

Hints & Hacks

A Breakout PCB Interface; Cable Labels; Twist-Proof Wires

A Transceiver Accessory Socket Breakout Board

I run the audio from all of my radios into an audio mixer. This provides two stereo channels into an amplifier with two speakers above my radio desk. To feed the audio from each radio to my mixer, I use the audio output from the accessory sockets (located on the rear panel of most radios). It's a fixed, low-level signal ideal for mixers. I can also access the push-to-talk (PTT) function via the same socket on most radios.

I wanted all of the accessory socket functions — for any radio — brought to a common plug-in breakout interface. My preference was to have each signal or function on a phono socket, making for an easy-to-use plug-in solution.

To do this, I designed a single breakout printed circuit board (PCB) and a cable that works for all radio models and manufacturers (see Figure 1). The only component that changes is the accessory plug on the radio end of the cable, as that depends on the radio manufacturer. The design brings all of the pins on the radio's accessory socket to a single PCB panel that uses solder-in phono sockets.

The phono sockets on top of the breakout PCB are numbered one through eight. You can designate the function you want on each phono socket as you wire it. Once you complete the wiring, you can label each

socket's function. Additional space near the radio cable entry point is available if you choose to label which radio that breakout PCB is wired for. You can usually find the pin assignment for the accessory sockets in the rear of each radio's operating manual.

I have made 10 of these boards for my various radios, and some are for my club activities. I can now plug into all of the functions and signals I need from each radio without rewiring the accessory socket plug, and it has the added bonus of looking neat and tidy. If I need to reconfigure the interface for a specific use, such as packet or accessing the PTT for a foot switch, it is now simply plug and play.

Visit www.arrl.org/qst-in-depth for assembly instructions and Gerber files to create your own breakout PCBs. — 73, Kevin Jackson, AA3XV, aa3xv@aol.com

Heat-Shrink Tubing to Preserve Labels

A little time spent labeling wires can save you many hours of troubleshooting when something goes wrong, as you'll always know what goes where. However, it is important to make sure that the labeling stays attached and — if outside — holds up to the weather.

My labeling method uses paper and transparent heat-shrink tubing (see Figure 2). It's particularly effective for cable exposed to the elements. I simply print a description of the wire onto bond paper, cut it to size, and insert it under the transparent shrink tubing before using heat to seal it in place.



Figure 1 — A completed breakout board interface. [Kevin Jackson, AA3XV, photo]



Figure 2 — Wire labels sealed with clear heat-shrink tubing. [Steve Mollman, KD9HL, photo]

Alternatively, you can use return address labels, such as those made by Avery®. These are precut and have adhesive to hold the label steady while you slide the shrink tubing into place. The Avery adhesive isn't good for long-term adhesion to the plastic jackets on wires and cables, but it will allow the labels to stay in place long enough for you to install the shrink tubing.

Printing can be done on a laser or inkjet printer. If you don't want to use a printer, you can write the description on plain bond paper. If labeling by hand, use a good dark-ink pen such as a Sharpie®. Legibility is important. Make at least two of each label, and place one at each end of the cable.

To get the best seal, heat the tubing from the ends, and work your way toward the center. Be careful not to overheat and damage the underlying insulation. While researching this hack, I discovered that there are two different styles of transparent heat-shrink tubing. One is "window-glass clear" while the other is a foggier "wax-paper clear." The window-glass clear style seems to be slightly stiffer than the wax-paper clear. If flexibility is important for your project, take that into consideration.

Shrink tubing also has a limited shrinkage factor varying from 40 to 60 percent, depending on the brand. This means that it is usually best to put the shrink tubing on the cable before installing any connectors. I found that 3/4-inch shrink tubing will fit over a PL-259 connector and seal RG-8 coax, but it won't seal RG-8X and other small-diameter coax.

Clear shrink tubing is available from Amazon in various diameters, including assortments with sizes ranging from 3/32 inch to 3/4 inch. Some are precut to 3 1/2-inch



Figure 3 — Tagged zip ties being used as wire labels on the USB hub. [Ray Fallen, ND8L, photo]

lengths. — 73, Steve Mollman, KD9HL, kd9hl@arrl.net

Tagged Zip Ties for Labeling

I have way too many cables (coaxial, USB, CAT5, audio, video, and ac and dc power cables) in my shack and work area. Consequently, I spend way too much time trying to figure out what goes where.

Several years ago, at the Dayton Hamvention® flea market, I picked up a bag of 3M® orange zip ties with tags that could be written on with Sharpie.

As you can see in Figure 3, I labeled the USB cables so that the writing faces up when each USB plug is correctly aligned with the hub. I've also labeled my ac power cables on both the wall outlet and equipment ends, as well as the dc power cables terminated with Powerpoles. This will save you lots of time when you need to locate and identify a particular cable.

If you didn't go to Hamvention this year, that's okay — just search for zip ties with label tags on Amazon, and you can purchase a bag of 100 for less than \$10. — 73, Ray Fallen, ND8L, nd8l2828@gmail.com

A Screw and Washers to Keep Wires Straight

While tuning a trapped dipole, I found it necessary to adjust the length of various segments. This led me to develop an easy way to adjust wire lengths without twisting the wires (see Figure 4).

Note that one of the two flat washers has its sides bent downward to keep the wire from sneaking out. If you want to connect electrically at this point, use a ring terminal under the screw head. — 73, Paul Conaway, KD2DO, kd2do@arrl.net



Figure 4 — A screw and two flat washers keep the dipole wires from twisting. [Paul Conaway, KD2DO, photo]