BETTER SIGNALS

ANTENNAS AND SIGNAL IMPROVING ACCESSORIES

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Band and Bandwidth Antenna Improvisations

In general, low-band antennas for ham and SWB operation have limited bandwidths. For example, in ham application, a tuner is often needed to obtain entire-band matching on 80 and 160 meters, and, sometimes, on 40 meters, too. A tuner is an added expense and must become a part of the tune-up procedure for the transmitter. An antenna cut as a dipole on one band performs poorly on two adjacent bands be they ham or tropical SWB bands. A tuner can help in matching an antenna but does little in improving the performance of a miscut antenna itself.

There are ways of using jumpers and add-ons to devise more benefits from a given antenna with good results. In this column, we will use the W9INN-40-80-160M broadbander, Fig. 1, as an example. This antenna was detailed in the column of the previous issue. The same ideas covered this month can also be used with other low-band ham, SWB and MW/LW antennas.

Operation At Both Ends Of A Ham Band

In the first example, a jumper of proper length will be added to the 40M wire of the W9INN antenna which will permit low SWR, no-tuner operation on the CW portion of the 40M band. If you recall, our W9INN antenna was cut for sideband operation with a mid-frequency of 7.22 MHz. In the modification, the first step is to place an insulator, Fig. 2, into the 40M wire about 9′ up from the feed point. A jumper directly across the insulator permits sideband operation in accordance with a frequency centered about 7.225 MHz.

The 40M wire is made resonant at the CW end of the band by removing the jumpers and substituting a 20″ stiff wire loop across the insulator, Fig. 3. An antenna bridge can be used to advantage in cutting this loop for resonance on a specific CW center frequency. The set up is ideal for the SSB operator who, on occasion, likes to do a bit of CW DX'ing. Similar ideas can be used to do some occasional DX'ing on the 80M and 160M CW bands. On 80 meters, a straight 1′10″ length of stiff wire is clipped to the 80/160 wire at the resonactor, Fig. 4, for CW operation. Use a stepladder or lower the antenna wire a bit by releasing the rope that pulls up on the antenna at the end stake.

Keep the loop and the add-on you make.

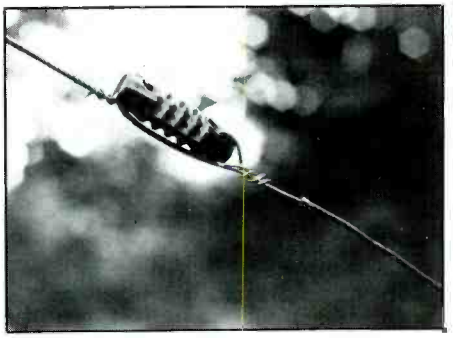
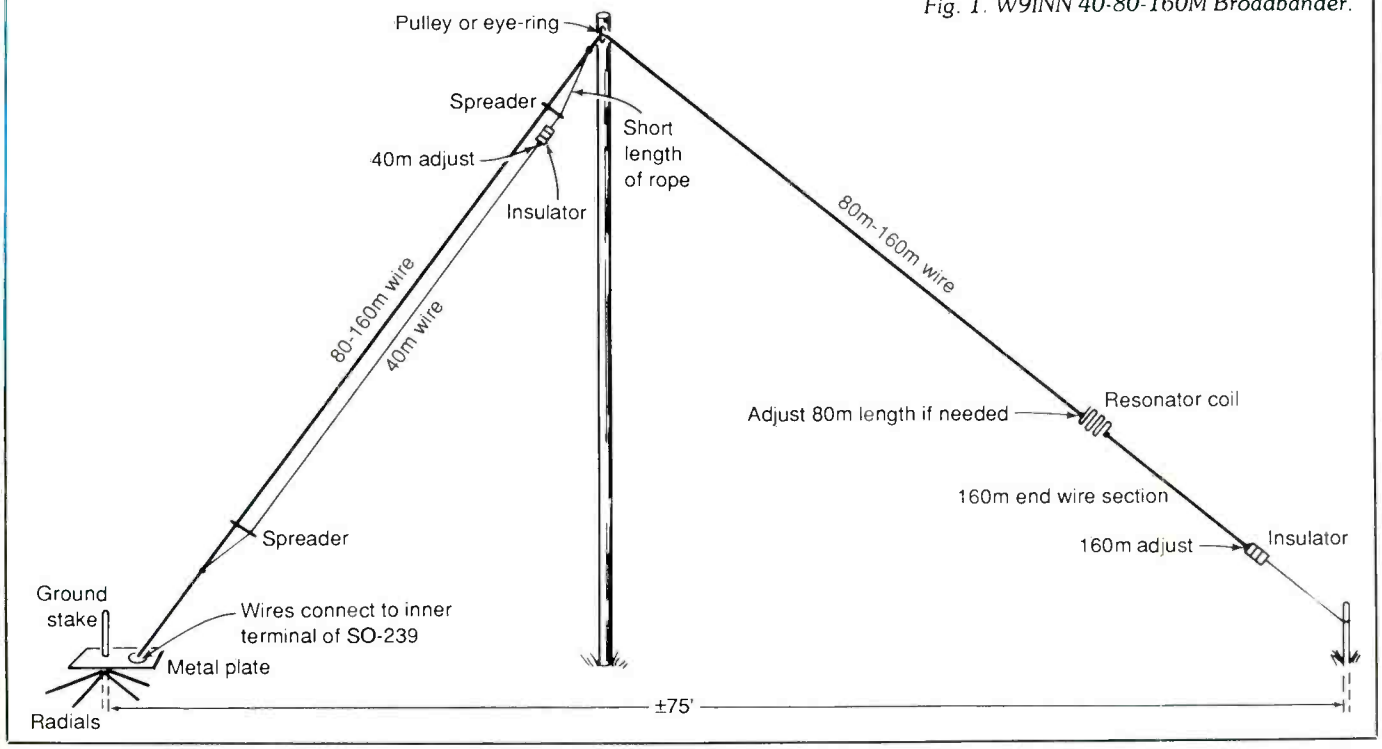


