R3-C2 network with values of C2 and R3 as 0.0047 µF and 470 kilo-ohms, respectively. Trigger pin 8 is connected to the emitter of T1.

Normally, with reed switch S1 closed, transistor T1 is non-conducting and its emitter current is zero. So the monostable remains in the standby mode with low output at pin 10. When T1 conducts upon opening reed switch S1, a positive pulse from the emitter of T1 triggers the monostable and a short positive pulse is available to Q output of the monostable. It resets when T1 is made non-conducting by closing reed switch S1. The negative trigger pin 6 and astable input pin 5 of IC1 are tied to the ground along with ground pin 7.

The short-duration (one-second) low-to-high output from IC1 is used to set and reset IC2. It is a low-power

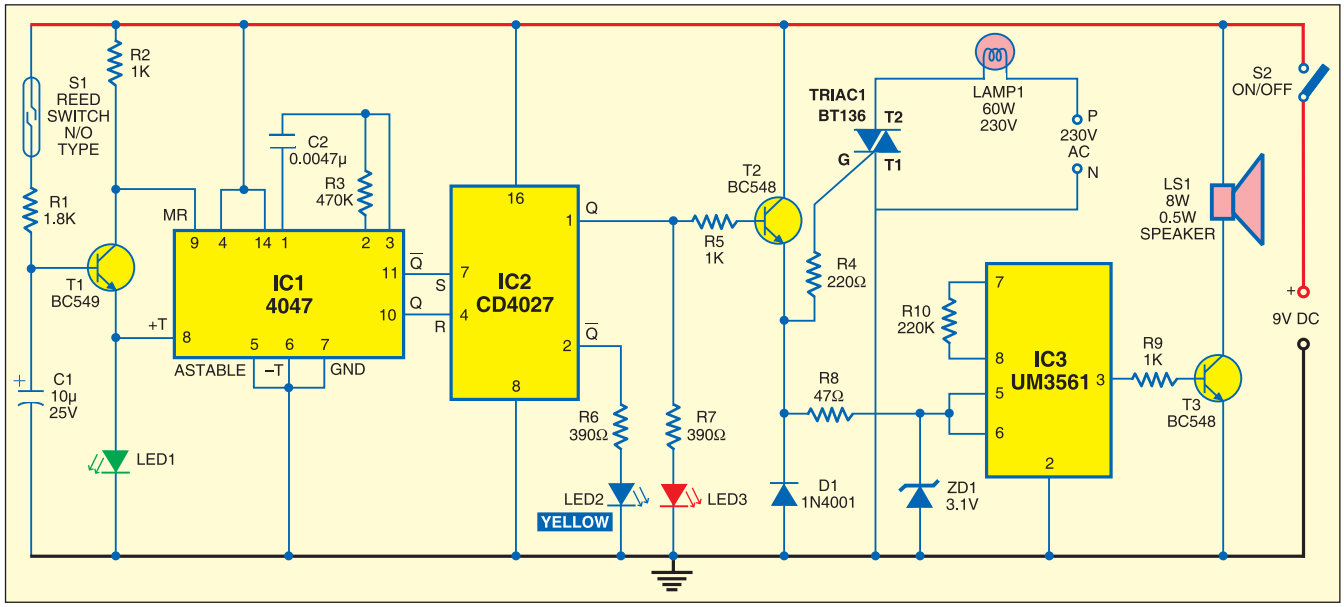

Fig. 1: Circuit of front door guard

dual J-K master/slave flip-flop having independent J, K, set, reset and clock inputs. The flip-flops are edge-sensitive to the clock input and Q and $\overline{Q}$ outputs change states on the positive-going transition of the clock pulses.

IC2 is wired such that its $\overline{Q}$ output turns high when reset pin 4 receives a high pulse (as indicated by LED2). When set pin 7 receives a high pulse,

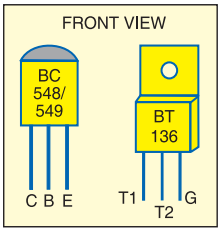

Fig. 2: Pin configuration of BC548/549 and BT136

$\overline{Q}$ output goes low and Q output goes high. This lights up LED3 and drives transistor T2 (BC548). The output from transistor T2 is used to activate triac1 (BT136) and alarm tone generator IC3. The triac is used to switch on porch lamp.

IC3 (IC UM3561) is a tone generator that produces different tones based on its pin connections. Here it is used to generate a fire brigade alarm by connecting its pin 6 to Vcc. Resistor R10 keeps the oscillation of IC3 to the required level. Zener diode ZD1 and re-

sistor R8 provide 3V DC to IC3.

The circuit can be easily assembled on a general-purpose PCB. All the ICs are commonly available low-cost versions. A standard 9V, 500mA adaptor can be used to power the circuit. Reed switch S1 is an important part of the circuit, and it should be normally open type.

Mount the reed switch on the doorframe and the remaining circuit on the nearby wall. The magnet for controlling the reed switch should be fixed on the door so as to close the reed switch when the door closes. When the door opens, the contacts of the reed switch break to activate the alarm. Isolate the triac from the remaining parts of the circuit and ensure adequate spacing between its pins to avoid short circuit.

Warning. Since triac is used in the circuit, some parts will be at mains potential. So exercise utmost care during testing and installation to avoid lethal shock.