Hushkit for You

Install an ANR system in your headset and save money too.

By Gary R. Jones

Though it happened years ago, my first encounter with a noise-canceling headset still puts a smile on my face. While taxiing in a new Glasair with Bill Sprague (former sales manager for Stoddard-Hamilton Aircraft), I was startled when he turned on the device. Instantly my senses were in conflict. My ears were telling me the engine had quit, but my eyes were still looking at the blur of the rotating propeller.

The technology was brand new, offered only by Bose, and was quite expensive. As great as these headsets were, at $1000 each, sticker shock took many potential buyers to their knees. I joined the ranks of thousands who would have to wait for a more affordable version.

To the Rescue

Paige Brittain, owner of Headsets Inc., came up with an affordable and common-sense alternative. "There are many good quality headsets in use today," he says. "Converting an existing headset rather than discarding it because technology had outdated it seemed like the way to go. Our active noise reduction [ANR] modules are designed to fit in almost every headset on the market today." Since 1994, his company has sold more than 25,000 ANR conversion kits.

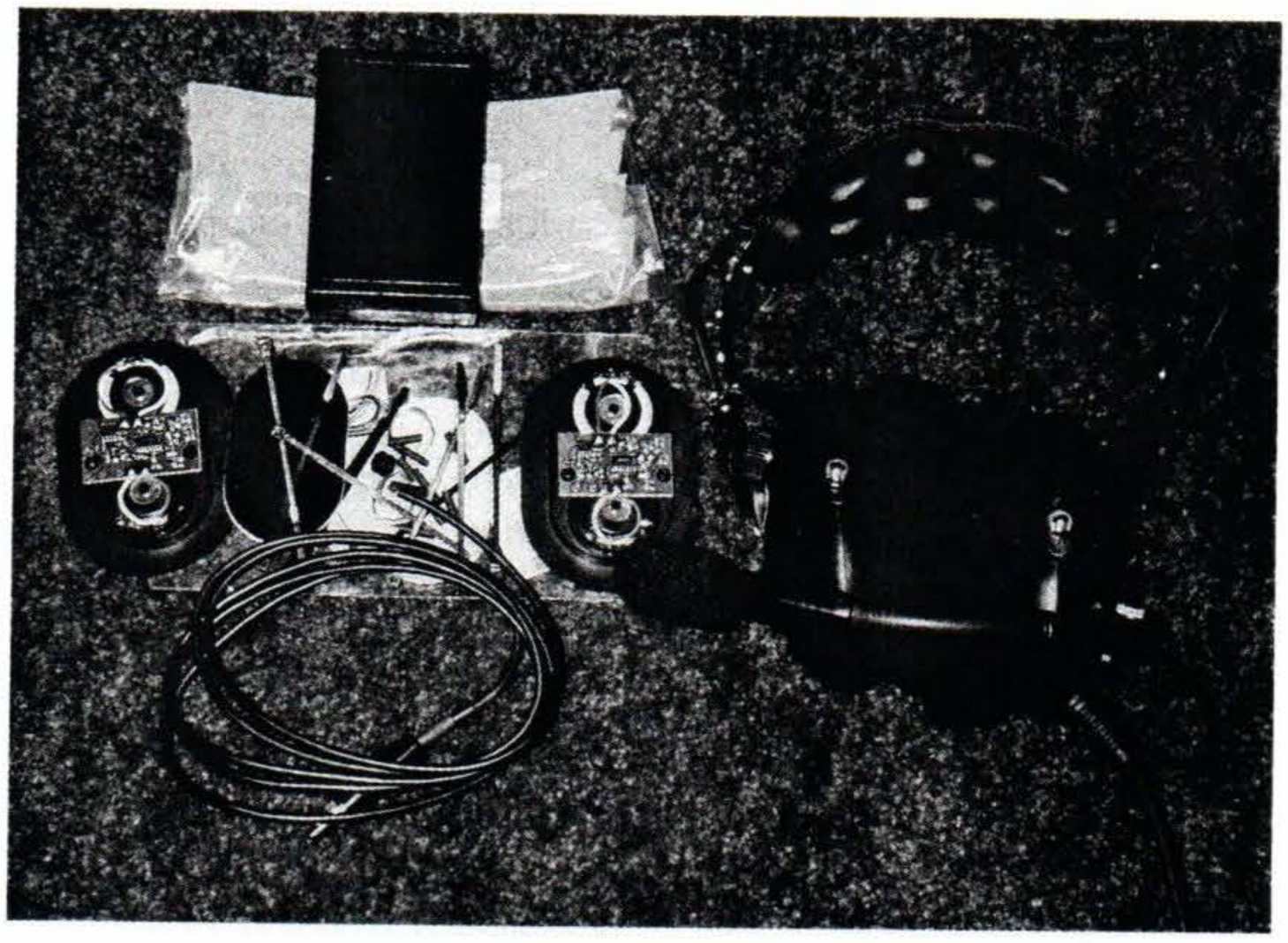
How Does It Work?

