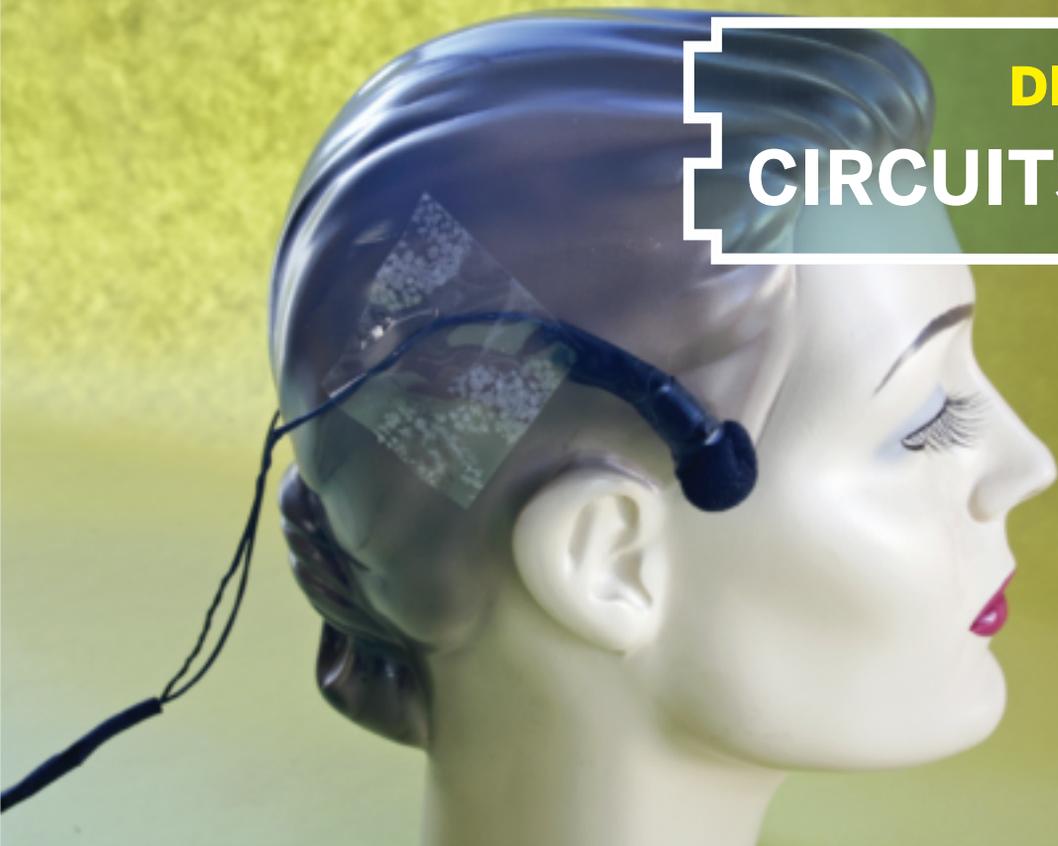
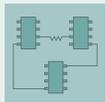


DIY CIRCUITS



THE STEALTH MIC



Disguise an inexpensive binaural microphone as ordinary earbuds. By Bill Byrne

A binaural recording system re-creates the way a person actually hears by placing 2 microphones at a distance of about 7" (roughly the distance between your ears), usually mounted on a dummy head or worn on the human recorder's head. When played back on headphones, the binaural stereo effect is preserved and is often quite remarkable in its realism.

With some easy modifications, a pair of headphones can be turned into a binaural microphone with readily available materials and cheap parts. Better yet, I'll show you how to make your own binaural mic, disguised as earbuds.

In today's iPod-saturated urban environment, no one ever notices someone wearing headphones. This makes earbuds an ideal prop for covering a hidden mic that's plugged into a recording device, for various stealthy endeavors.

Photograph by Sam Murphy

MATERIALS

- Microphone condenser elements (2)
RadioShack part #270-090
- Solid-core wrap wire, 30 gauge in 2 colors
- Soldering iron and solder
- 1/8" heat-shrink tubing
- Lighter
- 1/8" stereo plug
- Earbud cushions

1. Wire the binaural mic elements.

Normally I don't use wrap wire because it's so thin it can be frustrating to deal with, but in this case, for earbuds, we really need the wires to be thin and lightweight.

