PHONE LINE SENTINEL

Put an end to phone-call interruptions with the Phone-Line Sentinel-it will /et others know when you're on the line.

MORDECHAI SAAD

WE ALL KNOW HOW ANNOYING IT CAN be when you're in the middle of an important phone call and somebody else picks up the line and says "Oh, I didn't know you were on the phone." And it's all the more annoying when they start dialing without first checking for a dial tone. Of course, such an interruption can be devastating to a fax or modem transmission. If you are regularly plagued with such interruptions, then you need one of our Phone-Line Sentinels placed next to every phone in your house. The PC board measures only 1 x 1.8 inches.

How it works

The nominal voltage of a telephone line, when not in use, is about 50 volts DC. As soon as the line is in use, meaning that a telephone on the line has been picked up, the line drops to about 5 volts DC. Therefore, all we need is a voltage-level sensor to detect whether or not the line is in use. The Phone-Line Sentinel is just that: it monitors the phone-line voltage and lights an LED to let you know when the telephone line is in use.

At the heart of the circuit, shown in Fig. 1, is IC1 an ultra-low-current voltage-level sensor. Using that IC, the circuit draws "no" current (about 5 µA) when the phone line is not in use, and negligible current (about 3 mA) when the line is in use. Power for ICl is supplied from the phone line via R2, Dl, and Cl. 'h-ansistor Q1, which powers LED1, is driven directly from IC1 whenever the proper voltage level has been detected. Resistor Rl limits the current flow through LEDl, and R3, R4, and D2 divide the phone-line voltage down to a proper level for ICl. Protection from phone-line transients is provided by resistor R5 and varistor R6.

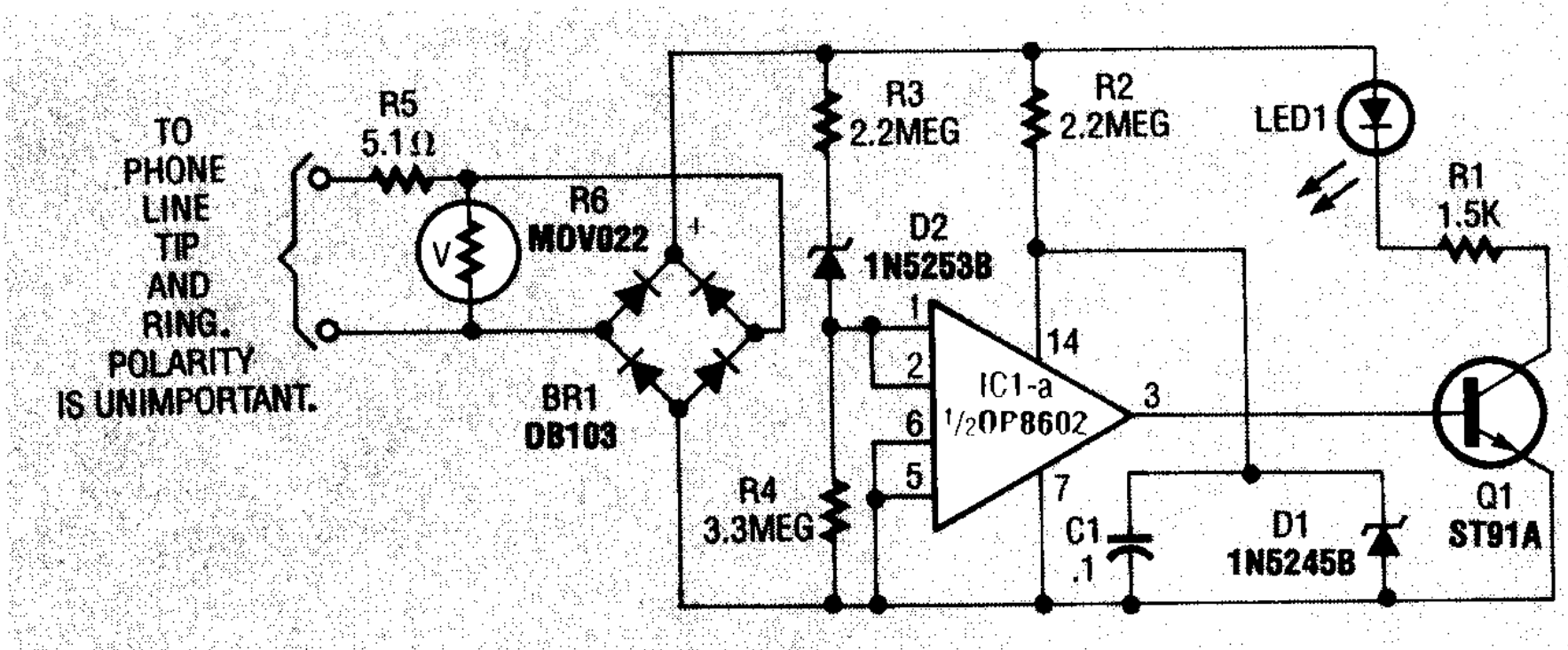


FIG. 1—AT THE HEART of the circuit is an ultra-low-current voltage-level sensor that draws only about 5 μA when the phone line is not in use.

