# A PRACTICAL PORTABLE ANTENNA SYSTEM

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*Here is a portable antenna system that can operate on the ham bands or MARS frequencies. It is compact, portable and flexible enough to be mounted or strung up almost anywhere.*

With today's compact transceivers, a complete station can be carried in a fairly small ladies handbag. The biggest problem, though, is the antenna as it just doesn't lend itself to miniaturization. Many types of antennas have been tried for portable work with varying degrees of success. The more successful antennas were rather bulky and so not too portable.

For many years military communications systems have been refined and simplified to provide maximum flexibility and portability even at the cost of performance. The antenna systems used provide wide frequency ranges and ease of set-up.

The antenna system described here, for amateur use, leans heavily on the design philosophy of these military systems. The system offers maximum flexibility, portability and at least usable performance and efficiency. It covers most of the h.f. spectrum including the MARS frequencies.

### The Tuner

The tuner contains an L-section network that can be set up for either a *C* or *L* input, an s.w.r. bridge, a field strength meter and a non-inductive 50 ohm dummy load resistor for matching.

Using the tuner with the s.w.r. indicator, most amateur band frequencies can be tuned to an almost perfect 1:1. Not too bad since the Navy considers anything under 3:1 acceptable.

The built in field strength meter allows you to monitor the radiation and make sure that the antenna, rather than the tuner, is taking the load.

### Tuner Construction

The tuner can be built in a mini-box, cabinet or any other suitable package. It is possible to fit the components, shown in fig. 1, into a 5" × 6" × 7" container. The tapped coil shown may be replaced by a roller coil taken from a TCS or a Command set.

The layout should follow good r.f. wiring practices. Inductor $L_1$ should be kept as far as possible from the cabinet walls and clear of the other components. The s.w.r. bridge and field strength components should be shielded from the tuner (and each other).

Circuits and construction techniques for the s.w.r. bridge and f.s. meter are not given here. The s.w.r. bridge can be taken from any of the existing manuals and magazine articles as can the f.s. meter.

### The Whip Antenna

The package includes two antennas, a whip and a long wire. The whip can be made up of mobile antenna parts similar to the Topper Mobile or possibly a 3′ lower section and a 5′ upper

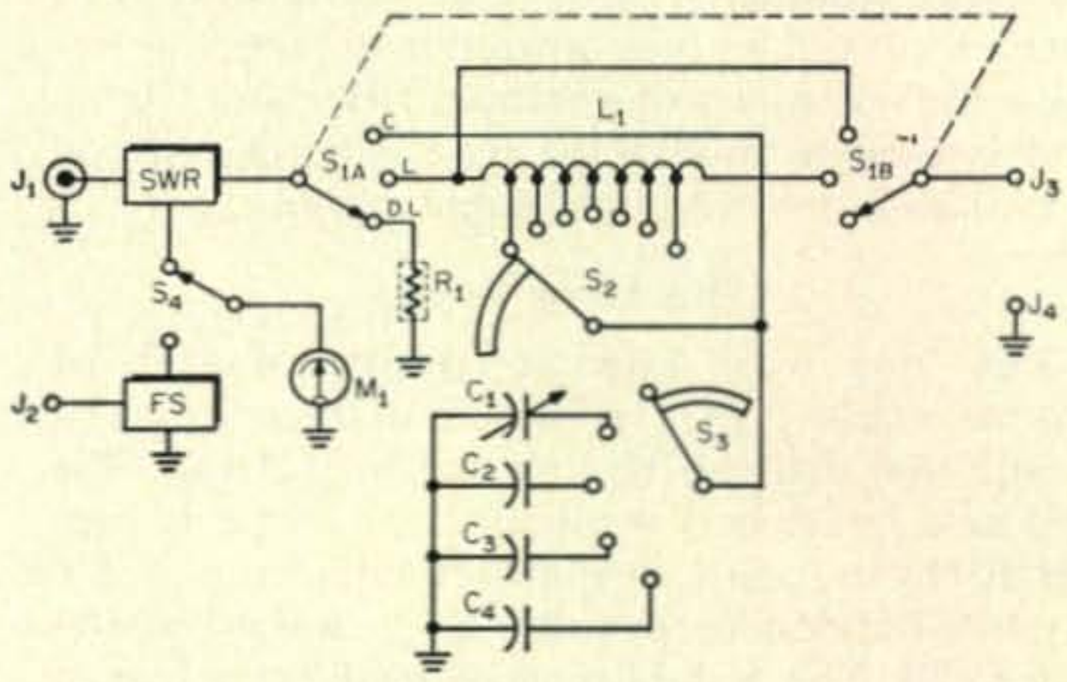


Fig. 1—Circuit of the tuner used with the two portable antennas. The circuits for the s.w.r. bridge and field strength meter may be found in any of the handbooks.

