ARRL Periodicals Archive – Search Results

A membership benefit of ARRL and the ARRL Technical Information Service

ARRL Members: You may print a copy for personal use. Any other use of the information requires permission (see Copyright/Reprint Notice below).

Need a higher quality reprint or scan? Some of the scans contained within the periodical archive were produced with older imaging technology. If you require a higher quality reprint or scan, please contact the ARRL Technical Information Service for assistance. Photocopies are $3 for ARRL members, $5 for nonmembers. For members, TIS can send the photocopies immediately and include an invoice. Nonmembers must prepay. Details are available at www.arrl.org/tis or email photocopy@arrl.org.

QST on CD-ROM: Annual CD-ROMs are available for recent publication years. For details and ordering information, visit www.arrl.org/qst.

Non-Members: Get access to the ARRL Periodicals Archive when you join ARRL today at www.arrl.org/join. For a complete list of membership benefits, visit www.arrl.org/benefits.

Copyright/Reprint Notice

QST Issue: Jun 1979
Title: Build Your Own 5/8-Wave Antenna for 146 MHz
Author: Doug DeMaw, W1FB

Click Here to Report a Problem with this File

Build Your Own 5/8-Wave Antenna for 146 MHz

Why not make your own fm/mobile antenna? It can be done for less than $2. Here's the scoop on how to do it.

By Doug DeMaw,* W1FB

A popular 2-meter antenna for both mobile and fixed-station use is the 5/8-wave vertical. At low radiation angles it offers approximately 3 dB of gain over a 1/4-wave whip, and yet it is omnidirectional. Sure, you can go out and get a store-bought antenna, but it's a simple task to assemble an effective homemade 5/8-wavelength vertical from ordinary materials. In most parts of the USA, it should be possible to do the entire job (minus the 50-ohm coaxial cable) for under $2. Another feature worth mentioning is that no large holes need to be drilled in the car body when using the mounting technique shown in this article. Only two no. 6 sheet-metal screws are used to secure the antenna to the vehicle, and those are affixed under the trunk lid.

Construction

The whip section is made from 1/8-inch (3-mm) brazing rod. It can be obtained at most welding supply stores or shops. The standard length seems to be 36 inches (0.9 m). Ideally, a piece of rod 47 inches (1.2 m) long would be used. In this example an 11-inch (279-mm) extension of no. 10 solid copper wire has been soldered to the top end of the whip. The opposite end of the brazing rod is threaded (6-32) and screwed into the coil form for the matching network. The builder may be able to purchase a 47-inch length of stainless steel rod (1/8-inch diameter) which has been threaded at one end by a machinist. This type of material would cost more than a section of brazing rod, but it would be more durable under stress.

Fig. 1 shows a pictorial view of the antenna. L1 is wound on a 3-1/2-inch (89-mm) length of 3/4-inch (19-mm) diameter solid Plexiglas rod. One end of the form is tapped for a 6-32 thread. The opposite end has a 10-32 thread for affixing the coil form to the mounting bracket. Other insulating materials can be used as the coil form, such as phenolic rod, fiberglass or other high-dielectric solids.

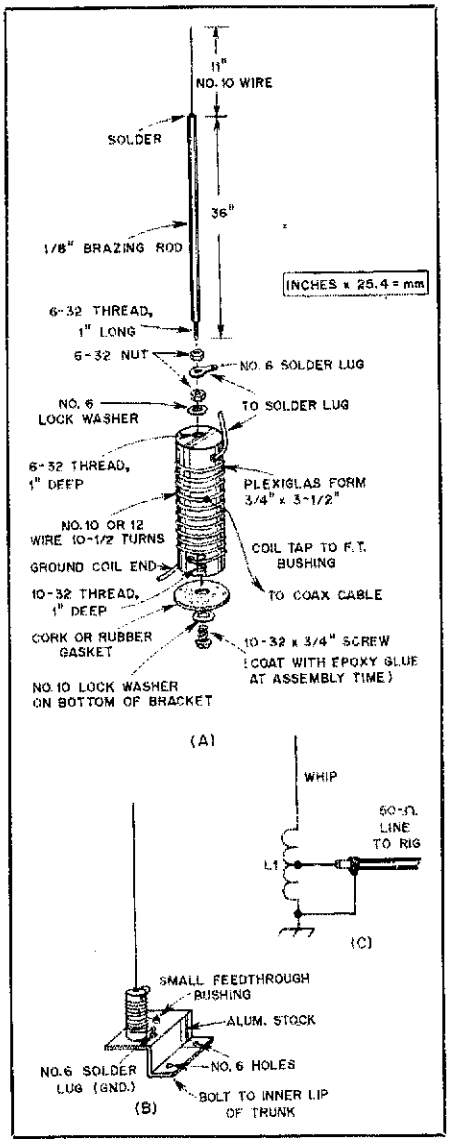


Fig. 1 — A breakaway view of the antenna is shown at A. Detail B shows the relative shape of the mounting bracket. The electrical equivalent of the antenna is given at C.