Fig. 2. Insertion of insulator in 40M wire.

Anytime you want to do some CW operation you will have the items that will permit you to operate on the ends of the bands with a low SWR and no tuner.

In the installation, a permanent set up was made for 160M operation. First, the wire end was cut back and resonated to 1950 kHz at the high-frequency end of the 160M band. An appropriate jumper and clip was prepared, along with an experimental length of wire, and attached to the end insulator, Fig. 5A. The opposite end of the wire was attached to a second insulator,

Fig. 1. W9INN 40-80-160M Broadbander.



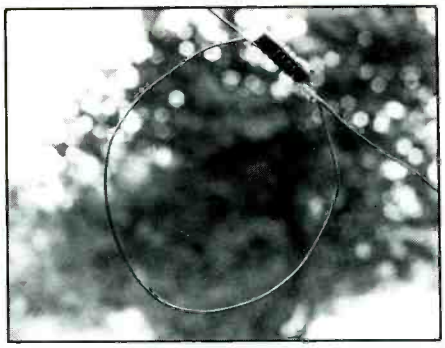


Fig. 3. CW loop across insulator

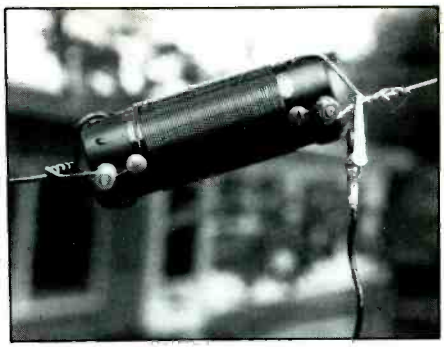


Fig. 4. Clip-on wire for tuning 80M wire to CW portionof band.

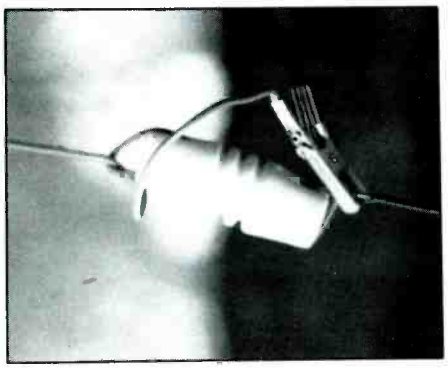


Fig. 5A. Use of jumper to lower resonant frequency on 160.

