

Modify the Boss Ground Loop Isolator (GLI):

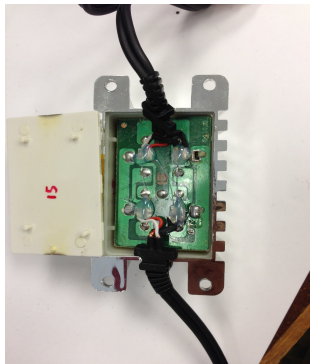
1) On the male RCA cable side, cut off the RCA connectors.

2) Solder onto cut cable with a pair of new 3.5mm phono plugs. The phono plugs are stereo; connect to the left channel (which goes to the tip of the phono plug).

Visually inspect for good solder joints & absence of shorts. Check connectivities afterwards with an ohmmeter to make sure wires connect where they are supposed to and are not shorted. Note that the isolation transformer on the PCB may read 90 to 150 ohms and that's okay (not a short). Be aware that if you find a short it might have already been there in the box when we bought it. If such a short is between the grounds of the two 3.5mm connectors it is not critical.



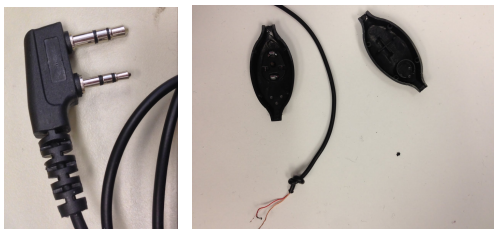
3) Open up the bottom plate of the GLI. (Note there are different variations of wiring among the boxes we've bought, including phase reversals and left-right swaps. In all cases, work with this starting material such that the intended circuit is produced.)



4) Unsolder the leads to Female RCA cables on GLI to remove it.



5) On the headset cable that came with the radio, pop open the button and unsolder the leads.



Do not cut any of the wires, carefully untwist as needed, because we need to preserve the already solder-tinned ends for the next step.

An important part of this cable is the strain relief built into it. Note this too comes in variations and adjustments may need to be made when cutting the slot in the box.

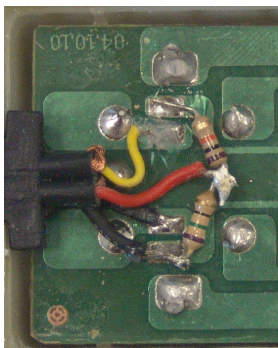
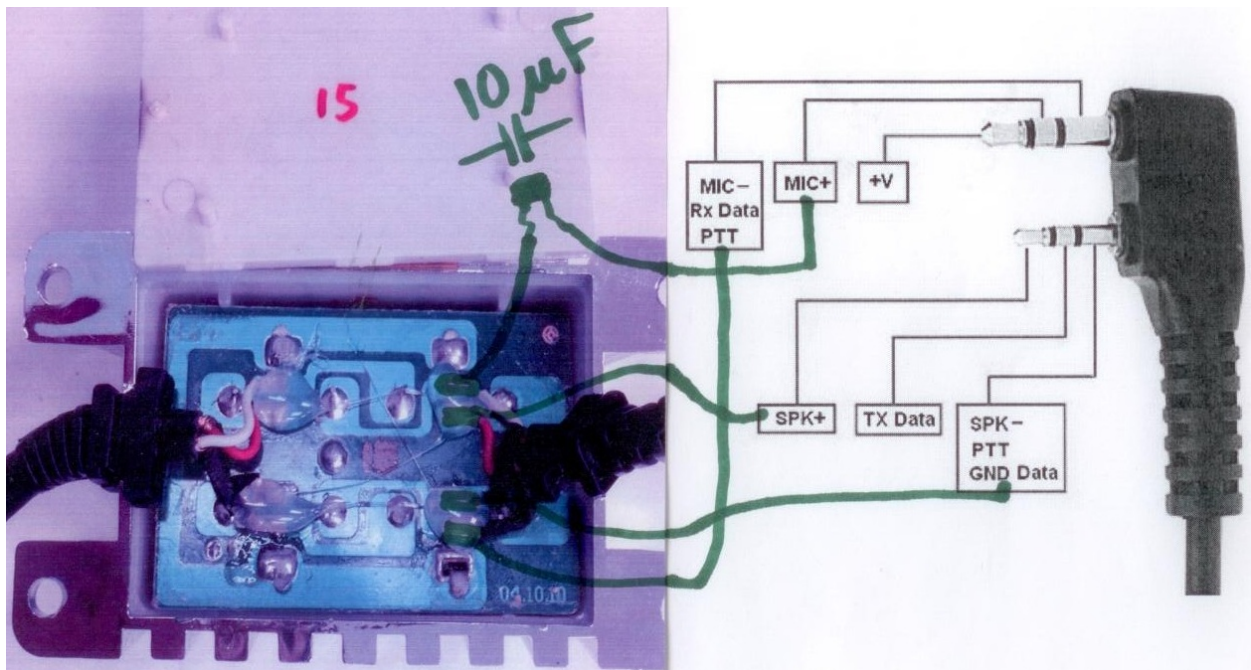
6) Solder the cable end with the dual plug (2.5mm and 3.5mm) to the GLI circuit to where the female cables once were, with 10uF ceramic capacitor in series on the microphone signal (usually will connect to the top trace on the PCB).

