

ANTENNAS AND SIGNAL IMPROVING ACCESSORIES

W9INN 160-80-40M Broadbander

The low-band ham antenna is a problem in today's world of townhouses and tract developments. A second aggravation can be the use of more than one antenna to cover all three bands along with separate cables to the radio room. The W9INN 160-80-40M Broadbander offers effective solutions to the above. An attractive feature of this antenna is good and matched performance on some of the shortwave broadcast bands as well. Basic operation and a typical installation are covered in this column. In a subsequent column several innovations are covered that can be used with the basic W9INN and other wire antennas to add additional matched shortwave broadcast and ham bands to their capability.

The restrictive mounting site problem has been handled in two ways by W9INN. The antenna legs are only an electrical quarter-wavelength long worked against ground like a quarterwave vertical. Thus the feed point is at ground level, Fig. 1. The ground can be as simple as a 5' stake driven into the ground or, radials can be added to improve low vertical angle DX and make the entire antenna less susceptible to changing ground conditions. An antenna worked against a good ground is usually the better way to go

with low height antennas as compared to a low dipole when DX'ing is your aim. The low angle results improve with more radials. In fact sixteen of them is a worthwhile objective for the low-band DX'er.

W9INN uses a unique coil he has named a resonator to decrease the required length of the quarterwave 160 meter leg, Fig. 1. It functions as a loading coil to obtain resonance on 160M and has a high reactance untuned trap-like performance on 80 meters. The 80-160M leg extends from the antenna end to the coaxial SO-239 receptacle at the feed point. The ground space occupied by the antenna is approximately 75'.

On the feed point side of the mast, two spreaders space the 40M quarterwave element a proper distance from the 80-160M leg. Both ends are soldered to the inner conductor of the SO-239. As shipped, the antenna is assembled completely except for the attachment of the spreaders. Even these are dressed and can be positioned correctly with ease.

When you order the antenna you can choose three preferred resonant frequencies, one on each band. These will bring you in the ball park even though you do not erect your antenna exactly as shown in Fig. 1.

However, ground-system conductivity, height, and angle between the two sides of the 80/160M leg have their influence on the exact resonance points. Mast here was only 23' high and the ground length of the antenna then approached 90'. I had to increase the length at all three antenna ends as marked in Fig. 1 to hit the center resonant frequencies of 1.85, 3.8 and 7.22 MHz. The SWR at each frequency was dropped to 1.1-to-1. The 160M 2-to-1 bandwidth was 120 kHz; 80M, 270 kHz. A ratio of less than 1.6-to-1 was maintained over the entire 40M band, and a ratio of 1.2-to-1 over the 15M band. In fact on the latter band the 40M leg operates as a three-quarter wavelength element. The cable length here was 90' and in addition to the ground stake I used three 40M radials. The 160-80-40M Broadbander worked out well on all four bands. It was a joy to be able to operate on all four bands just by retuning the transceiver.

On 80 and 160M and on the other bands too there was no problem in bringing the SWR down to 1.1-to-1 over each of the bands with a tuner. Of course the tuner is only really necessary on 80 and 160 meters when you wish to operate over the entire band. As a bonus the antenna functioned

