Infrared Proximity Detector/Alarm

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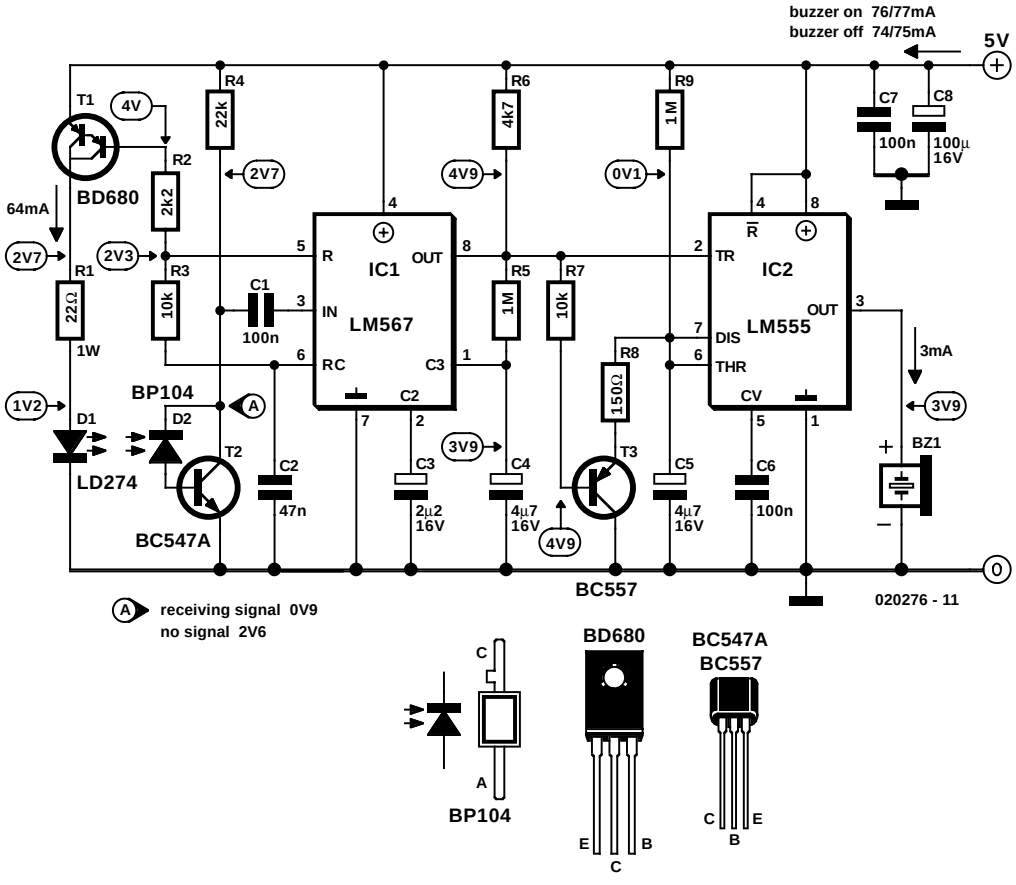

This circuit can be built from readily available low-cost components, some of which may even be hiding in your junkbox!

The indicated value of 22 Ω for resistor R1 causes an average current of about 65 mA through infrared emitter D1. Because the IRED is pulsed at a duty factor of about 50% through the action of T1 and IC1, a peak current of 128 mA flows during every half cycle. This may seem a lot but in fact is well within the safe specification of the LD274. The LM567 PLL IC is configured to supply a switching frequency of about 20 kHz.

When the infrared beam emitted by D1 is reflected by a nearby object, IC1, through receiver diode D2 and transistor T2, receives the recovered 20 kHz signal at its input, pin 3. Because the '567 PLL is then locked, the IC output (pin 8), drops low, triggering the 555 chip in monostable mode (IC2) and so causing acoustic actuator Bz1 to sound. The monostable remains on as long as the reflected signal is being received. Because of the presence of T3, capacitor C5 is allowed to charge only when no signal is being received. In that condition, the 555 is turned off automatically after a time determined by R9-C5. Using the component values shown, this will be about 5 seconds.

Obviously D1 and D2 should be mounted such that the latter can only pick up reflected infrared light. The choice of the two infrared components used in this circuit will be uncritical but they must be 'band' compatible, i.e., generate (D1) and respond to (D2) the same wavelength. The operating point of the receiver input circuit is rather dependent on ambient daylight levels and the value of R4 may need to be adjusted a little to ensure a voltage of between 1.5 V and 4 V on the collector of T1 when no signal is being received.

Some dc buzzers cause a lot of back-emf so it may be necessary to insert a diode in series with the output of IC1. If necessary, this diode should preferably be a Schottky type because of the inherent low voltage drop of about 0.4 V as opposed to 0.65 V for a typical small-signal silicon diode.

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