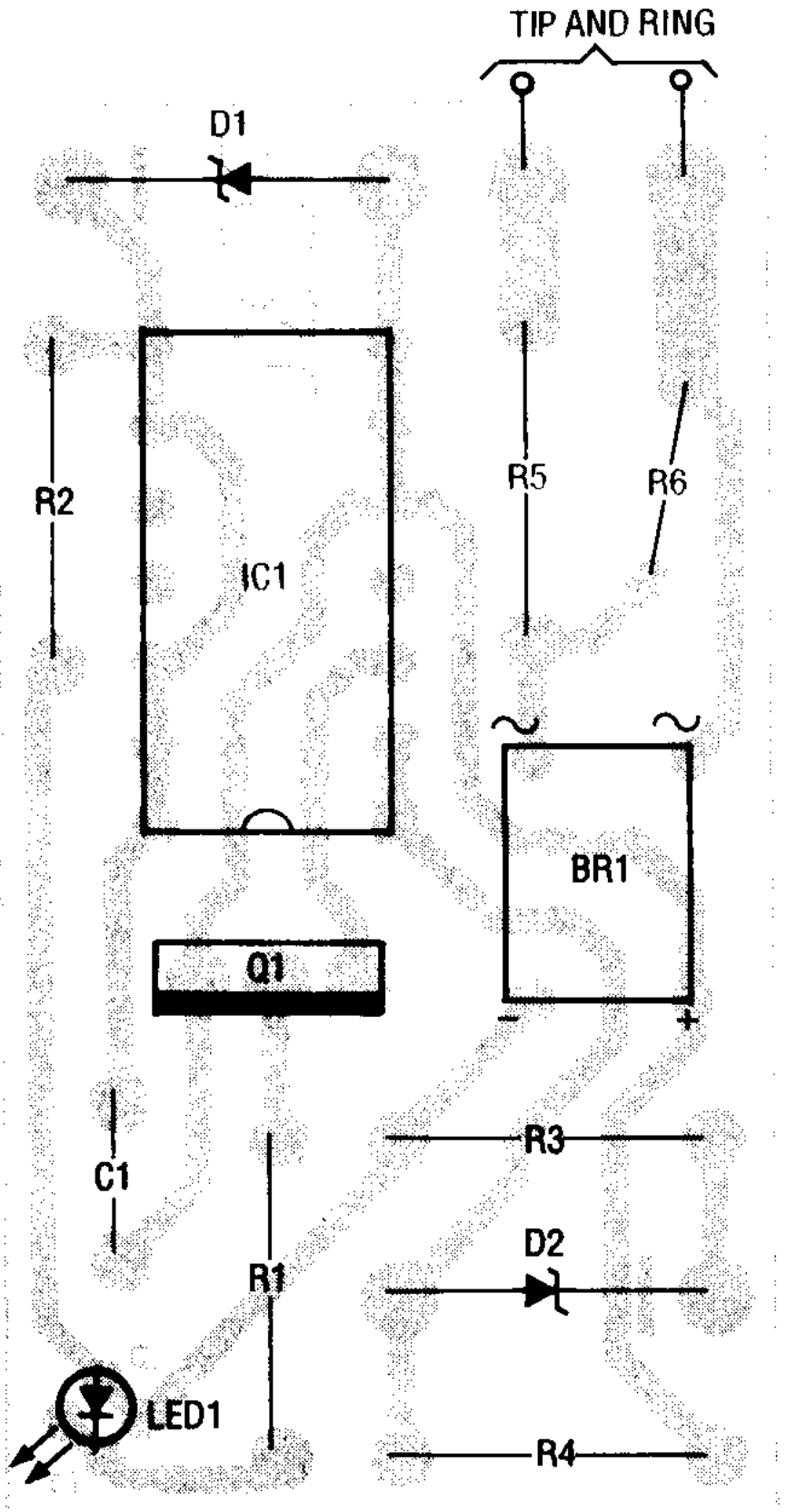


FIG. 2—IF YOU'RE USING A PC board, follow this parts-placement diagram. The LED can be mounted so that it can be bent in any direction, or remain straight up.