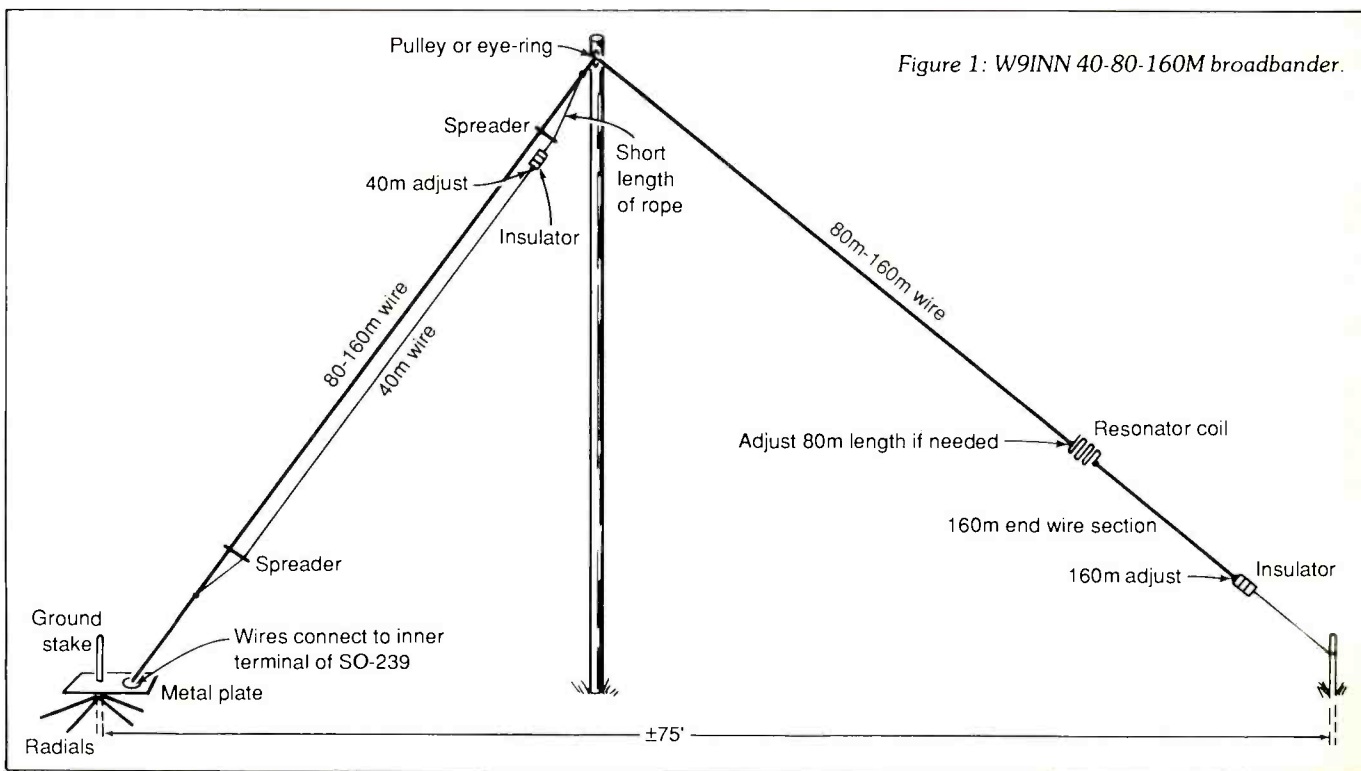


Figure 1: W9INN 40-80-160M broadbander.

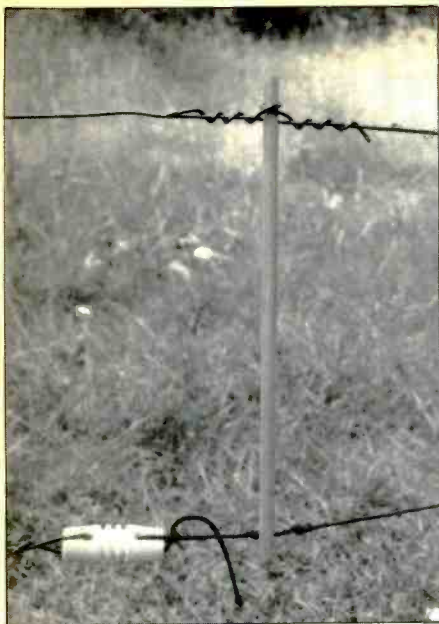


Figure 2: Spreader attachment before erection; 80-160M wire at top of spreader; end of 40M wire at bottom.

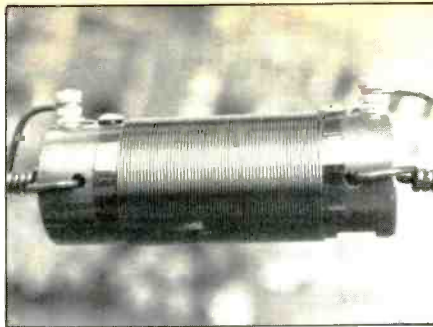


Figure 4: Resonator coil.

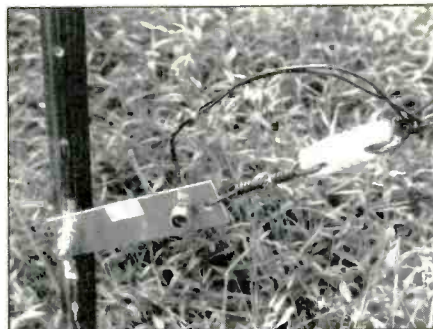


Figure 5: Feed point arrangement.

