

## Optoelectronic alarm circuit is time-sensitive

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Using an optoelectronic slot switch and a 556 dual timer operating as both a pulse generator and missing-pulse detector, this circuit generates an alarm when an opaque object blocks the light input for longer than a preset time interval. It has many applications and is especially useful when united with a slotted disk to monitor motor speed stroboscopically, indicating when the steady-state rotation rate is too high or low. It can also be used on the production line for checking the width of materials.

Generally, the output of the pulser periodically activates the light-emitting diode of the H13B1 switch. Other sensors may be used; Darlington photosensing

transistors, though, are the most sensitive. In this case, the pulser's operating frequency is set at 1.42 kilohertz, but it may be suitably selected by replacing the 100-kilohm resistor at pin 1 with a potentiometer.

As shown, the H13B1 is built with a slot of several millimeters separating its LED from the output photo-transistor so that objects can be placed in the air gap between them. When the slot is not blocked, the photo-transistor continuously resets the missing-pulse detector. Should the light path be blocked, pin 8 will remain high and the threshold voltage at pin 12 will fall at a rate determined by the adjustable  $R_1C_1$  time constant.

Depending on the value of this constant, which can be selected for delays from microseconds to seconds, the detector will generate a step voltage if it is not reset within that period. The signal is then inverted by  $Q_1$ , which in turn fires the silicon controlled rectifier to drive the load,  $R_L$ .

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**Light block.** Pulser operating as astable, multivibrator triggers LED in slot switch so that missing-pulse detector is periodically reset. Interruptions in light beam caused by external object cut off reset pulses, causing circuit to generate alarm if interval exceeds preset time.

