

Circuit & Design Ideas

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

Using the Infrared Relay as a Door Minder

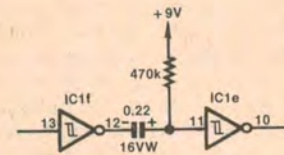
When operated from a suitable mains-sourced power supply, the Infrared Light Beam Relay, described in the April, 1981 issue of Electronics Australia, makes an excellent shop "door minder". Except that, in common with most such devices, it operates the buzzer continuously if a customer stands still in the beam.

Referring to the circuit of the receiver section, it will be seen that the signal is essentially direct-coupled between the output of the detector and the buzzer. If AC-coupling is introduced at an appropriate point in this signal path, the buzzer should only function for a brief period, determined by the time constant of this AC-coupling circuit. The most ap-

propriate point to insert this coupling is between the output of IC1f and the input to IC1e. It will be necessary to return IC1e input to the 9V rail, so that Q5 will normally be held cut-off, so muting the buzzer.

To obtain a buzz period of about ¼ second, use a 0.22µF coupling capacitor in conjunction with a 470kΩ resistive return to 9V. Duration may be varied by altering the size of the coupling capacitor (larger capacitor longer time, smaller capacitor shorter time).

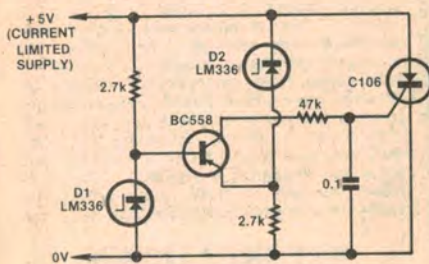
Implementation of this modification is very simple. On the copper side of the PC board, cut the track between pins 11 and 12 of the IC. Cut the leads of a



0.22µF tantalum capacitor short, and solder it across the severed track, with the +ve electrode to pin 11. Shorten the leads of a 470Ω, ¼ watt resistor and solder it between pin 11 and the track (9V) running to pin 14.

W. Pearce,
Croydon, NSW.

Simple Crowbar Protector



When working with TTL circuits and bipolar processors, an easily implemented overvoltage protection circuit can save costly replacements in the event of excessive supply voltage. The

following circuit was designed to provide a simple solution to this requirement.

D1 and D2 are 2.5 volt reference diodes that simultaneously establish 2.5 volts at the base and emitter of the BC558 when the supply voltage is exactly 5 volts. In this situation the BC558 is cut-off.

Should the supply voltage rise, the voltage at the BC558 base remains at 2.5 volts; but the voltage at the emitter will rise (actual voltage being supply voltage minus 2.5 volts). When the supply rises to 5.6 volts or above, the BC558 turns on, supplying approximately 50µA (via

the 47kΩ resistor) to the gate of the C106 thyristor. This turns on and latches until such time as the supply is removed. During this period the power supply is forced into its "current limit" mode.

Thus this design provides the necessary protection, is economical in parts count, and, most importantly, requires no adjustment.

Provided a reduction in temperature stability can be tolerated, each LM336 can be replaced with four forward-biased silicon diodes if a more economical approach is desired.

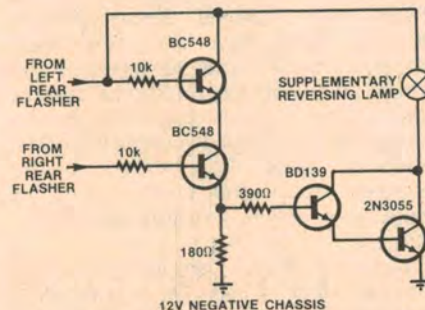
L.W. Murakami,
West Beach, SA.

Automatic Reversing Lamps

Whilst most vehicles use the rear turn signal lamps as reversing lamps, some drivers prefer to have a supplementary lamp, which can give better illumination of the area into which they are reversing. Naturally these drivers also desire that the supplementary lamp automatically comes on when they engage reverse gear.

Although this can be achieved with cabling from the reversing lamp switch to the new lamp, in many cars with front wheel drive the reversing switch is located in the engine compartment; and thus the cable has to run the full length of the vehicle. For many persons this then becomes a major undertaking.

This suggestion enables the supplementary reversing lamp to be automatically switched on whenever



reverse gear is selected, yet requires no new cabling from the front of the vehicle. When both rear turn signal lamps are on the supplementary lamp is illuminated, but if only a single turn signal is on (ie the normal turning situation) the

extra lamp remains extinguished.

Referring to the circuit it will be seen that the two BC548 transistors are connected in an AND gate configuration, with their inputs wired to the left and right rear turn signal cables. The emitter of the "lower" BC548 drives a Darlington pair via a 390Ω current-limiting resistor. The Darlington pair control the supplementary reversing lamp.

It is suggested that the 2N3055 be mounted on a small heatsink, and the complete unit could be located in the boot of the vehicle.