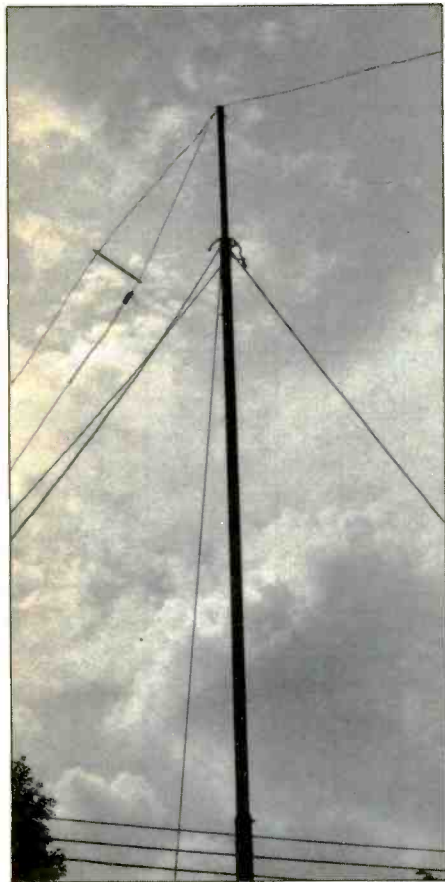


Figure 3: Antenna in position on top of plastic mast.

well as a general purpose shortwave broadcast antenna with some additional boost in performance on the 13, 19, 31, 41 and 75M bands.

The first construction procedure is to stretch out the antenna along the mounting site. Next the spreader near the feed point was attached about 3' from the feed point, Fig. 1. The top spreader was assembled at ground level, Fig. 2. In the photograph note that the top 80-160M wire passes around the spreader but is held in position by the looped wires that are a part of the spreader assembly. The bottom 40M wire is held to the spreader by a flexible rope, also supplied. The looped wire on the left of the insulator can be used to adjust the 40M wire to resonance. Fig. 3 shows the antenna raised to the top of the mast. The 80-160M wire extends to the right away from the mast.

Similar looped tuning wires are located on the 80M side of the resonator, Fig. 4, and, for 160M, ahead of the 160M end insulator, Fig. 1.

The feed point assembly is shown in Fig. 5. Note that the two antenna wires are joined and attached to the inner conductor SO-239 receptacle at the rear. All of this is supplied already assembled. The mounting plate itself is grounded to the metal stake. The three 33' 4" 40M radials I supplied are attached to the same bolt/nut assembly that holds the plate to the stake.

In my installation I used an MFJ-204B antenna bridge, Fig. 6, to tune the antenna to the three exact center frequencies I desired. This can be done without applying any power to the antenna using the bridge and the receiver part of the transceiver. As mentioned previously I was able to get SWR down to 1.1-to-1. This technique avoids inconsistencies. The antenna becomes resonated in its mounting situation. When you



Figure 6: Antenna bridge at work.

tune the antenna first, the influence of the coaxial line on the SWR readings at the transmitter is minimized. Stated another way, the actual length of the line has a minimal effect on the SWR readings.

W9INN Antennas can be reached at P.O. Box 393, Mt. Prospect, IL 60056.

Jo Gunn Enterprises

— CB Antennas — Mobile Antennas
— 10 Meter Antennas — Coax

LONG DISTANCE
LOCAL — GROUND WAVE — DX
"COMBINATION TALKING"

JG-4 STAR



Specifications:
Type: Horz. & Vert.
Polarization: Twin Feed
Gain: 15.5 DB
Front to Back Ratio: 45 DB True
Side Rejection: 45-50 DB True
Back Rejection: 45 DB True
Weight: 34 Pounds
Length: 12 Feet
SWR: 1.1
Horz. to Vert.
Separation: 20-25 DB
Wind Survival: 100 MPH
Power Multiplication: 50X
Audio Gain: 20 DB
Wind Load: 3.7

DX ANTENNA
"STRICTLY FOR
DX TALKING"

JG-4V



Specifications:
Type: Horz. & Vert. Polarization
Single Feed
Gain: 15.5 DB on DX
Front to Back Ratio: 50 DB True
Side Rejection: 45-50 DB True
Back Rejection: 35 DB True
Weight: 24 Pounds
Length: 12 Feet
SWR: 1.1
Wind Survival: 100 MPH
Power Multiplication: 50X
Audio Gain: 18 DB
Wind Load: 2.8

Call or Send \$2.00 for Complete
Catalog and Pricing of Antennas.
(\$2.00 Refundable on 1st Order.)