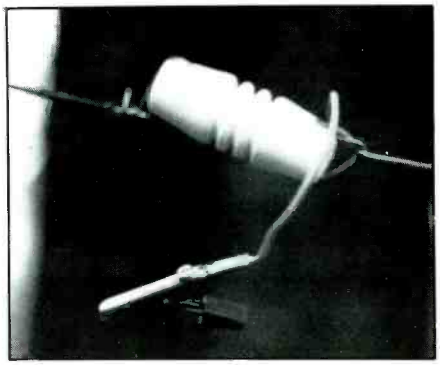


Fig. 5B.

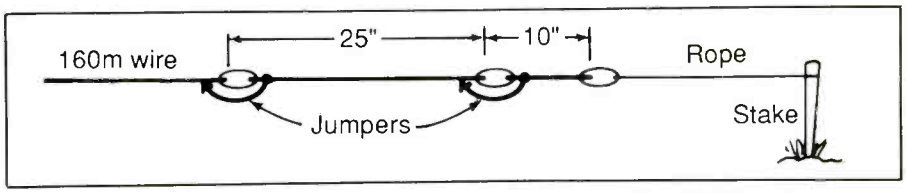


Fig. 6. Jumpers for selection of three portions of the 160M band.

Fig. 6. A length was chosen experimentally to resonate the antenna to 1845 kHz with the jumper closed, Fig. 5B. Finally, a third insulator was attached in the same way to permit low-SWR CW operation at the very low frequency end of the 160M band. An antenna bridge such as the MFJ-204B is a big assist in cutting the wire for a particular band segment.

Adding 20M To The W9INN Antenna

The addition of a 20M wire permits operation on this DX band and sets up a good performing 15, 20, 40, 80 and 160M antenna system. With wires resonated on the appropriate sideband frequencies you can change bands by only retuning your receiver. You will have a low SWR on each of the bands and each antenna will be tuned for resonance.

The 20M antenna operates as a 3/4 wavelength element against ground and has a physical length of 51'7". Our exact resonant frequency was 14.225 MHz. The 20 meter addition was mounted on a second plastic pipe the same height as the first one, Fig. 7, and was spaced approximately 7' from the first mast. The presence of the 20M wire had no influence on the W9INN 80-160M wire. The resonant frequency of the 40M wire was shifted slightly an unimportant amount.

Shortwave BroadcastResults

The basic W9INN antenna performs well as a receiving antenna on the 13, 41 and 75M SWB bands because each is on, or near, to the resonant 80, 40 and 15M ham bands. Results are good on the 120M band as well when the 80/160M wire is resonated near the high frequency end of the 160M band. Also, 80/160M wire has odd-order harmonics that produce resonance and fine performance on the 19M and 31M SWB bands. The presence of the 20M wire also helps to frequency spread the SWB reception capability of the antenna.

It is possible to peak the 49 or 60M pick up, if you wish to do so, by temporarily adding either an 8'4" or 12'3" length, respectively, across the 40M wire at the newly installed insulator for adding CW capability on 40M, Fig. 3. By adding one of the two wires you can set up a quarter wavelength wire on