Shown here with wires in following order:



- red* to capacitor
- green*
- copper*
- blue*

*Color could be different for other cables. Therefore, rather than relying on colors of wires, ensure that connections will match the schematic below:



7) Lift the top* wire (typically white or orange) on the left hand end of the circuit, and put in a resistor divider:

solder 10k resistor to the top pad where the wire once was.

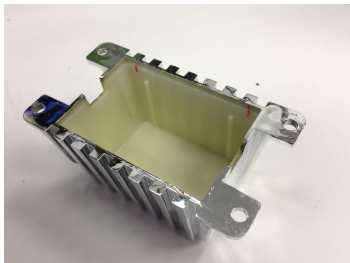
on the other end of the 10k resistor, join with a 75 ohm resistor and solder the lifted wire on it.

solder the other end of the 75 ohm resistor to ground pin, black wire on the bottom* pad, thus completing the circuit to its own ground.

*Note that while most isolation boxes come with white wires on top and having the white wires be on separate circuits, there are variations. (Perhaps most of our part are actually clones not authentic Boss parts?) In other words, most of the isolators come with right & left channels swapped so that if you inserted in in your stereo system it would direct your right signal to your left speaker & vice versa. However we can't count on them all being made this way, so again, the goal is to produce correct and consistent final circuits from these parts with their variations.

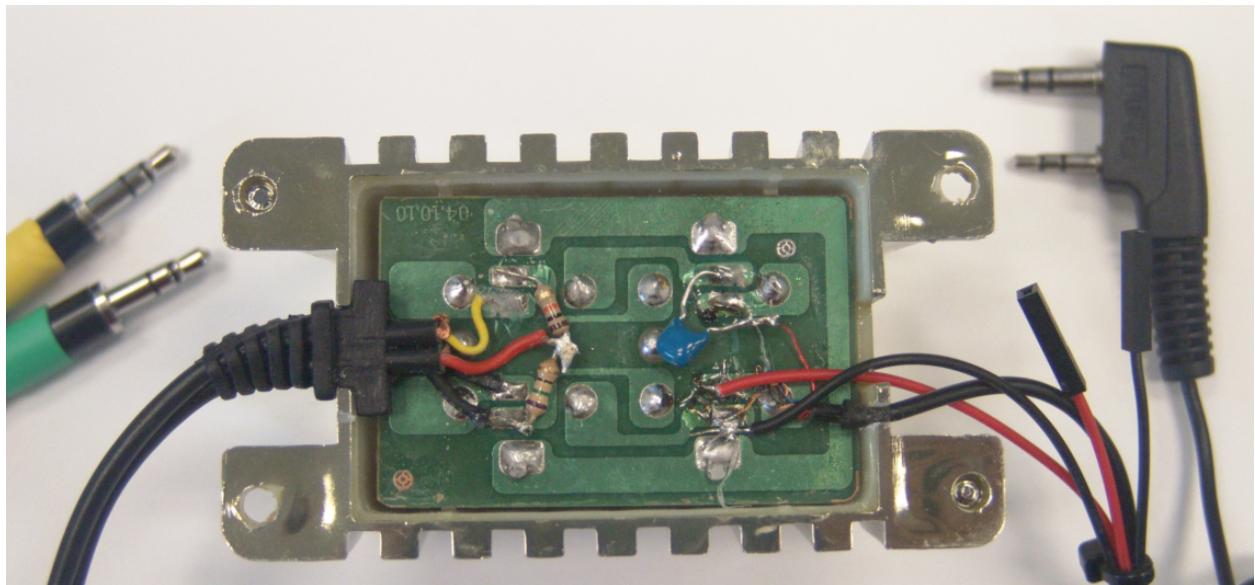
8) Cut a slit next to the opening on one end of the case for the new headset cable. Make sure width is snug but not so tight as to abrade cable insulation. Make sure depth is flush (not quite snug, no pressure) but not loose, so once box is closed cable will not be able to shift thus also reducing possibility of abrasion.

Add the push to talk wires, which would be the red and black cable to be soldered to the two ground/return (lower two) pads on the right hand end of the circuit. Route the through the old opening at that end of the box. Fold them back and cable-tie them to the dual-plug cord.

