

An-Ten-Ten-nas

INFORMATION
To help you decide
On the best
Antenna for you

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In each issue of the News, we shall try to clarify a significant cluster of ideas in antenna work. Our object is to help you make the best decisions about the antennas you buy or build without imposing our own prejudices on you. The more you understand, the better your choices will be.

An Improved Hilltopper Portable Dipole

Every 5 years or so, I return to the simple dipole as a hilltopper antenna. As the weather improves and the sunspots are kind, 10-meter operators get an urge to drive up to a handy hilltop, set up an antenna with a bit better performance than a mobile whip, and see who in the world they can contact. Over the years, my own favorite design keeps evolving. In No. 42 of this series, I presented a collapsible antenna that used hitchpin clips to hold sections in place. However, the center plate that connected the element to the mast was a bit heavier than I prefer, since it used small U-bolts. As well, each element section was 3' long.

In this episode, we shall update the 10-meter hilltopping dipole in two ways. One is by reducing each element section to 2'. The second update is the addition to my collection of favorite portable antenna hardware: the spring tool clip. **Fig. 1** shows both of these handy devices.

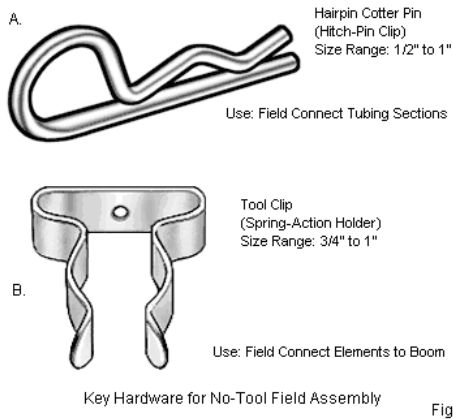


Fig. 1

Although there are some nuts and bolts (and lock washers) involved in the project, they are permanent. In the field, we shall use the hitchpin clip and the tool holder to assemble the antenna. In fact, the hitchpin clips will also hold the two element halves in their collapsed storage condition.

The spring tool holders play their biggest role in attaching the dipole element center to the mast. **Fig. 2** shows the general scheme. Instead of U-bolts to hold the plate to the mast, a single tool clip does the job. Attached the tool holder and the small L-shaped plate for the coax connector with a single nut, bolt, and lock washer to the insulated plate.

(Polycarbonate is my favorite plate material, since you can cut, drill, and shape it with normal woodworking tools.) When you first see the tool clip, the back part with the bolthole will be arches, and the curved sides will be far apart. As you tighten the bolt, the back side will flatten and the holder arches will come together to create a tight grip. A single tool clip is more than enough support for the single dipole element.

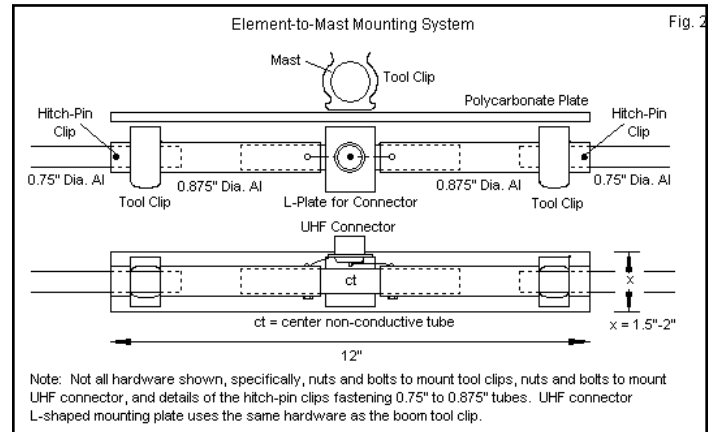


Fig. 2

The diagram also provides the outline of the coax connection. The exact size of the gap is unimportant, since the leads to the connector become part of the element. Relative to the mast, orient the connector downward so that you can run the coax straight down the mast, holding it in place with a few strips of disposable electrical tape. A piece of CPVC or similar insulating tubing goes inside the center section of the element (7/8" diameter) tubing. The inner tube holds the element in alignment. Note that I used two more tool clips to hold the element to the plate.