G. Hennig,
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Editor's Note: A possible drawback to this circuit is the need to "float" both leads from the supplementary reversing

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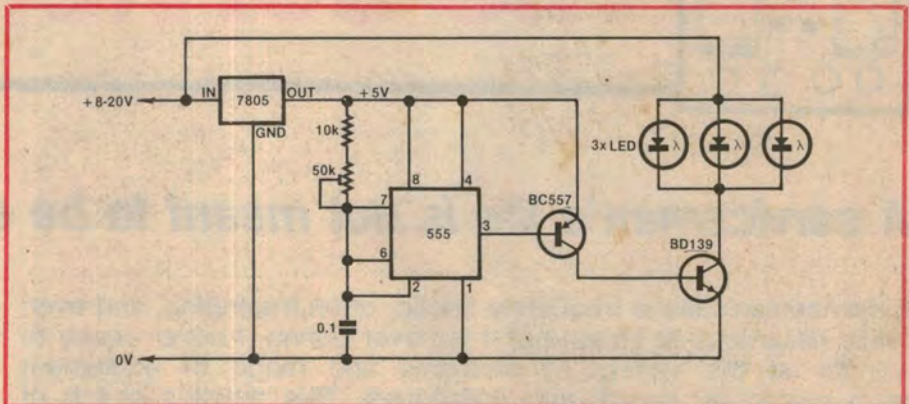
Low Power Strobe

Much of today's equipment incorporates drive motors which have black and white "striped" flywheels intended to be used with a strobe for checking and adjusting the motor speed. Suitable strobes can be large and expensive; however this circuit is designed around a 555 timer and three LEDs as the light source. The only drawback is the limited light intensity which restricts use to those applications where the ambient light can be subdued.

The 555 is connected for normal astable operation, although the usual "discharge" resistor (between pins 6 and 7) is omitted, in order to obtain a very short (discharge) duty cycle. Frequency may be varied by the 50kΩ trimpot.

Output from the 555 is fed to a two-stage amplifier to drive three parallel connected LEDs during the 555's discharge cycle. Hence the LEDs will flash in exact synchronism with the 555.

A three-terminal five volt regulator



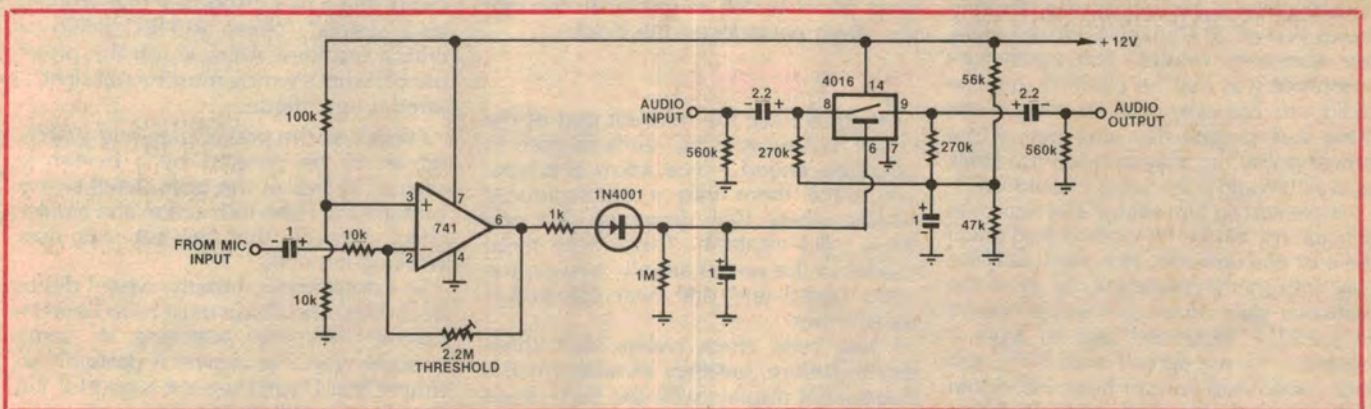
maintains a constant supply voltage to the 555, to eliminate frequency drift with changes in actual power supply voltage, which may range from 8 to 20 volts. The two-stage buffer is required because the LEDs are returned to a higher voltage than the (regulated) supply to the 555.

The prototype was calibrated to

404Hz, the frequency required to correctly set the speed of a Model 15 Teletype motor. By holding the group of LEDs close to the flywheel, the motor can be adjusted to precisely the correct speed.

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Simple Noise Gate



In some applications it may be desired to couple a microphone to an automatic noise gate, such that in the absence of acoustic input signal the preamplifier noise is "squashed". This particularly applies to noisy preamplifiers used in con-

junction with high gain high power amplifiers; or in the case of the residual output from the balanced modulator in the Cylon-Voice Simulator (EA, January, 1981).

Referring to the circuit, it will be seen that the input to the 741 op amp is bridged across the microphone output. The 741 is connected in the inverting mode, with the series feedback resistor being a 2.2MΩ potentiometer which serves as a gain control for setting the squelch threshold. Output from the op amp is applied to a half-wave rectifier, and then fed to the control input of one "pole" of a 4016 quad-bilateral switch. This switch is wired in series with the preamp output, such that in the absence of signal the preamp output is muted. With signal present the rectified output rises sufficiently to activate (and therefore "close") the bilateral switch, thus enabling the

preamp output to feed the following equipment.

An RC time constant network is connected across the output of the diode rectifier to provide a controlled release time for the gate; and thus preclude gate closing during short pauses. Note that the threshold control allows manual adjustment of the input level at which the gate is opened. As the 4016 switch actually contains four separate devices, a relatively compact unit comprising four gates could be built around one 4136 or TL074.

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REVERSING LAMPS

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lamp. One solution would be to substitute a 2N2955 power transistor (PNP type) for the 2N3055, and move it to the other side of the lamp. Connect its emitter to the positive rail, and the lamp between collector and ground. The emitter of the BD139 should also be grounded and its collector connected to the base of the 2N2955. Finally install a resistor of, say, 1kΩ between the base of the 2N2955 and the positive rail.

PSST! Got any neat circuit ideas? Why not send 'em to us? We pay between \$5 and \$20 per item, depending on how much work we have to do to publish it. ☎