$C_1$—12-200 mmf variable (Johnson 200L15 or equiv.) Voltage rating should be equal to the final plate capacitor in the rig used.
$C_2$, $C_3$, $C_4$—200 mmf. Same voltage rating as $C_1$.
$J_1$—Coax connector, BNC type or SO-239.
$J_2$, $J_3$, $J_4$—Banana jacks. $J_4$ should be insulated with ceramic or polystyrene for high r.f. voltages.
$L_1$—1¾" diameter, 11 t.p.i. Air Dux #1411A indented coil stock or equiv. Tapped at 3, 5, 7, 9, 11, 13, 14 and 15 turns.
$M_1$—0-500 microampere meter.
$R_1$—50 ohm dummy load made of four 200 ohm non-inductive resistors (Spraque 10 NIT or equiv.) Good for 100 watts for 1 minute.
$S_1$—2 pole-3 pos. ceramic. Two deck 90 degree index type recommended.
$S_2$, $S_3$—s.p. 8 pos. shorting switch, ceramic, Centralab PSID section, P270 index or equiv.
$S_4$—S.p.d.t. slide or toggle switch.

*OE Div. USS F. D. Roosevelt, CVA-42, FPO N.Y. N.Y. 09501.

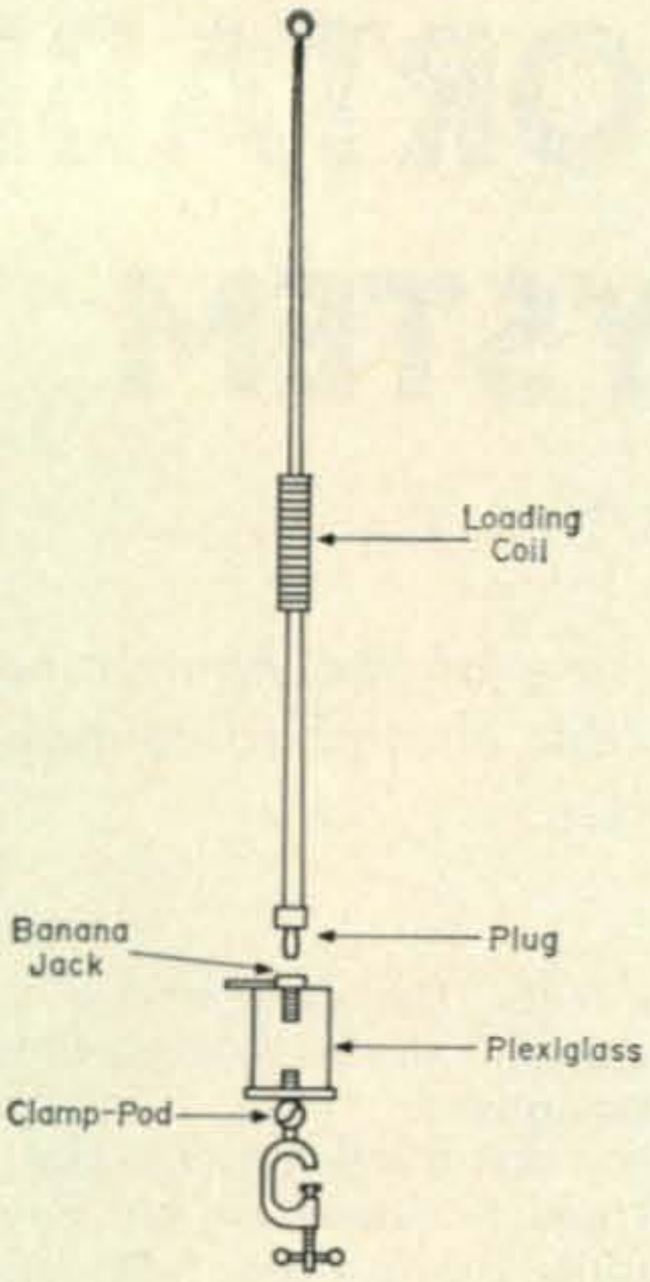


Fig. 2—Whip antenna can be made up from mobile components as described in the text.

section wtih a Master Mobile #750 loading coil. This is shown in fig. 2.

I used a surplus whip from a pack set that has ten 10" sections. A coil, 10" long by ⅝" diameter was wound on a bakelite form with #14 wire. A plexiglass base insulator is tapped to receive the antenna and a standard Herland Clamp Pod is used to mount the base. The clamp pod is available in most photo supply stores.

