



Turn a Mobile Antenna into a Base Antenna

Thomas Kocourek, N4FWD



The finished project includes a ground plane with radial rods that help complete the antenna circuit.

You'll commonly see VHF and UHF mobile antennas equipped with so-called 3/8 x 24 threaded bases. The 3/8 fraction refers to the diameter of the *shank*, or threaded part of the base. In this case, the shank is 3/8 of an inch. The number 24 is the *thread pitch*, or the number of threads per inch.

This antenna base is designed to screw into that mobile mount, making attachment or removal quick and easy. But there is no reason why such a mobile antenna could not be used at home. All you need is an appropriate base. Here are instructions for building one, complete with the necessary *ground plane*, which will help complete the antenna circuit and allow the RF energy to radiate as efficiently as possible.

Materials

- TRAM Model 1465 Base Ground Plane Kit (hamradio.com)
- Diamond DIA 3/8 x 24 adapter (hamradio.com)
- Plastic washer from RoadPro RP-302 kit (hamradio.com)
- 4-inch UHF double female bulkhead connector (amateurradiosupplies.com)

Note: items purchased from hamradio.com can be purchased from other ham radio equipment vendors and from Amazon.

Tools

- Two crescent wrenches
- Allen wrench (included in the TRAM kit)
- Pliers
- Thread lock compound (may be included with the Diamond adapter)
- Dielectric paste



Remove the brass ground plane nut from the TRAM 1465 mount assembly and set it aside.

Step 1

When an antenna is attached to a vehicle, the body and frame act as a ground plane. Your base antenna will need its own ground plane, and the TRAM kit supplies it using four *radial rods*. At VHF and UHF frequencies, these rods are sufficient for creating the ground plane.

Begin by removing the brass ground plane nut from the TRAM 1465 mount assembly and setting it aside (see ①). You can probably unscrew it with your fingers, but you may have to use pliers to apply more force.



Remove the short barrel adapter from the TRAM bracket.

Step 2

Remove the short barrel adapter from the TRAM bracket (see 2). A single nut holds it in place, and you may need pliers to loosen it. You won't be using this.

Step 3

Insert the Diamond 3/8 x 24 adapter (see 3). You'll notice that the adapter uses plastic washers to insulate it at the top and bottom of the mount. The white washer on the top comes from the RoadPro RP-302 kit. It may seem odd to purchase this kit only for the washer, but the washer is just the right size, and it has an internal sleeve that is critical for insulating the antenna from the mount. Put the white washer over the threaded part of the adapter, with the washer sleeve facing down. Then place the metal washer from the Diamond kit on top of it. Add a drop of *thread lock* to the adapter threads at the top. Thread lock is an adhesive that prevents loosening, water leakage, and corrosion.

Step 4

Now screw on the 3/8 x 24 coupler from the Diamond adapter and tighten (see 4).

Step 5

Thread two nuts onto the bottom of the 4-inch bulkhead connector as shown in 5. Place the nuts so that they touch each other; we're going to use them to help secure the barrel adapter. With that in mind, add a drop of thread lock to the threads at the opposite end of the connector.

Step 6

Screw the bulkhead connector into the bottom of the Diamond adapter. Apply your wrench to the *lower* of the two nuts and use it to tighten the connector into place (see 6). When you are finished, remove the lower nut, and set it aside. Rotate the remaining nut until it is about 1 inch from the bottom of the Diamond adapter.



Insert the Diamond 3/8 x 24 adapter and the bottom and top washers. Add a drop of thread lock to the adapter threads at the top.



Screw on the 3/8 x 24 coupler from the Diamond adapter and tighten.



Thread two nuts onto the bottom of the 4-inch bulkhead connector. Place the nuts so that they touch each other. Add a drop of thread lock to the threads at the opposite end of the bulkhead connector.



Screw the bulkhead connector into the bottom of the Diamond adapter. Apply your wrench to the lower of the two nuts and use it to tighten the connector into place.

Continues on following page.

Step 7

Thread the brass ground plane nut (which you removed in Step 1) onto the bulkhead connector until it meets the nut. Make sure the holes for the setscrews are pointing down, as shown in ⑦. Don't tighten it yet.

Step 8

Insert just one radial rod from the ground plane kit into one of the holes in the side of the brass nut. Insert the Allen wrench into the corresponding set screw hole and tighten (see ⑧). Then rotate the brass nut so that the radial rod clears the mounting bracket. When you've positioned this rod correctly, you'll know the others will clear the bracket as well.

Step 9

Using your crescent wrench, tighten the top bulkhead connector nut against the top of the brass nut to hold the orientation. Now finish inserting and tightening the remaining three radial rods. Add the bulkhead nut you had set aside previously, and tighten it against the bottom of the brass nut.

Step 10

Because the mount will be outdoors, you should use a coax cable waterproofing compound before attaching your coax cable to the assembly. This is a so-called *dielectric paste* that you just squeeze into the coaxial connector before you attach it. (Don't use silicone grease.) And of course, apply waterproofing tape to the connection.

All you have to do is attach the flat side of the mount (see ⑨) to a support such as a metal or PVC pipe. Stainless steel hose clamps work well for this purpose. Screw the VHF or UHF antenna of your choice into the top of the mount and you're done.

You may need to trim the length of the antenna for the lowest possible standing wave ratio (SWR) reading at your radio. Also, be sure to use low-loss coaxial cable, such as RG-8 or LMR-400.



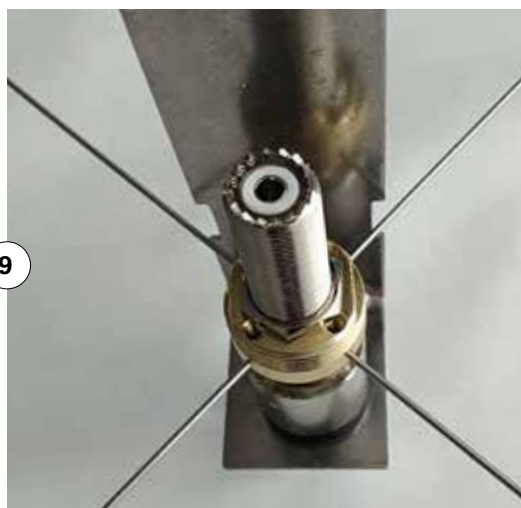
7

Remember the brass ground plane nut you removed in Step 1? Thread it onto the bulkhead connector until it meets the nut. Make sure the holes for the setscrews are pointing down.



8

Insert one radial rod from the ground plane kit into one of the holes in the side of the brass nut. Insert the Allen wrench into the corresponding setscrew hole and tighten. (The Allen wrench is visible in this image. It is the thin, black tool that looks like a backward "L.")



9

All done! This view is of the bottom of the mount where the coaxial cable attaches; the antenna screws into the other side. The flat part of the mount secures to your support pipe or pole.