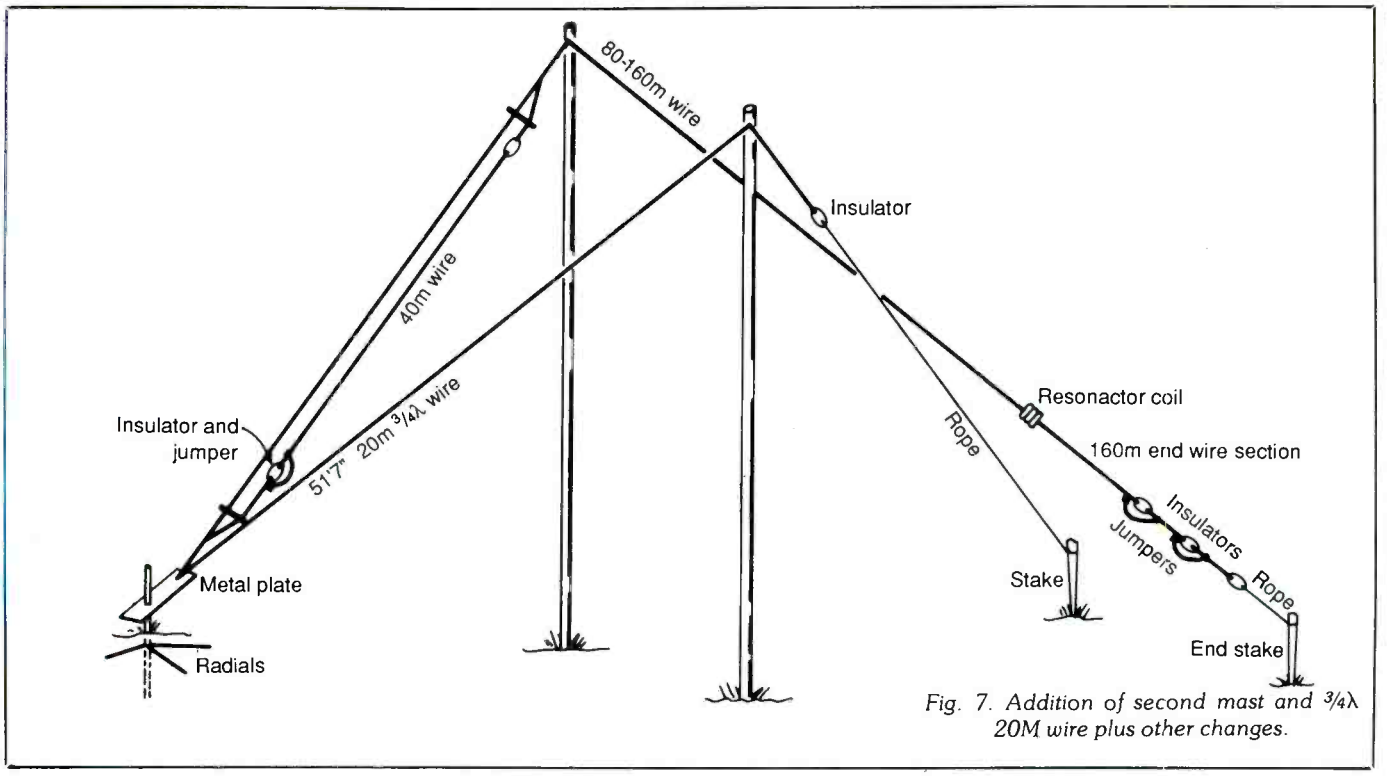


Fig. 7. Addition of second mast and 3/4λ 20M wire plus other changes.

either the 49M or 60M SWB bands. You can use two short wooden stakes to set up a small triangular support for the wires as they come away from the insulator ends. Don't let the wires curl or lay on the ground.

Broadcast Band (BCB) Reception

If you are a BCB enthusiast you can easily add broadcast band capability to the antenna. As you know, more people now share an active interest in all-band radio reception, and ham radio, than ever before. It is a good thing. The AM broadcast band addition to the installation is a wire that connects to the very end insulator of the 80/160M wire with a jumper, Fig. 8. What you see is the last insulator of the three associated with the 160M band operation, Fig. 6. A jumper clip is associated with a length of #16 plastic covered hook-up wire. This wire is wrapped tightly around the rope that extends between the last insulator and the support stake, Fig. 8. A 25′ length of wire is wrapped tightly around the rope attaches to the end support stake, Fig. 7. When all the clips associated with the end antenna are closed, the antenna resonates well up into the broadcast band. You have a resonant antenna on the AM broadcast band which is good in picking up the weaker broadcast signals for identification.

The total length occupied by this modified antenna from feed point to end stake is 116′. It's really an all-bander. PC

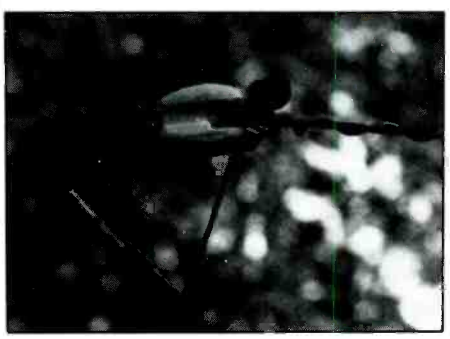


Fig. 8. Adding BCB capability to the 160-80-40 broadbander.