Construction

The Phone-Line Sentinel is available as a kit (or completed unit) from the source mentioned in the parts list. However, if you can dig up all of the parts on your own, you can point-to-point wire the circuit, or make your own board from the foil pattern we've provided.

If you're building the circuit using a PC board, simply follow the parts-placement diagram in Fig. 2. If you'll notice, the LED can be mounted on the board in two positions, so that it can be bent in any direction, or remain straight up. You can also mount the LED on leads as long as you like, allowing the board to be hidden from view, or perhaps inside a telephone if there's enough room, leaving only the LED indicator in view. We'll leave the details up to you. Just be sure to observe the LED's polarity on the board regardless of how you install it.

Connecting the unit to a phone line is easy If you have a spare

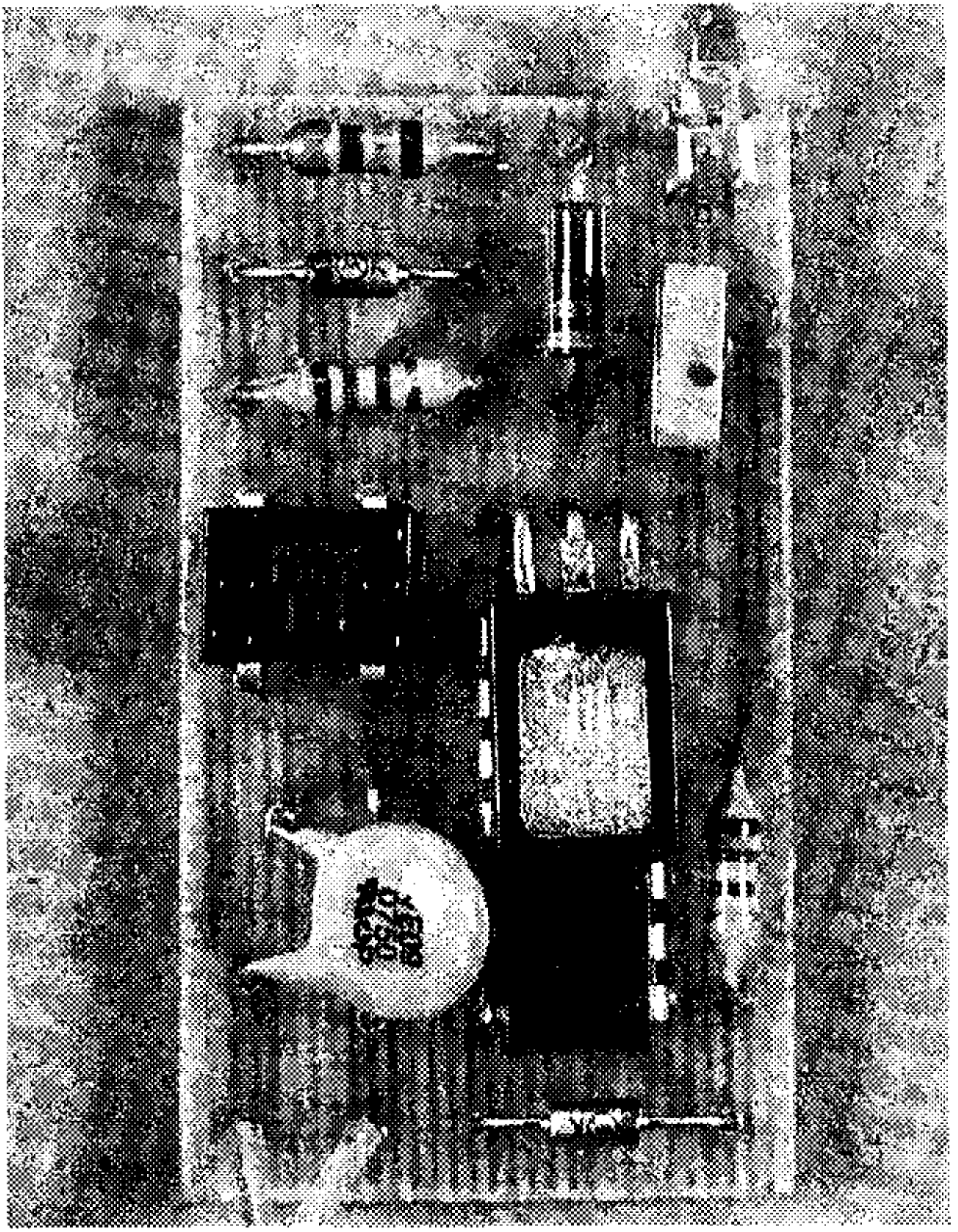
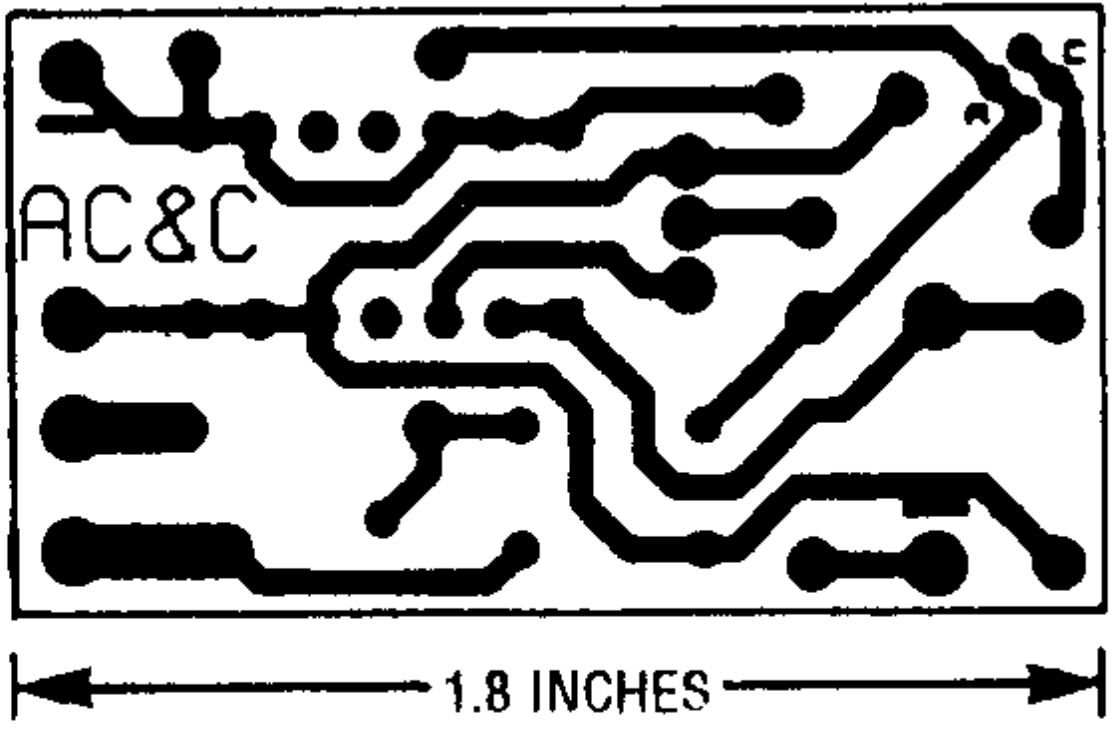