Route 1 — Box 383
Ethelsville, AL 35461
(205) 658-2229
Hrs: 10am - 6pm (CST)

DEALER INQUIRIES, PLEASE CALL

Please send all reader inquiries directly.

ANTENNAS AND SIGNAL IMPROVING ACCESSORIES

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 resonator, 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.

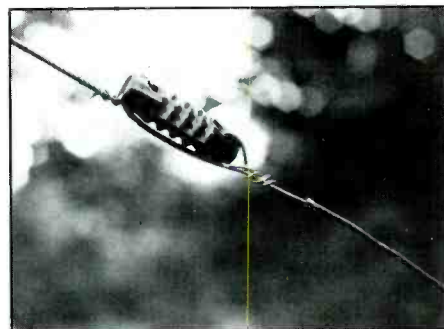


Fig. 2. Insertion of insulator in 40M wire.

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,

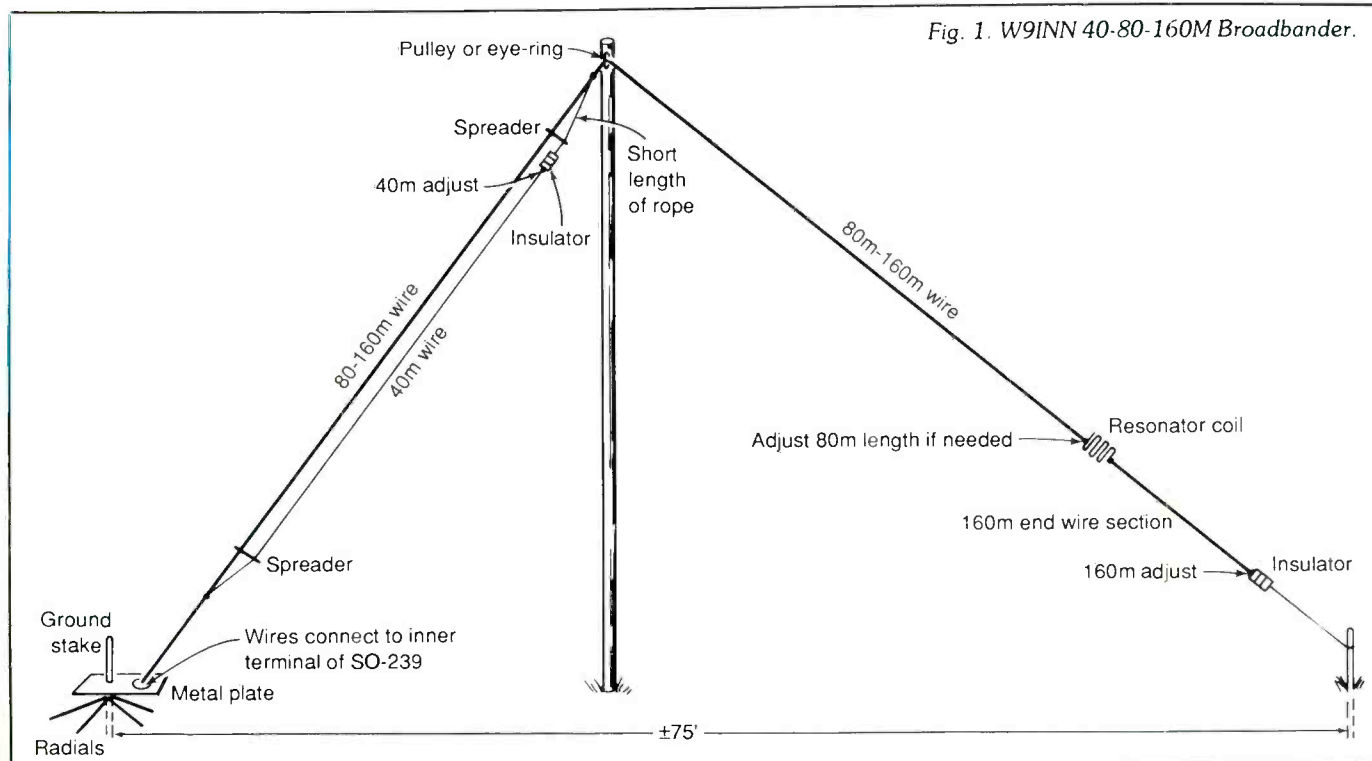


Fig. 1. W9INN 40-80-160M Broadbander.