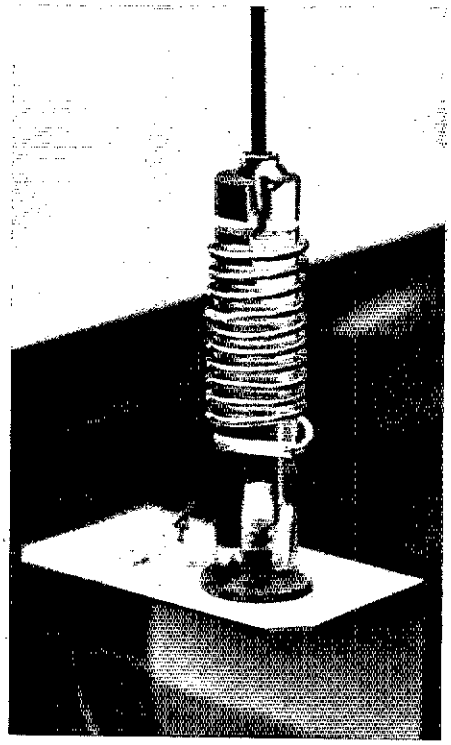
L1 contains 10-1/2 turns of no. 10 or 12 solid copper wire. The tap is located 4 turns from the top of the coil. A spacing of one wire diameter is used between the coil turns. A small hole is drilled off center through the coil form at each end of the coil. This permits threading the wire through the form to keep the coil turns in place.

The mounting bracket is fashioned from 1/8-inch (3-mm) aluminum stock. It must be bent in a manner similar to that shown in Fig. 1, but on a custom basis to fit the vehicle with which it will be used. In this case it has been installed on a 1977 Pontiac Bonneville. The bracket is attached to the inner lip of the trunk. There is sufficient space between the car body and the trunk lid to allow clearance for the vertical portion of the bracket. Vehicles with engines in the rear are suitable for front mounting of the antenna. The writer did that when equipping his XYL's 1971 Volkswagen fastback with a 2-meter antenna some years ago. In the interest of minimum ignition noise in the fm receiver, it is wise to install the antenna as far from the engine as possible.

Following adjustment of the antenna it is prudent to weatherproof the coil. A layer of gray vinyl electrical tape was used with the model shown. If large-diameter heat-shrinkable tubing is available, it will be ideal. Alternatively, a heavy coating of exterior spar varnish or glyptol will suffice.

For those desiring the 5/8-wavelength vertical for fixed-station use, refer to the details in Fig. 2. There are four radials employed. Each is 20 inches (508 mm) in

*Senior Technical Editor, ARRL



Close-up view of the coil assembly before weatherproofing. The RG-58/U cable is attached beneath the bracket with a 1/4-inch (6-mm) cable clamp.

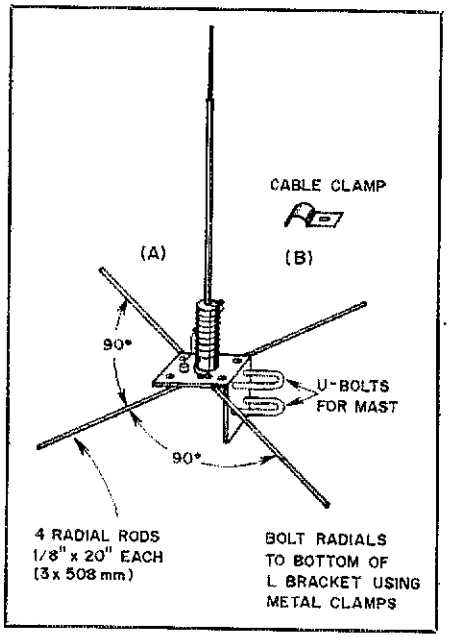
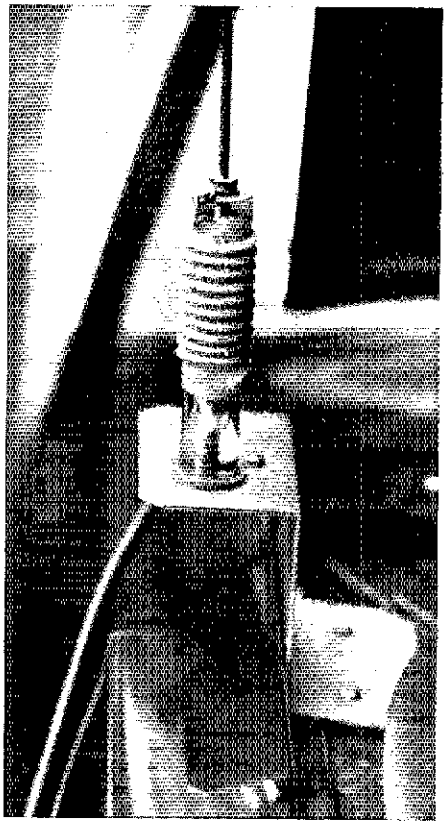