Cut two 3' lengths of wrap wire in each of 2 colors. Solder these to the first microphone element's 2 contacts (Figure A, next page). Slide a couple inches

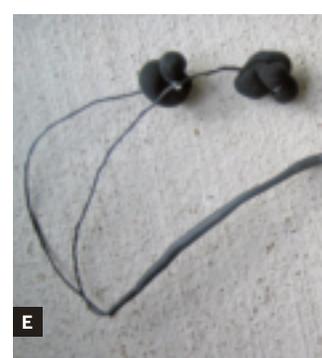
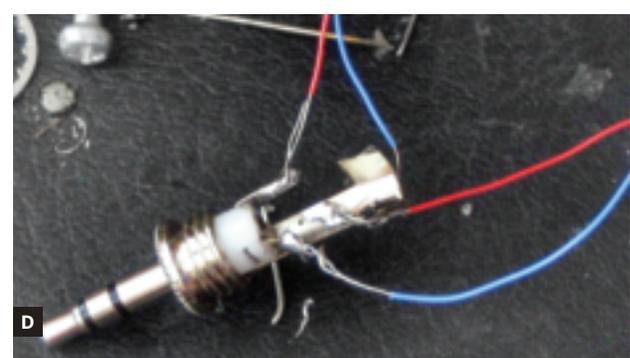
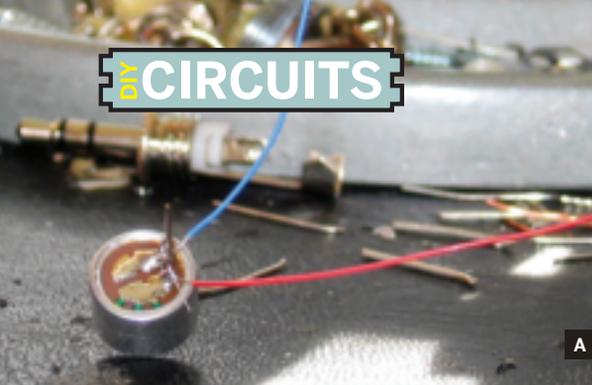


Fig. A: The microphone element soldered to 30-gauge wrap wire. Fig. B: Heat-shrink tubing reinforces connections to avoid introducing noise. Fig. C: Both elements wired and reinforced. Fig. D: Wire each element to the

stereo plug in opposite directions, with ground (in back) connecting to blue on one, red on the other. Plug tip is the right channel, and sleeve (middle) is left. Fig. E: The finished microphone passes as earbuds.

of heat-shrink tubing over each connection, and heat it with a lighter. This will secure the connections (Figure B). We want them to be as stationary as possible, as movement of these wires will create noise on the line.

Twist the 2 wires together, but not too tightly. Slip on another piece of heat-shrink, this time over both wires. Slide it up to about 2" from the mic element, then shrink it.

Repeat the same process with the second mic element (Figure C).

About 10" from the mic elements, slip another piece of heat-shrink tube over to combine all 4 wires. Keep track of which pair goes to which mic.

2. Wire the stereo plug.

Open the stereo plug, and slide the cover over the 4 wires. Here's the trickiest part: in order to have the correct stereo image, the wires on 1 of the 2 mic elements should be reversed. So, for one mic element, the red goes to a plug terminal, and the blue to the plug's ground; on the other mic element, the blue goes to the second plug terminal and the red goes to the ground (Figure D).

Solder these connections, then screw the cover back on the plug.

3. Disguise the mics as earbuds.

Fasten the earbud cushions over the mic elements so that they're large enough to sit comfortably in your ears (Figure E). That's it, you're done.

4. Record.

To hear exactly what's being recorded, some folks will actually use a mannequin's head to hold the binaural mic, and will hold the head in their hands while wearing a pair of normal headphones to monitor the sounds. Working this way creates the amazing effect of listening to a binaural recording as it happens, but keep in mind that if you walk around holding a dummy head out in front of you, you may attract attention (in fact, I think you'd get arrested in some places).

With these stealth binaural mic headphones, as long as you're in a situation in which it's socially acceptable to be wearing headphones, you can record away, knowing that what you hear will be very close to what you play back later.

➤ For a schematic diagram and list of recordings, go to makezine.com/17/diycircuits_mic.

Bill Byrne is a multimedia artist, motion graphics designer, and educator. He wrote about Wii control in MAKE, Volume 14.

Photography by Bill Byrne