

Adding a MW Antenna Port to Tecsun DSP Ultralights

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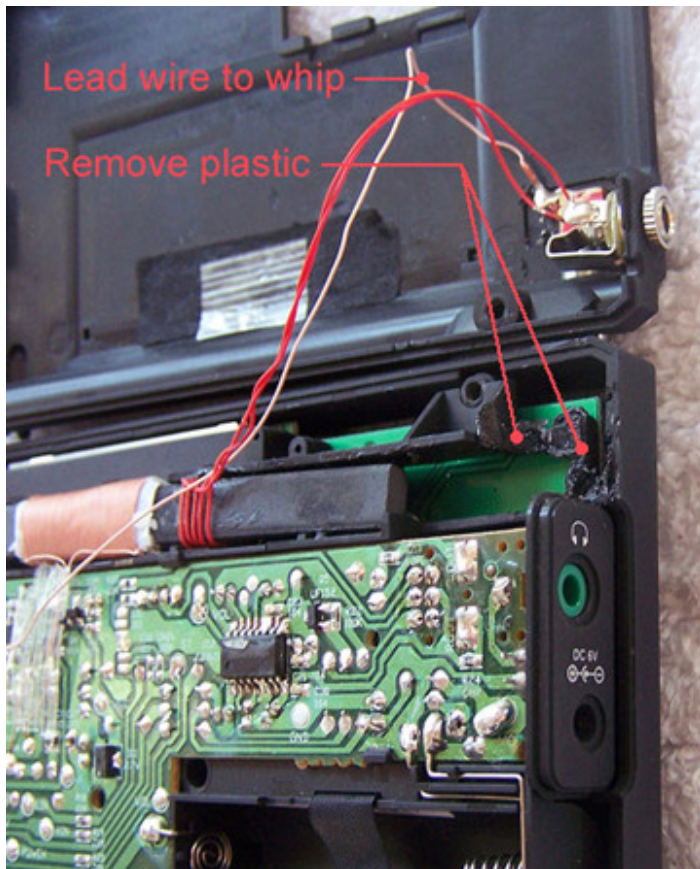


This article is a continuation of the Ultralight DXing article “Directly Connecting External Antennas to Small Portable Radios” that was widely published in 2008. That article detailed my “discovery” of the “swamping effect” that greatly simplified adding a highly effective antenna port to Ultralight and similar portables, allowing them to be directly connected to Beverages, phased arrays or other major outdoor antennas. Possibly more importantly, the swamping effect virtually eliminated the internal ferrite bar as a receiving antenna (while connected to outdoor antennas,) thus eliminating all internal shack and house noise from the MW band. That same swamping effect also solved impedance matching the outdoor antenna to the ferrite bar, allowing very effective use of the outdoor antennas for DXing. The original article is found in the “Antennas and Equipment” section of the Ultralight Library at dxer.ca and at ultralightdx, the Yahoo group. Reference to that article is strongly recommended.

The basic strategy proposed in that first article was to add an antenna port, usually using a 1/8” mono or stereo audio jack, to a convenient spot on the cabinet. Inside, wire wrap wire or small Litz was used to run from one pole of the 1/8” jack to the ferrite bar antenna, thence 5 to 7 tight turns around the bar and back to the other pole of the jack. I then created several coax patch cords (I used RG-174) with a 1/8” plug on one end and a coax antenna connector on the other... BNCs or other. The PL-380 directly above was photographed while connected to a 1000’ Beverage antenna. When the patch cord and external antenna are disconnected, the internal ferrite bar operates totally normally, as the radio’s MW antenna. In another recent article on connecting external antennas to Ultralights, Kevin Schanilec evaluated several different means of connecting, both directly and inductively to major antennas. He found that the method described here was both the most effective and the most noise-resistant. He also noted that using a carefully-selected second ferrite bar to inductively couple the antenna to the radio was almost as effective as this mod and left the Ultralight in a totally stock/Barefoot condition. The physical modifications outlined here are slightly more effective, but relegate the receiver, automatically, to the Unlimited Class of Ultralights.

The following notes discuss, individually, the three most popular Tecsun DSP Ultralights. They illuminate three separate and different approaches to adding an external antenna port for MW DXing. In each of the three cases, I have chosen to make the cabinet holes and perform the removal of some internal frame plastic using only a sharp-pointed soldering iron. Previously, I had made all holes, even the large one for the 1/8” jack itself with a standard electric twist drill. In practice, I found that, when making the large hole, the drill tended to “grab” the radio cabinet and could easily result in damage to either the cabinet or the DXer.... So, I committed to using a small, sharp-pointed iron. Even careful use of the iron resulted in holes that were not quite round. Nevertheless, careful use of the iron, and conservative hole-making resulted in a very satisfactory installation.

All three radios have quite similar but yet subtly different cabinets. To open each, the units are placed face-down on the bench and several small screws are removed from the back of the radio. The back half of the cabinet then lifts off easily. In all three cases, the new antenna jack was placed in the end of the cabinet, quite near the base of the whip antenna. The similarities did stop there, however.... Those subtly different radio cases!



Tecsun PL-300/ Grundig G8

Understanding the photo to the left is important. The radio has been opened and the loose rear panel has simply been rotated upward, as if it had been a hinged along the top of the receiver. So, you are looking at the upper interior of the back half of the case, placed immediately above the guts of the receiver, still residing in the front half of the case.

This installation is the classic example of adding an antenna port in this particular case type. If you look closely, the whip antenna is still in place and its base is just visible behind the newly installed antenna port. The fit here is, literally, a matter of millimeters and orienting the antenna jack properly is critical; the guts of the jack must be positioned so that it will operate reliably while NOT shorting out on the base of the whip antenna.