### The Long Wire

The long wire antenna consists of 100′ of bronze cable (G.C. #70-100 dial cord) on a plastic reel that can be fastened to a clamp. The reel acts as an end insulator. The cable is supported by a small insulator made from a 20′ length of nylon cord and a 2 lb. weight at the other end. The weight may be lead but a bag of sand or shot handles better than the solid weight. A sliding insulator with cord and weight supports the close end of the antenna if necessary. The arrangement is shown in fig. 3. Weights can be thrown over existing projections and the length of the antenna adjusted for the circumstances but the longer the better.

### The Ground

A ground is a very necessary part of this system. It is obtained by the use of a 2′ × ¼" brass rod sharpened at one end and with a binding post at the other. If a good ground cannot be obtained readily, a counterpoise wire (about 15 to 40 feet) can be draped across the floor. Watch that wire though; its *hot*.

### Using The System

To use the whip antenna, the base clamp is mounted to a table edge, window sill or to the ground stake. Assemble the whip to the clamp

**Parts List**

1—Whip antenna (fig. 2)
1—Long wire antenna (fig. 3)
1—12′ length of coax with connectors to connect tuner to rig.
1—8′ braid ground strap with banana plug at one end and large alligator clip on the other end.
1—3′ jumper, insulated inner conductor from RG-58/U with banana plugs at each end.
1—3′ f.s. meter pick up wire, insulated, with banana plug at one end and alligator clip at the other end.
1—Ground rod 2′ × ¼" brass.
—Mounting clamp, photographer's type, Herland clamp-pod with swivel mount.
1—Carrying case.

and position it for the best angle, either vertical or as clear of obstructions as possible. Connect the whip to the tuner with the 3′ jumper described in the parts list.

Switch the tuner to the dummy load position and adjust the rig to the desired output. From this point on do not adjust the rig, only the tuner. Now, switch the tuner to C INPUT and adjust the *L* and *C* controls for the lowest s.w.r. and the same plate current on the rig as was obtained in the DUMMY LOAD position. If a good match cannot be made try the L position of $S_1$. A final check with the f.s. meter will indicate if the antenna or the tuner took the load.

It is probable that the C INPUT position will work best for the whip on all but the highest bands.

### The Long Wire

To use the long wire heave the end line over the far support. Reel off as much wire as can be used; heave the sliding insulator over the close support and mount the reel clamp close to the tuner on a window sill, table edge, *etc*. Take up the slack in the antenna and connect it to the tuner with the 3′ jumper. Connect the ground and load the rig into the dummy load. Now shift to the L INPUT and tune using the same procedure as for the whip. Again, use the f.s. meter to make sure the antenna is loading.

[*Continued on page 99*]

