

ADD A DISTINCTIVE EXTENSION PHONE RING TO YOUR TELEPHONE

By Mark Forbes

THE low-cost (approximately \$12) telephone-line-powered tone ringer described here will enable you to add an extension ringer in your garage or other area where the telephone ring cannot be heard. It will also make the ringing sound of a standard phone more pleasant.

The tone ringer is based on *IC1* (Fig. 1) a two-tone oscillator whose power supply and interface were designed specifically to be used with the telephone system (so no dc power supply is required). Up to four tone ring-

ers can be used on a single telephone line, and a remote can be used on a 25-foot extension.

Circuit Operation. On a non-busy telephone line, about 50 V dc is present between tip and ring (red and green wires, respectively). As shown in Fig. 1, capacitor *C1* blocks this dc voltage in the normal "hung-up" state. To ring the telephone, an ac voltage between 85 and 125 volts (peak-to-peak) is applied between tip and ring (the "ring wire" is not to be confused

with the "ring voltage"). This ac signal is coupled by *C1* and *R1* (which acts as a current limiter) to *RECT1*, a diode bridge, then filtered by *C2*. Thus, the supply voltage for *IC1* is provided by the phone line, and is present only when the ac ring signal is present. A threshold circuit is provided within the IC to prevent "chirps" on the ringer often heard when another phone on the same line is being dialed.

When *IC1* is on, it generates an audio tone of approximately 575 Hz modulated between 510 and 640 Hz at a 10-Hz rate to simulate a bell ringer. The center frequency (575 Hz) is determined by RC network *R3* and *C4*. This frequency can be varied somewhat by the selection of components. For the given value of *C4*, resistor *R3* can range from 180 to 330 kilohms. The modulating frequency is determined by the *R2-C3* combination and with the given value of *C3*, the range for *R2* is roughly 120 to 180 kilohms. With proper selection of these components, several telephones can be differentiated by different tones.

Capacitor *C5* couples audio to the speaker. The *IC1* manufacturer recommends the use of a 1000-to-8-ohm transformer with a 15-kilohm resistor across the primary. Acceptable performance has been obtained with the direct connection illustrated in Fig. 1. If a slight volume increase is desired, the transformer may be used.

Construction. The simple circuit can be assembled on a perf board or a small pc board such as that shown in Fig. 2. Double-check the polarity of all components before soldering in place.

When used with a miniature loudspeaker, the entire ringer can be mounted within a small plastic enclosure which can be mounted near the telephone, or up to 25 feet away as a remote ringer monitor.

Keep in mind that some telephone companies require that you inform them that you are using one of these circuits. ♦

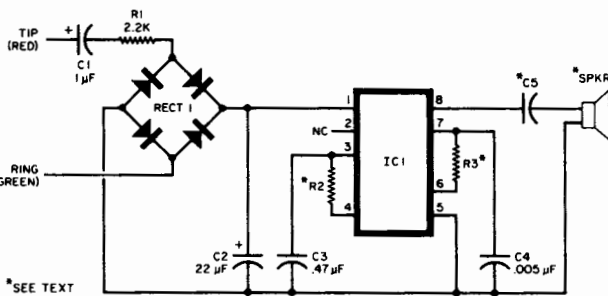


Fig. 1. The tone generated by *IC1* is about 575 Hz.

PARTS LIST

- C1—1- μ F, 100-V, capacitor
- C2—22- μ F, 35-V, capacitor
- C3—0.47- μ F, capacitor
- C4—0.005- μ F, capacitor
- C5—0.22- μ F disc capacitor
- IC1—ML8204 tone ringer (MITEL)
- R1—2.2-k Ω , 1/2-watt resistor

- R2—See text
 - R3—See text
 - RECT1—Diode bridge (Radio Shack 276-1161, or similar)
 - SPKR—8-ohm loudspeaker
- Note:** The ML8204 (IC1) is available for \$5 from Mark Forbes, 1000 Shenandoah Drive, Lafayette, IN 47905.

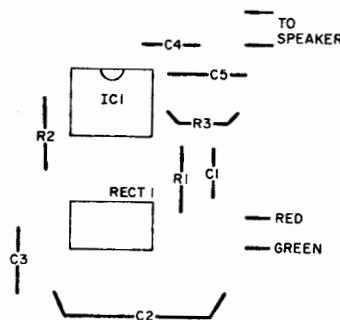
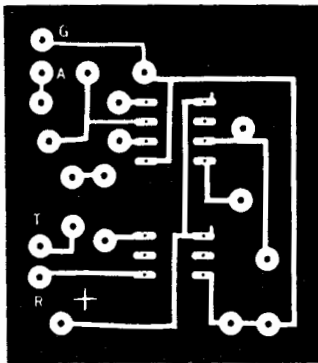


Fig. 2. Actual-size foil pattern and component layout are shown above.