As you will note, some of the plastic sub-frame of the radio has been removed (with the hot soldering iron) to provide clearance for the new antenna port when the radio is reassembled.

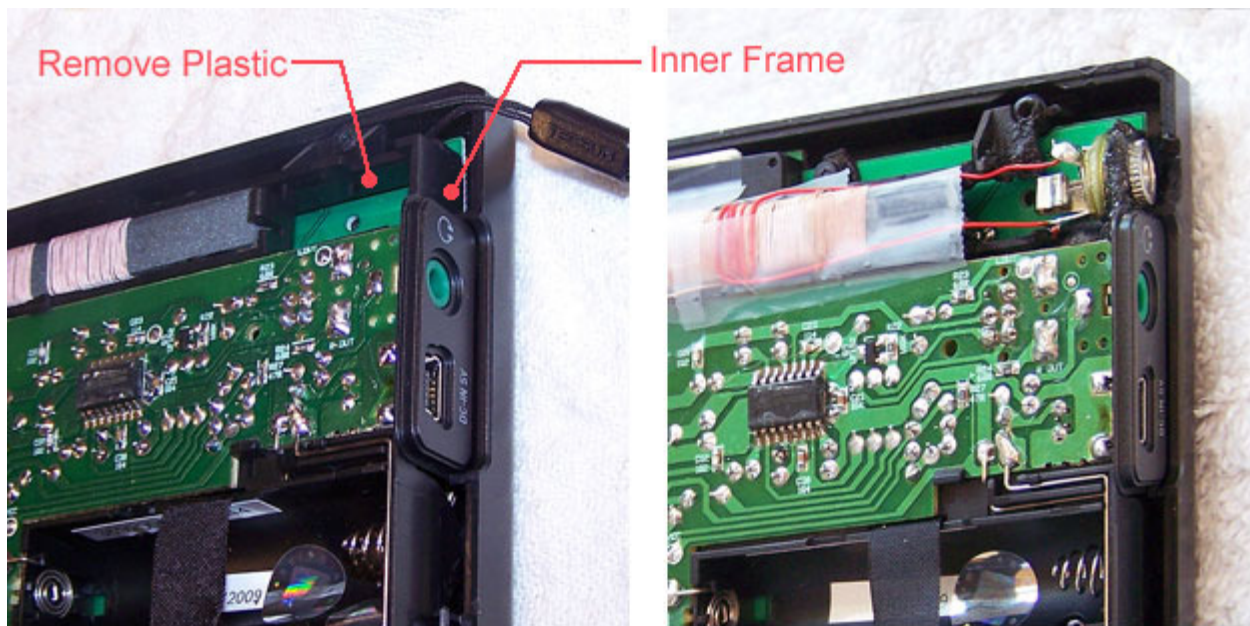


Tecsun PL-310

There were several choices to be made when making this modification to the PL-310. One obvious choice was to convert the existing "FM & SW Antenna" port to this new MW use, abandoning the use of that port for shortwave and FM. In this particular instance, I wanted to maintain the ability of this radio to accept outside antennas for those two bands, too, so the addition of a new 1/8" MW antenna port was the route chosen.

Unfortunately, in the area of the modification, the PL-310 case was just a few millimeters smaller than the case used for the PL-300. It proved impossible to mount the new antenna port while leaving the whip antenna in place.... It just would not work without shorting out the jack to the base of the whip.

So, for this modification, I simply removed the whip antenna. Now, on MW, the radio will operate either with an outside antenna, or independently by using the internal ferrite bar. Now without its stock whip antenna, on SW or FM, the radio is totally dependant on an appropriate external antenna, fed to the radio via the stock "FM & SW Antenna" port.



Tecsun PL-380

The PL-380 is a rather more difficult candidate for this particular modification. Like the 310, there is simply *not* room to put the new antenna jack in the rear clamshell of the cabinet near the base of the whip antenna. The only way to do that in the *rear* cabinet is, like the 310, is to permanently remove the whip antenna from the case. In this particular radio, I wanted very much for all of its capabilities, including the whip, to be available for normal use when the radio was not connected to outside antennas.



Happily, there was one other placement option in the same area: part of the plastic inner frame of the radio directly behind the cabinet edge in the front half of the cabinet near where I had previously installed ports – see photo at upper left. That area of the inner frame is secured by two screws... one from the bottom of the circuit board and the other a cabinet screw nearer to the ferrite bar. It was possible to remove the amount of plastic inner frame shown above and still have both the ferrite bar and the future home of the new jack be structurally sound. I removed that portion of the frame and carefully burned a hole for the jack with a hot soldering iron. I also had to remove arcs of plastic from both outer cabinet halves to allow the antenna plug full access to the jack. (See photo to the left for the removal of the outer areas of cabinet.)

The other difficulty with the PL-380, noted by others, was the extreme difficulty of removing the existing ferrite bar antenna. In this mod, one must at least lift the ferrite bar to whip the 5 to 7 turns of the coupling coil around the bar. For some reason, Tecsun has chosen to increase both the volume and tenacity of the glue used in holding the ferrite bar in place in this model. Several DXers have broken the bar while attempting to remove it. I was able to get the antenna out whole, but the factory Litz wire was ruined. As you can see in the photos above, I replaced the coil with an approximation of the original windings that was crafted from scrap very small Litz wire salvaged from spare Ultralight bars. It worked great for entertainment use and as part of the transformer to get the Beverage signals inside this great little radio.

The difficulties with removing the existing antenna and the need to replace its windings might lead an experimenter to also include new better Litz wire on the existing bar, as Gary DeBock is now doing, or one might simply use inductive coupling as Kevin Schanilec and others have recorded. Or, one might wait for Roy Dyball's replacement of the internal bar with a torroid-based transformer, likely the most elegant solution.