The active part of ANR revolves around electronically changing the low-frequency sound wave to become out of phase with the ambient noise, but within a certain frequency range. This is accomplished by placing a microphone in each headset ear cup near the ear canal. The microphone picks up the low-frequency noise that makes it through the headset ear cup and sends it to a circuit board, changing it 180° out of phase with the noise in the air cup. The out-of-phase signal is sent through a micro speaker that is mounted at the bottom of the ANR module in the ear cup. There are two micro speakers in each headset ear cup: One is for audio and one is for active noise reduction.

Conversion Immersion

Several friends had converted their headsets to ANR and liked the results. It makes sense from both a health and safety standpoint, so I took the plunge. I use both a David Clark 10-40 and a Marv Golden muff-style headset in my Glasair. The plan was to convert both of them. The Marv Golden was a stereo unit with two volume controls, and the David Clark set was monaural with a single volume control.

Here's the active noise reduction (ANR) kit from Headsets, Inc. (left) and the standard headset in which it will be installed.



The original ear cup speakers are ready for removal.

Head

Taking a close look at the installation kit, I was impressed. Everything was there including solder and precut heat-shrink tubing. The instructions included four color-coded diagrams that covered every possible headset combination. Before diving into the project, I spent 30 minutes studying the manual, getting familiar with the materials, and learning what was to be accomplished.

Converting

The main thrust of the conversion involved the removal of the original speakers located beneath the foam in the ear cup and replacing them with the ANR module. To make the headset a bit more manageable during conversion, I separated the metal headband that connects the two ear cups.

With the foam removed, the screws that held the speakers in place were exposed. Once the screws were removed, the speakers came out. Before cutting the speaker wires, I marked each wire with a note on what wire went where. The left ear cup was busy with electrical wiring because that's the side on which the boom microphone is attached. The key is to take your time. It's imperative that you know which wire goes where. If labeling each wire is not enough, take notes or draw a diagram. This project is not difficult, but the wiring has to be perfect.

The ANR power cord has to be installed. For the cord to enter the ear cup, a ¼-inch hole has to be drilled near the bottom of the cup. Making sure the area is clear of any obstructions, start with a ⅛-inch drill, then a 3/16-inch bit and finally a ¼-inch bit. Deburr the hole, install the rubber grommet, and slide the power cord into the ear cup. To keep the power cord from sliding out of the cup, put a plastic tie wrap on the power cord inside the ear cup.