FIG. 3—THE COMPLETED BOARD should look something like this.



USE THIS FOIL PATTERN to make your own PC board.

jack in a desirable location, all you have to do is solder the tip and ring (green and red) wires of a modular phone cord to the board as shown in Fig. 2. Otherwise you can use whatever wire you like and connect it to the line however you see fit. Figure 3 shows the completed board.

Testing the circuit is as simple as using it. Just connect it to the phone line: the LED should be off if the line is on-hook. Then, if you pick up any phone on the line, the LED should light. After the operation of the circuit checks out, it's time to decide what you're going to do with it. Because of the extremely compact size of the board, the neatest thing you can do is mount one inside every phone you own, with only the LED left exposed. If you do a neat job, it will look like it was factory installed.

PARTS LIST

All resistors are ¼-watt, 5%.
R1-1500 ohms
R2, R3-2.2 megohms
R4-3.3 megohms
R5-5.1 ohms
R6--MOV022 varistor
Capacitors
Cl-Q.1 µF, 50 volts, ceramic
Semiconductors
IC1-OP8602 ultra-low-current voltage-level sensor
D1-1N5245B 15-volt Zener diode
D2-1N5253B 25-volt Zener diode
BRl-DB103 bridge rectifier
LED1-light-emitting diode
Q1-ST91A NPN transistor
Miscellaneous: PC board, modular phone cord or hookup wire, solder, etc.

Note: The following items are available from TelMore, 11 Market Dr., Syosset, NY 11791: A complete kit, including PC board and all parts in Parts List (above), $14.99. An assembled and tested unit, $19.99. With the assembled units, you must specify which way you want the LED positioned. With the LED pointing straight up, order LIUD-UP; with it pointing to the long **side of the board, order LIUD-LS; with it pointing to the short side, order LIUD-SS; and with it mounted off the board on** wire **leads, order LIUD-W. Add $1.75 for the -W model. Please add $7.50 for shipping and handling to all orders. NY State residents must add ap propriate sales tax.**