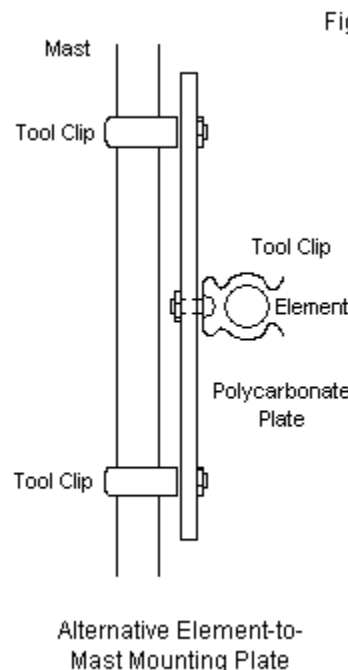


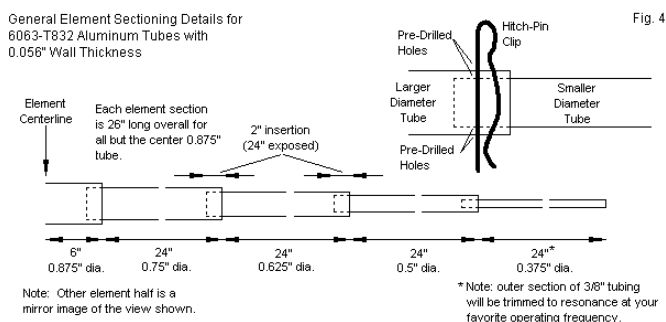
Fig. 3

Alternative Element-to-Mast Mounting Plate

The single tool clip has sufficient strength to hold the element securely. However, if you are concerned about slippage, you may widen the plate and use a pair of clips for the mast, as shown in **Fig. 3**. The simplified sketch omits most of the element information shown in **Fig. 2**.

Combined with the hitchpin clips, the tool clips allow you to go into the field with no tools whatsoever. If you check all of the nut-and-bolt connections prior to departure, you should have no use for wrenches, pliers, and screwdrivers. (However, a toolkit in the vehicle is a good safety measure for all kinds of unanticipated needs.)

This version of the antenna uses 26" sections of tubing to shorten the storage bundle for the antenna. **Fig. 4** shows the general layout of the element—actually, half the element, since the other half is identical. 26" lengths of tubing allow for a 2" insertion of each smaller size into the next larger one. With a shop jig, drill holes through both tubes at the junction. Make them just large enough to handle the hitchpin clips. The compression of the clip will ensure a good physical hold and good electrical contact between sections. Remember: this technique is perfectly adequate for several days of operation. However, do not use it for the permanent home antenna, since eventually, the quality of the electrical contact will degrade. Home antennas need good metal biting fasteners to endure years of weathering.



The sections of tubing begin with a short length of 7/8" diameter and proceed in 1/8" increments down to 3/8" tubing at the outer ends. I recommend that you incest in 6063-T832 tubing from a mail order or web source (such as Texas Towers) to ensure a snug but smooth fit between sections. As well, the 6063 material is designed for antenna use. Local home centers—if they have any tubing—may carry thinner walled material that does not have the same hardness of 6063. Even though receiving tubing in the mail may take longer than a trip to the home center, the end result will be a more durable antenna that will serve you for many sunspot cycles to come.

The outer tubing section should be trimmed and drilled only after raising the antenna in the yard and finding the correct length for the lowest SWR in the part of the band you like best. The SWR curve should be acceptable all across the first MHz of 10 meters, so the dimension is not critical, and 102" per dipole side should be close to correct.

To assemble the antenna, simply extend the element sections and insert hitchpin clips into the proper holes. I

recommend that you tie a brightly colored ribbon to the loop of each clip. If you drop a clip in tall grass, you can easily find it, and ribbons will not affect RF performance. They will indicate when the winds have become strong enough to indicate that it is time to return home.

To disassemble the antenna, simply remove the hitchpin clips. You can nest the element section and use a single large clip to connect them all together. Then you will have only 4 pieces to the storage package: 2 half elements, a center plate, and a sack or string of hitchpin clips (with extras, of course). You can sew up a small drawstring bag from an old towel to hold the pieces all together in the trunk of almost any vehicle, no matter how small.

The mast I shall leave up to you. You might consider section of Schedule 40 PVC tubing. I prefer to use such tubing in fairly short sections with a straight coupler piece cemented to one end. Then I can simply press-fit section together until I reach the desired height. Using several sections rather than a single long piece tends to make the mast somewhat stiffer. As well, shorter section fit into the trunk better without getting in the way of the picnic lunch. I also connect 3 ropes near the top and use them as guys. Tent pegs or similar stakes make a system that is easy to set up and take down, but one that withstands fairly good breezes. I also tie bright ribbons to the guys to make sure that I do not inadvertently trip over one and bring down the entire antenna.

The ideas here create an antenna system that you can set up in 5 to 7 minutes and take down in a similar length of time. At home, it is always good practice to clean the antenna sections after each use to ensure that they slide smoothly in each other. (Do not use any lubrication, since it will degrade the electrical contact between sections. Even lubricants design to improve electrical contact will dry over time and inhibit sliding. Cleanliness is the best practice.) Use nothing harsher than a plastic scrubbing sponge to remove any dirt. Finally, always check the antenna package for smooth operation and for having all of the parts before setting out on a hilltopping expedition.

This package is for me the Mark 4 version of the hilltopping dipole. If I run across any more good hardware that will simplify a portable antenna without adding weight or reducing the quality of the antenna, I'll report on it here.

Incidentally, this episode completes the 16th year of the An-Ten-Ten-nas series.