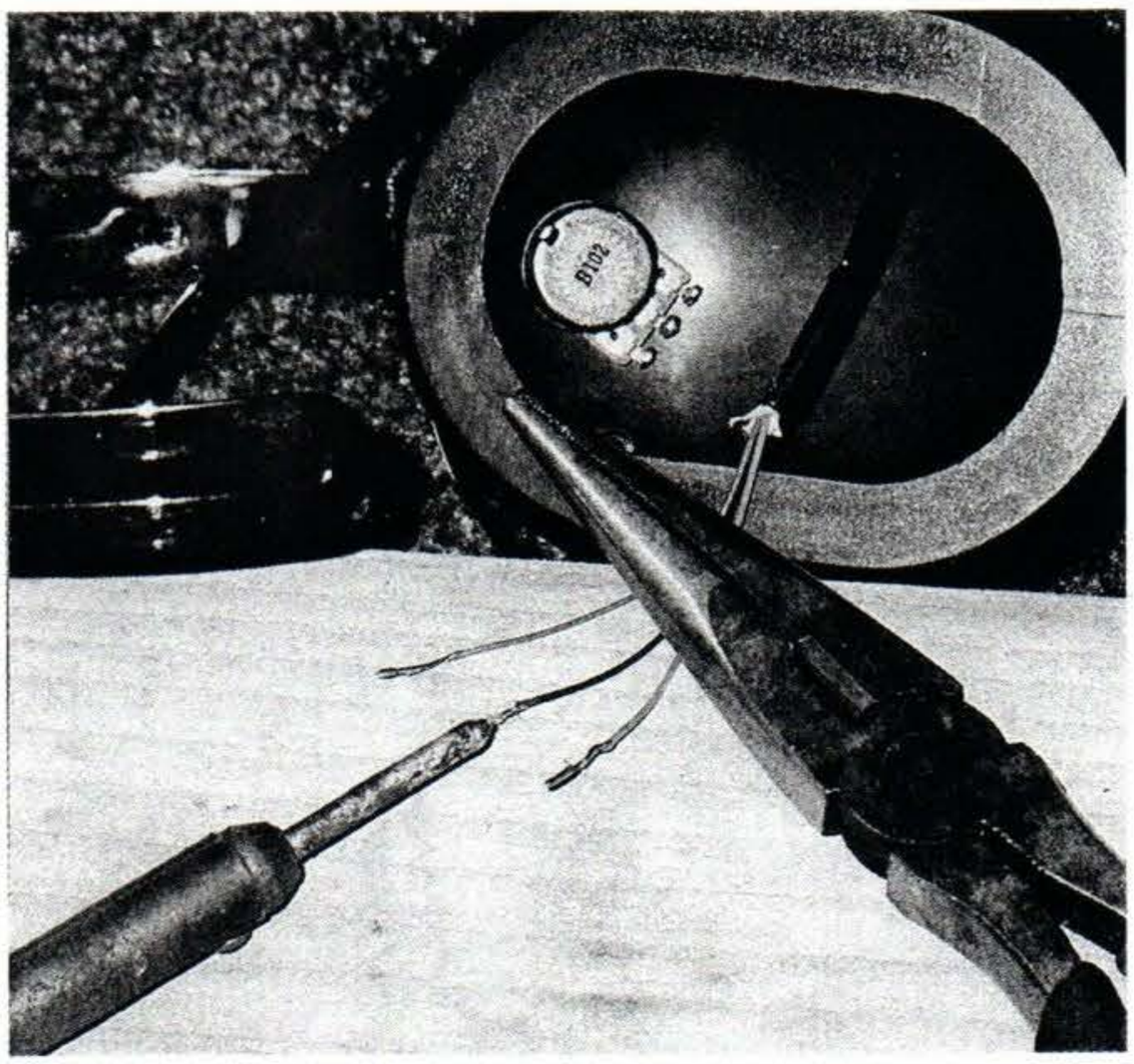
During the actual operation of the ANR headset, a 9-volt battery will power the noise-canceling module. Typically, the battery will last 20 hours.

It is likely that the crossover cord that travels over the headband and goes into each cup will have to be replaced, as it must be shielded. This is a simple matter of cutting its wires and pulling it out of the ear cup. The new crossover cord uses the same holes. Mark the wires before cutting them.

Now the fun starts. The wires that need to be soldered have to be stripped approximately ¼ inch. I didn't have wire strippers that could strip 28-gauge wire, so I improvised. After laying the wire on a piece of

The ANR power cable is installed and secured every 10 inches to the original audio cable.

Crossover cable wires have been stripped and are ready for tinning.



PHOTOS: GARY R. JONES

wood, I used a single-edge razor blade to remove the plastic covering without nicking the wires. This procedure worked well but was tedious. Later I discovered that the insulation on the tiny wires could be stripped with my fingernails. The small-diameter wire allows tucking it away in a small space.

The Connections

Carefully follow the color-coded diagram as it's time to solder the wires together. If you haven't soldered in a while, practice with some scrap pieces first. A fine-tip soldering iron is recommended. The 3/16-inch tip on my iron worked fine.

Wires that were to be connected were first twisted together, then soldered. In two places, three wires were joined. Here I followed the steps above, tinned the third wire, and then soldered it to the other two. When the solder had cooled, I gently tugged on the wires to verify a firm connection and placed a precut piece of heat-shrink tubing over each wire junction. A match was used as a heat source to shrink the tubing.

When complete, each ear cup had three wires to attach to the ANR module: one each for audio, power supply and ground. The tips of these wires had been tinned with solder. On the ANR module circuit board, there are three small printed-circuit lands that each need a drop of solder.

Before the three wires were soldered to the circuit board, the new high-density foam was tucked inside the ear cup, and the original foam was discarded. Before final soldering, I checked the orientation of each module and made sure that the left module was in the left cup and the right unit was in the right one. Using small needle-nose pliers, I carefully placed each wire on the appropriate land (conductive spot) on the circuit board. Because the wire end and land had been tinned, it was simply a matter of holding the wire in place and adding heat.

Total installation time averaged 1.5 hours per headset.

Headsets Inc. only recommends silicone gel-filled ear cushions. Other types do not seal properly and will adversely affect the ANR system, the company says. For headsets using something other than silicone gel-filled ear cushions, replacements can be purchased from Headsets Inc. for $20. Fabric covers for the ear cushions should not be used.

Testing and Evaluation

Double-sided adhesive tape is us to hold the ANR module in the e cup. Before securing the module the ear cup, try the converted heads to be sure it is working properly.