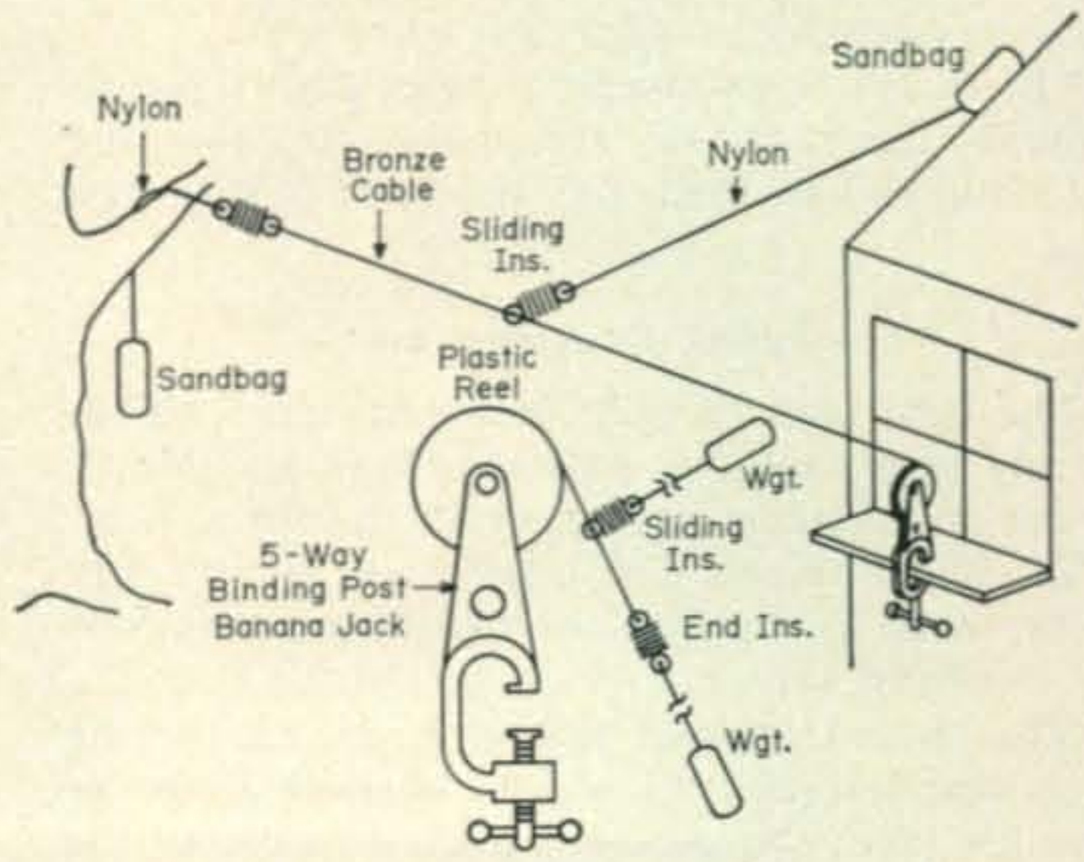


Fig. 3—Construction and typical installation for the long wire antenna.

assorted relays, blowers, etc. Few of these are getting into amateur hands because Western Union wants to get rid of the entire installation, not just the innards, so most of them are going to scrap yards.

The reperf and TD units are geared for 65 words per minute, so would have to be adjusted down to 60 w.p.m. for amateur use anyway, but the tape winders are very nice items. They fit into slide-out bases and are equipped with standard two-prong a.c. plugs and cords. They accept ordinary 11/16 inch perforator tape, and have microswitch contacts to stop the motor on tight-tape.

They would be just the ticket to handle the pile of tape most RTTY'ers collect in a couple of hours of operating. Both Western Union and the Bell Systems use tape storage reels which can hold the tape after it is wound. Western Electric and A.T. & T. frown upon their scrap being scrounged—they want it sold as scrap, period. Western Union however seems to have no interest once it is sold, so it might be possible to ask them where they sell their scrap in your locality, then do a little looking in the junk yard. You might even find the Phone Company's dumping ground as well.

I have seen these tape winders listed by two dealers. On the West Coast Elliott Buchanan, 1067 Mandana Blvd., Oakland, California, carries them, and in the East, Sasco Electronics, 1009 King Street, Alexandria, Virginia, has them. ■

## Portable Antennas [*from page 74*]

Generally speaking, the greater the antenna length and height the greater the efficiency. Also, the less *L* and *C* used in the tuner the higher the efficiency. In general the *L* input will give the best loading but some frequencies may require a *C* input.

### Results

You will notice an absence glowing 40 over S9 reports because these antennas represent the minimum as far as performance goes. This system has been used under varying conditions for well over a year now and has performed well.

For example I operated the whip inside my kitchen for several hours during a hurricane and was able to maintain contact with a county CD net on 75 meters. Another time, during a hurricane this past year, the long wire was used from the Air Station at Glynco, Ga., to maintain contact with the Georgia CD net and with 6th ND

MARS net for a couple of days. The wire was about ten feet off the rain soaked ground. Just recently I operated from the Naval Hospital in Jacksonville, Fla. and was able to meet state traffic nets.

I believe that if you try this system on several bands you will find that the advantages do outweigh the disadvantages. Particularly the ability to grab up a small package and go anywhere and set up a station at any time. See you portable 3 layers under the big signals from most anywhere. ■

## Hinged Tower Base [*from page 69*]

crete. With the bolts in place and everything together, trim the concrete surface until the plate is perfectly horizontal.

### Tower Raising

The tower base is mounted to the hinge, as shown in the photos, and the entire tower is assembled on the ground. (Because of a yard full of trees, the beam was not attached until the tower was raised, but this can be done if room is available.) Rotator cable and transmission line is installed, and guy wires are attached. Guy anchors are placed in the ground, at three points about 120 degrees apart.

If a block and tackle is to be used, the tie point should be directly in line with the tower, to avoid undue strain on the hinge. Four or five willing assistants should be on hand. Two men on the block and tackle, and two or three walking up the tower from underneath is ideal. The type of block and tackle that has a locking brake is much preferred.

When the tower is at a 45 degree angle, two men from underneath should be transferred to the side guy wires, to keep the tower from swinging to the sides. Extremely light pressure should be used on the guys, as the hinge and the block and tackle will keep the tower very nicely in line. When the tower is nearly upright, the rear guy wire is loosely attached to its anchor to control the tower and keep it from swinging too far. All guys are then permanently attached, and the hinge plate is securely bolted down.

If a place to tie a block and tackle is not available, a couple of additional strong backs under the tower will suffice. Once the tower is partially raised, a few men on each of the side guys can pull it the rest of the way up.

The writer used two sets of guys on a 60 foot steel tower, supporting a full size three-element 20 meter beam. The installation has withstood severe wind and ice conditions, and shows distinct signs of being around for quite a while longer. ■

## Rtty A-Z [*from page 67*]

one revolution, which causes the printing of that character or the operation of that function.

Any character or function may be selected while the printing of the previous selection is taking place.

The operations of the selector unit, locking