Circuit & Design Ideas

Interesting circuit ideas from readers and technical literature. While this material has been checked as far as possible, the circuits have not been built and tested by us. As a consequence, we cannot accept responsibility, enter into correspondence or provide constructional details.

Backup alarm control

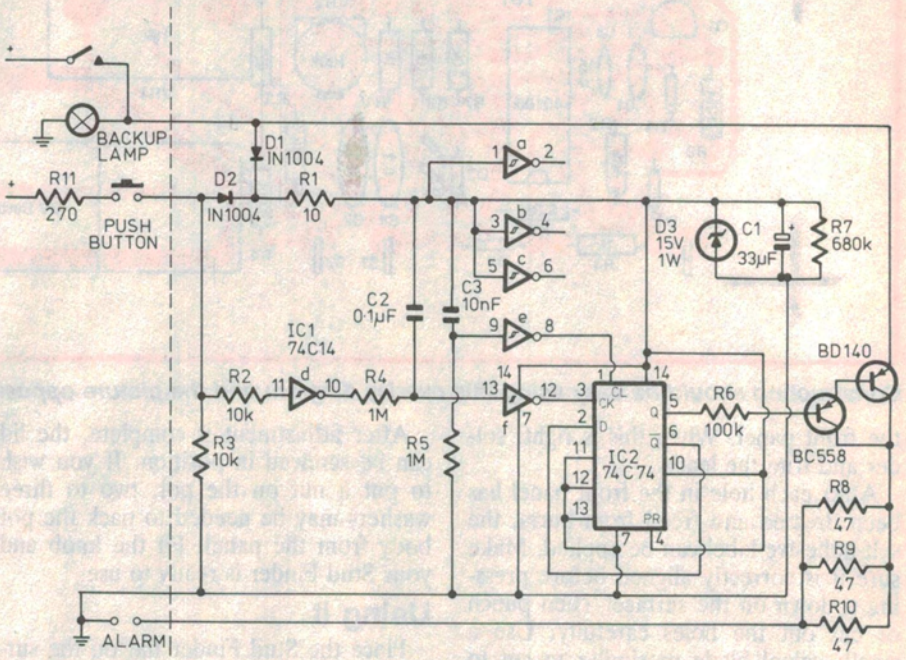
The object of this circuit is to have the "advantages" of an automatically operated vehicle reversing alarm together with the advantage of being able to turn it off when required, such as late at night to avoid disturbing others.

The action of the circuit is to allow the driver of a vehicle to control a piezo electric backup alarm so that the alarm may be

a. turned off, if required, either before or after the vehicle is reversed

b. maintained in the "off" condition, if set, for approximately 30 seconds after the vehicle is taken out of reverse

c. turned on again, if required, while the vehicle is being reversed.



Thus, if no action is taken before placing the vehicle into reverse, the alarm will sound. This may be silenced by operating the push button, either after placing the vehicle into reverse or up to 30 seconds before this. The alarm will then not sound while manoeuvring the vehicle in the forward and reverse directions, as when parking, but will sound if the vehicle is placed into reverse after having been left parked or driven forward for more than 30 seconds.

When power is applied via the lead to the back-up lamp, C1 charges to the 12 volt supply voltage via D1 and R1 and this, via C3 to the input of IC1e (Pin 9), causes an earth potential (logical 0) to appear at the output of IC1e (Pin 8). This is applied to Pin 1 of IC1a, which is the clear input of a dual D flip-flop. This pulse lasts for about 10ms, until C3 charges through R5. Hence, the Q output of the flip-flop is set at earth potential (logical 0) and Q1 and Q2 conduct, turning on the alarm via R8, R9 and R10 in parallel. The Q-bar output of IC2a (pin 6) is set to logical 1.

The earth potential via R3 and R2 holds the input of IC1d (pin 11) low, causing its output (pin 10) to be high. This holds the input of IC1f (pin 13) high, thus maintaining its output (pin 12) and the Clock input of IC2 (pin 3) low.

If the push button is now operated, almost the full 12 Volt potential is applied via R11 and R2 to the input of IC1d and, after a 100ms delay caused by the charging of C2 via R4, the output of IC1f and the Clock input of IC2a go high. This causes the data at D, which is connected to Q-bar, to be transferred to the Q output of IC2a, turning off Q1 and Q2 and thus stopping the alarm.

If the push button is subsequently operated and released, the flip-flop will toggle each time it is operated; turning the alarm ON or OFF as required.

Because of the low current drain of the CMOS components, the discharge time of C1 is almost entirely dependent on the current through R7. Thus, if the circuit is set so that Q1 and Q2 are not conducting, this will be "remembered" until C1 is below two thirds of the supply voltage, which takes about 30 seconds. Therefore, once the circuit is set to "OFF", the vehicle can be manoeuvred backwards and forwards without the alarm sounding, so long as any period of forward motion does not exceed 30 seconds.

In addition, if the push button is operated immediately before selecting reverse, C1 will charge via D2 and R1 and the Q output of the flip-flop will be set low by a 10ms pulse via IC1e as before. However, after a further 90ms, a clock pulse will be received via IC1d and IC1f causing the flip-flop to toggle and thus disabling the alarm.

R8, R9, R10 and R11 are not essential to the operation of the circuit. However, R11 prevents a "raw" 12 volt supply being available on the contacts of the dashboard mounted push button switch, and the alarm unit used was found to be somewhat erratic in its period and frequency of operation without a small amount of resistance in series with its supply.

The unused inputs of IC1 (a,b, and c) and IC2 (b) are tied to the 12 Volt or Earth levels as appropriate.

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Dreamed up a great idea?

If YOU have developed an interesting circuit or design idea, like those we publish in this column, why not send us in the details? As you can see, we pay for those we publish — not a fortune, perhaps, but surely enough to pay for the effort of drawing out your circuit, jotting down some brief notes and popping the lot in the post (together with your name and address, or course!). Send them to Jim Rowe, Electronics Australia, PO Box 227, Waterloo 2017.