

THEFT ALARM FOR HANDHELD CALCULATORS

BY TOMMY N. TYLER

HANDHELD calculators are a prime target for thieves because they can be quickly picked up and tucked out of sight. Though you could physically fasten the calculator to your desk, this defeats the purpose of its portability. Here's another approach—an audible alarm that sounds off when the calculator is unplugged from its charger.

The Alarm Circuit. Simplicity is the key feature of this alarm. It is inserted between the charger and the calculator, as shown in Fig. 1, and draws a nominal amount of power from the charger. As long as a trickle charging current (at least 100 μ A) flows into the calculator, silicon diode *D1* conducts. The forward voltage drop across it keeps germanium transistor *Q1*

turned on. Transistor *Q2*, which can be almost any pnp device, is cut off, and the Sonalert alarm is silenced.

However, if the calculator is unplugged, *Q1* turns off, *Q2* turns on, and the Sonalert starts to howl. Obviously, if the charger is unplugged, the alarm will not operate. So, it's important either to hide the charger or secure it in some way so that the thief will not disconnect it. To prevent the alarm from becoming obvious (when it is silenced!), it's a good idea to build the alarm and the charger into one small enclosure.

Two variations on the circuit are shown in Figures 2 and 3. The relay contacts can be used to trigger a remote signalling device. Install diode *D2* to prevent destruction of *Q2* by inductive voltage spikes generated by

keying the relay. Figure 3 shows a small transistor oscillator which can be used in place of the Sonalert. It can be assembled from junk box parts. (Note *R2* is changed to 2200 ohms.)

Construction. Take care in wiring jack *J1* and plug *P2*, observing correct polarities. Although *D1* will prevent damage to the calculator from reverse current, the unit's batteries will never charge! And, of course, be sure that *P2* and *J1* are the same types as those on the charger and calculator. Either pc or perforated board may be used. Both parts placement and the selection of semiconductors are not critical. Just be sure that *D1* is rated to handle the charger's maximum output (in the event that *P2* is accidentally shorted), and *Q1* is a germanium device. ♦

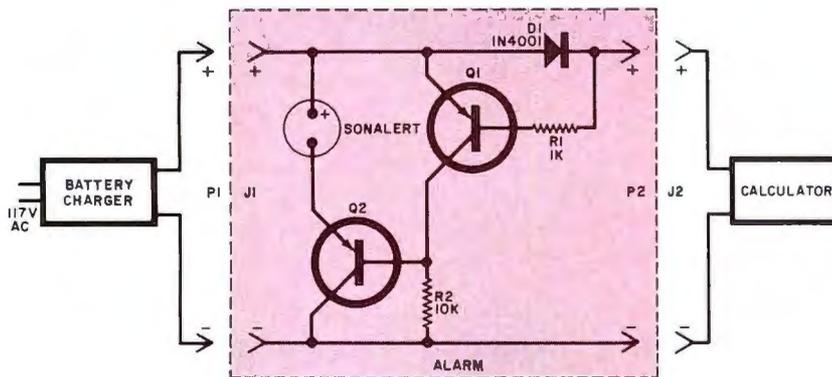


Fig. 1. When trickle current through *D1* stops, Sonalert is activated.

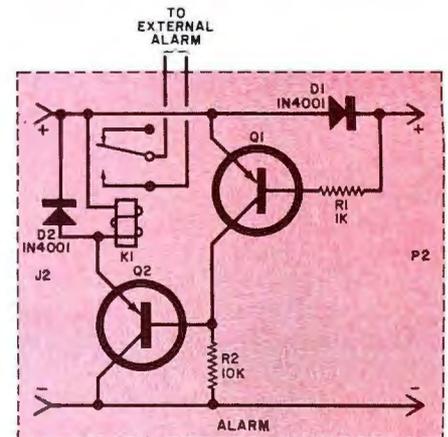


Fig. 2. For a remote alarm, use a relay instead of Sonalert.

PARTS LIST

- C1*—1- μ F, 15-volt electrolytic capacitor
- D1, D2*—IN4001 rectifier
- J1—Calculator-type power jack
- K1*—6-9 volt, 500-ohm relay (Radio Shack 275-004 or equivalent)
- P2—Charger-type power plug
- Q1—General-purpose germanium pnp transistor
- Q2—General-purpose pnp transistor
- R1—1000-ohm, 1/2-W, 10% resistor
- R2—2200-ohm or 10,000-ohm, 1/2-W, 10% resistor (see text)
- Sonalert—Mallory SC628P
- Spkr*—3.2-ohm dynamic speaker.
- T1*—500- or 1000-ohm/3.2-ohm audio transformer
- Misc. Perforated or pc board, hookup wire, solder, suitable enclosure, machine hardware, etc.
- *Optional. See text.

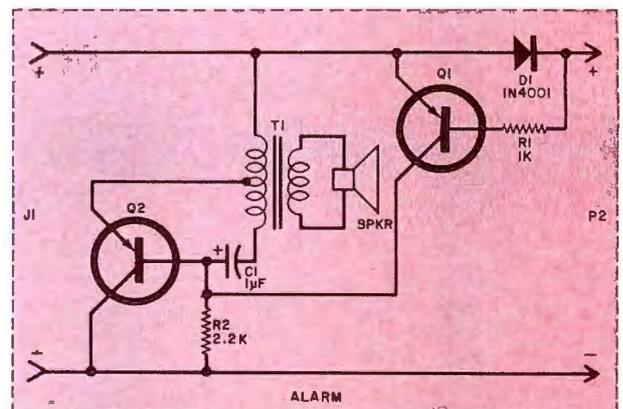


Fig. 3. Audio oscillator can also be used to provide an audible signal.