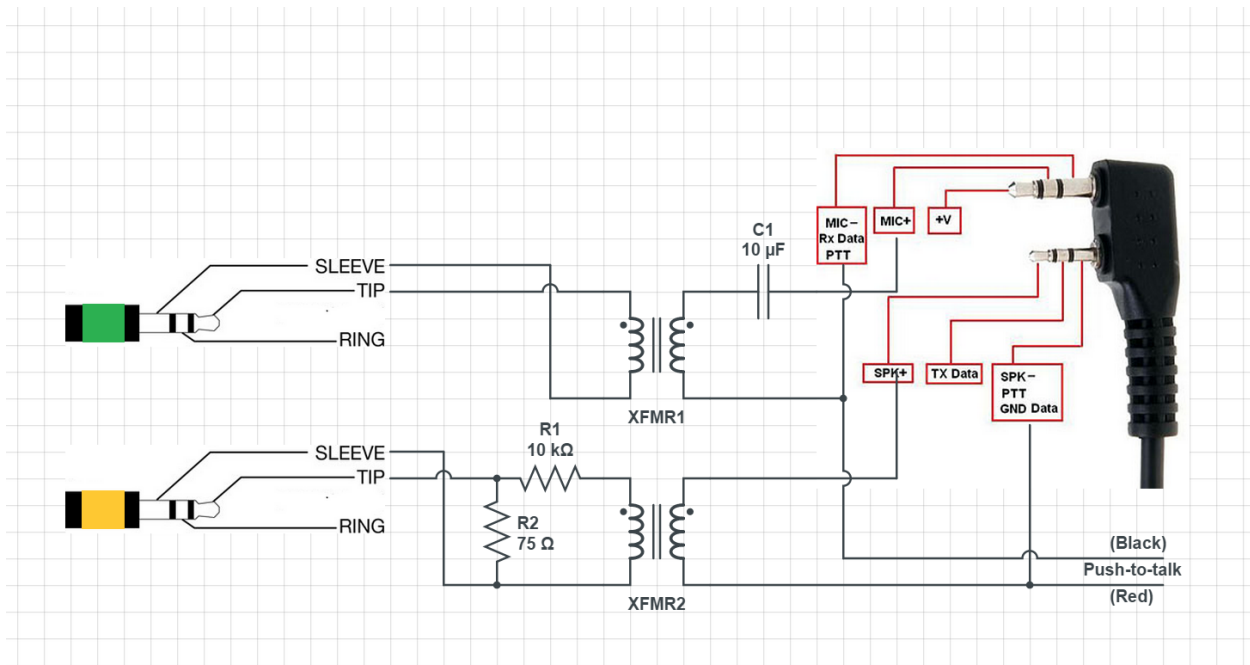


Test and verify connectivities at all points, and check that there are no shorts. Then test with an AC signal, for example 1 kHz at about 2 V p-p (signal generator may read 1 V p-p because it is expecting a 50 ohm load and we're not using one). Set scope at 500 mV / div for the strong signal and 5 mV / div for the attenuated one, which should be attenuated about 133 to 1 (+/- 20%).

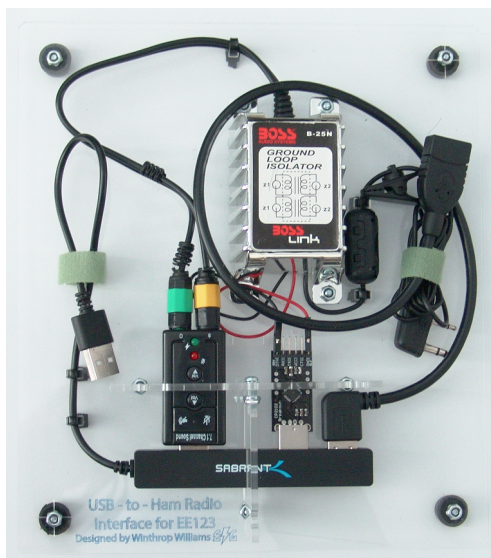
9) Label each box which passes the above tests, by heat-shrinking a green band on the 3.5 mm plug of the full-strength signal path, and yellow for the attenuated path. (These two colors match the USB audio device they will plug into.)



10) The complete circuit thus created is to match the following schematic:



11) The above isolation circuit (modified Ground Loop Isolator) is shown below with associated USB audio dongle, USB digital I/O dongle, and USB extension for SDR (Software Defined Radio) plugged into the USB hub.



12) The above mounting platform was laser cut from inexpensive cast acrylic, the kind labeled "Chemcast" in red diagonal printing from TAP Plastics. Extruded acrylic (and some more expensive cast acrylic) did not hold finer details of flexural fingers (shown to right of platform) designed to hold nuts in place during insertion of their bolts.