to build your circuit the same way, you can etch your own board using the solder- and component-side templates shown in Figs. 3 and 4, respectively. Or, you can order a pre-etched board from the source mentioned in the Parts List. It is recommended that you use the PC board because the NE614 is a high-gain, high-frequency IF amplifier, and errors might result from stray capacitances caused by point-to-point wiring.

The PC board is compact and was designed to fit in a pocket-size SerPac M6 case, which is also available from the source mentioned in the Parts List. You can, of course, use any other suitable enclosure.

When building the circuit on the PC board, use the parts-placement diagram shown in Fig. 5 as a guide. Begin assembling the board by mounting DISP1. To do that, first cut the pins on the display to a length of between ⅛- and 3⁄16-inch. Mount the display with pins 11 through 20 lined up with the pads along the component side of the board. Solder pins 1 through 10 together using a wire; connect that common wire to the pad indicated in Fig. 5.

Mount IC sockets for IC1, IC3, and IC5, making sure they are oriented properly. Install the non-polarized capacitors next. Go on to mount the diodes and transistors and IC2, making sure all are oriented properly. You can then vertically mount all the resistors—that facet of the design helps keep the board compact.

Install the electrolytic capacitors next; note their polarity as indicated in Fig. 5. Then mount switch S1 so that about 1⁄16-inch of the leads protrude through the PC board. That should ensure the switch clears an opening in the case.

Trim the battery-connector leads to 2½ inches overall and solder them to the board at the correct points. You might want to apply silicone rubber to the attachment point to reduce the strain at the joint.

At this point, clean the board of residual flux before installing the microphone. The microphone should not come in contact with cleaning solvents. Mount MIC1 with its leads just protruding through the board so that the microphone will have maximum height on the board. You can add a small bead of silicone rubber to the front edge of the microphone to support it more securely. Note: Be sure to use the microphone specified in the Parts List; do not substitute any other electret microphone that might have a different sensitivity, load, or frequency response.

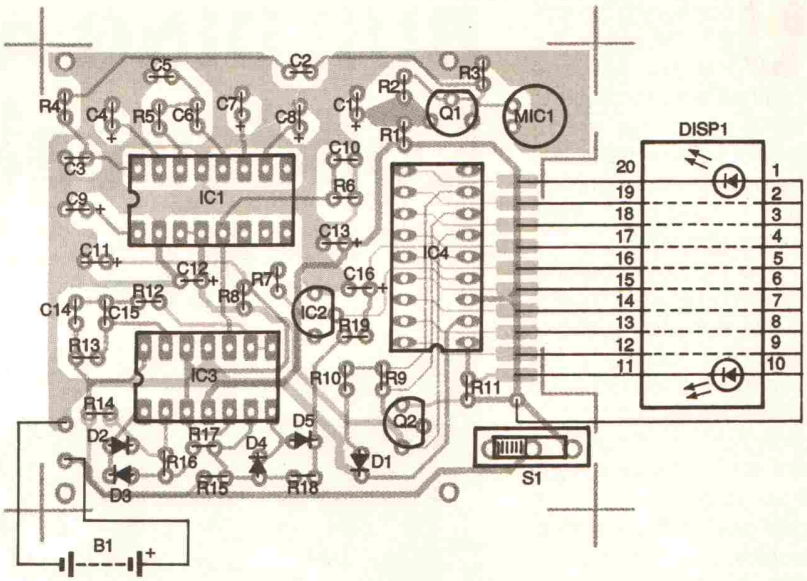

Fig. 5. Use this parts-placement diagram as a guide when assembling the circuit board. Note that pins 1–10 of DISP1 need to be connected together and to the indicated point on the board.

You can now insert the three DIP-package ICs into their respective sockets. Complete the assembly of your Analyzer by mounting the circuit board into a case. If you use the SerPac M6 case mentioned earlier, the four holes at the edges of the board will match the four internal mounting posts of the case. Place a ⅛-inch spacer at the center of the back side of the case to support the board in place when the case is closed. The spacer can be made from foam tape or a rubber pad of suitable thickness.

Checkout and Use. When the unit is powered up, the emitter of Q2 should supply a nominal +5 volts. Also, the voltage across IC2 should read about +2.5 volts. At the junction of R7 and R8, the voltage should be larger than that across IC2 to light the first LED bar (in a quiet room). That bar is in the STRESS range, which corresponds to no modulation. It might be necessary to adjust the value of R7, depending upon component tolerances, to obtain that condition.

As you speak, higher LEDs should light in the display area marked NORMAL. Under stress, the modulation level should fall and a bar in the STRESS half of the display will be lit.

The unit is small enough that you can carry it in a shirt pocket and glance down at the display while someone is speaking. It is best to evaluate a speaker in conversation because the Analyzer takes a moment to acquire the peak level of modulation and display it on the LEDs. If a source of white noise is introduced, such as the noise of running water or the hiss of a blank tape, the Analyzer output will remain in the STRESS region because the mixing of all possible frequencies will produce a zero swing on the RSSI signal. If music is playing, the Analyzer will remain in the STRESS range for the same reason.

You might find it interesting to analyze a taped conversation with the Voice-Stress Analyzer. You'll see that analysis is pretty much independent of the playback volume.

The results of voice-stress analysis are sometimes found in news stories that deal with political scandals and controversies. You can find a good source of stressful situations to evaluate your own Voice-Stress Analyzer by taping direct quotes of suspects from such news stories.

You can also use the Analyzer to measure the degree of stress in the voices of radio announcers or public speakers. As you can see, there are lots of entertaining applications for this fascinating project. ■