Fig. 2 — Details for adding radials and a mast bracket for fixed-station use. A brass plate could be used, in which case the radials could be soldered to the bottom of the L bracket.



The completed antenna, showing how it mounts to the inner lip of the auto trunk. The bracket can be painted the color of the car to improve the overall appearance.

length. Brazing rod is suitable for use as radial stock.

Tune-up

After the antenna is mounted where it will be used, adjustment for an SWR of 1 is made. An SWR indicator is placed in the feed line between the transmitter and the antenna. The tap on L1 is adjusted for the lowest SWR attainable, then soldered in place. The reflected-power reading will probably not drop completely to zero. This is so because some harmonic energy is present in the output of most rigs. The antenna will reject those frequencies and result in a false SWR reading. But most rigs will yield a reading of less than 1.5:1 when the tap position is optimum.

Another tune-up technique is to make the whip 50 inches (1.3 m) long, place the coil tap four turns below the top end of L1, then prune the end of the whip (1/4 inch or 6 mm at a time) until a match is obtained. Be sure to park the car well away from power and phone lines, downspouts and other conductive objects during the tune-up process. If not, such objects will detune the antenna and negate the matching adjustments.

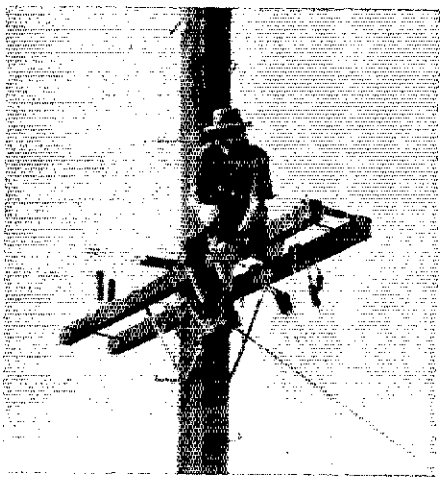
Performance

Performance from this antenna compares favorably with that obtained from a $28 commercial version which was used three years earlier. The main limitation is that vandals can bend or break the brazing rod more readily than would be possible if stainless steel were used. But then, for a $2 antenna many of us would be willing to replace the rod section if it became damaged or stolen, eh? QST

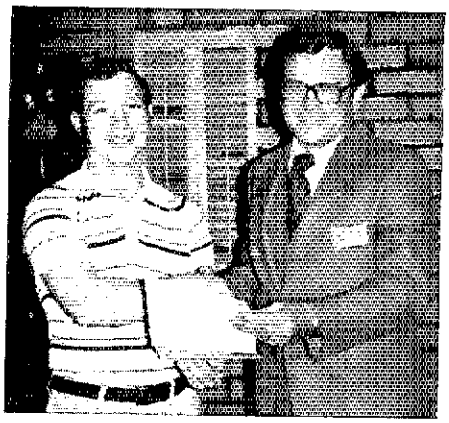
Strays

TELL US ABOUT YOUR FOREIGN PAYMENTS

☐ Are you sending money to ARRL from another country — International Money Order or bank draft? If so, please write us promptly, stating the amount sent and what the payment is for. This will help us serve you most effectively. Many times we receive such remittances and can take no action because we have not heard from the individual who sent it. — *Marion E. Bayrer, Circulation Department*



If you've never heard the signal from W6AM's Palos Verdes antenna farm, it's probably because you don't frequent the bands when this ham is going after some rare DX. Pat, W6RYX, got this shot of Don Wallace who, even at the age of 80, insists on repairing a favorite rhombic. *(W6RYX photo)*



Bud Chiller, WD8BIL (left), receives the ARRL Certificate of Merit for his service as control station for the Lake Erie ARA during the transfer of patients from Cleveland's Highland View Hospital to new facilities at Metropolitan General Hospital. Making the presentation is Al Severson, AB8P, emergency coordinator for Cuyahoga County, OH. Congratulations Bud! *(WD8PYV photo)*