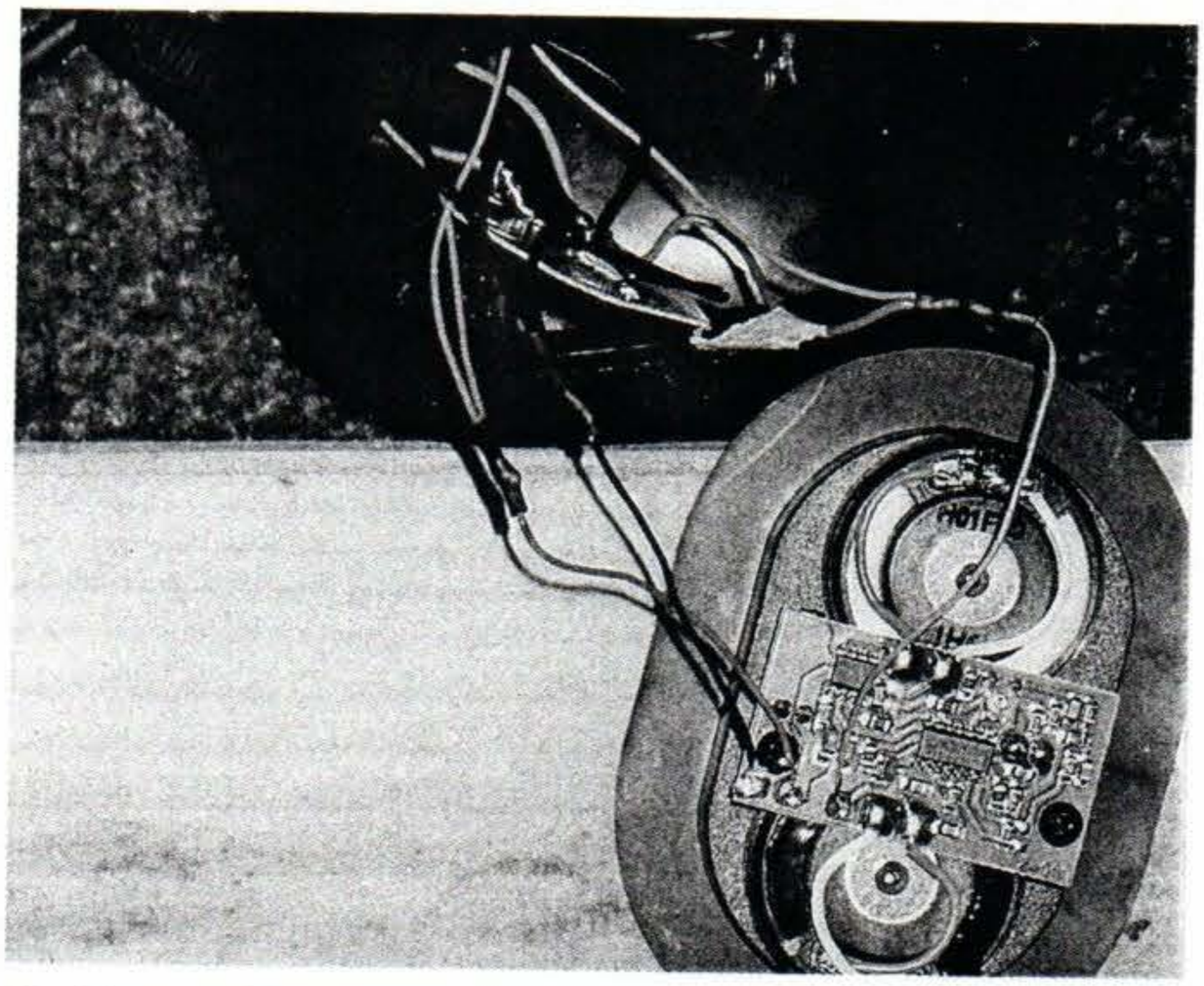
I'm happy to report that my co verted headsets worked perfectly t first time. With the engine of my Gl sair running, I turned on the pow to the headset. The performance wa startling. Like my first exposure yea ago, I thought the engine ha stopped. Again my senses were i conflict. This conversion was tim and money wisely spent. I only regre not doing it sooner.

Cost Options

For $169 you receive a complet ANR conversion kit. Or send you own headset, and Headsets Inc. wi do it for you for $50 plus the cost o the ANR kit. The price includes three-year warranty. (If you do th work, the warranty is for one year. Need to buy a headset? Headsets Inc will sell you one with its ANR systen for $399. **KI**

FOR MORE INFORMATION, contact Headsets Inc., 2320 Lakeview Dr., Amarillo, TX 79109; call 800/876-3374; e-mail orders@headsetsinc.com.

All wire connections in the left ear cup have been soldered and are insulated with heat-shrink tubing.



High-density, sound-deadening foam replaces the original material in the ear cup.