THE TOP RATED ALPHA DELTA MODEL DX-SWL SHORTWAVE SLOPER ANTENNA

Some Notes On Its Development

- Experience gained over the years in producing high power transmitting antennas led to the introduction of the DX-SWL—the first commercially available world band sloper combining AM broadcast, tropical bands and 60 thru 13 meters.

What does transmitting experience have to do with shortwave reception? Plenty! If a transmit antenna is not designed to precise parameters, it will not pass the RF "smoke test"—there will be burned connections, shorted components, high standing waves and generally lousy performance. On the other hand, a receive-only antenna of shoddy design can go unnoticed—except by your receiver and the weak DX signal you're trying to receive. DX-SWL antennas are used daily in 2 kw transmit service, as well as for world class reception.

- We recognized early on that a **Sloper** can outperform a dipole at the same height, for many incoming wave angles. The **Sloper** really shines on weak, low angle DX signals. A **Sloper** also requires only a single, elevated support—it's easier to install than a dipole.

- The model DX-SWL is designed with specially coated 12 ga. solid copper wire elements which are 25% greater in diameter than the more commonly used 14 ga. wire. Engineers know that a larger diameter yields less resistance, and thus less loss per unit length. Even though 14 ga. wire is cheaper, it is not acceptable for use in any Alpha Delta antenna.

- Because DX-SWL antennas are used worldwide in less than ideal environments, only high quality stainless steel hardware is used. Even though it is more costly than plated hardware used in other cheaper brands, we know that you want to put an antenna up once, and forget it. Climbing great heights to replace rusted connections is no fun. Due to the direct sun, high heat environment of some DX-SWL installation sites, we use only specially selected white coil form material. Black forms used by other brands are not acceptable due to heat absorption and possible coil distortion.

- Before you buy any shortwave antenna, check out the design details and transmit capabilities thoroughly—even if you're not going to transmit. We don't want your investment to go up in smoke!

Model DX-SWL Sloper Antenna is available for **\$69.95** at your **Alpha Delta Dealer**. For direct orders send **\$69.95** plus **\$4.00** shipping (USA only). Call for export order prices.

ALPHA DELTA
COMMUNICATIONS, INC.

P.O. Box 571
Centerville, Ohio 45459
(513) 435-4772

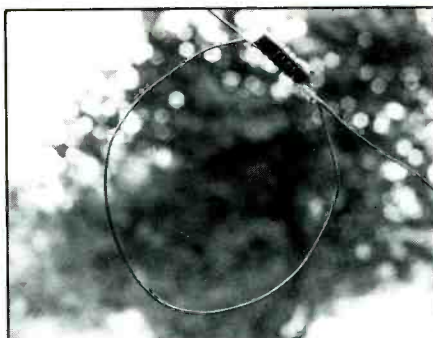


Fig. 3. CW loop across insulator



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

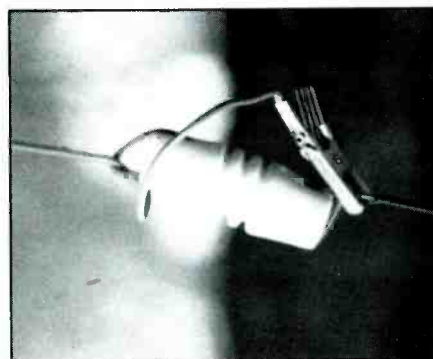


Fig. 5A. Use of jumper to lower resonant frequency on 160.

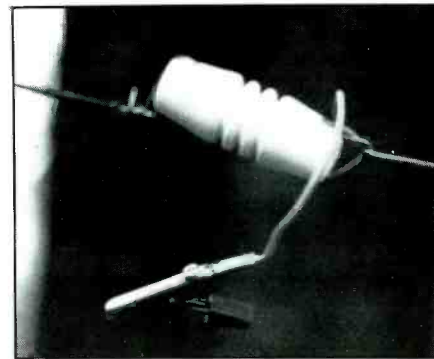


Fig. 5B.

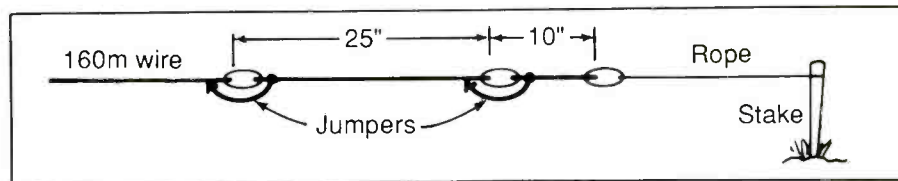


Fig. 6. Jumpers for selection of three portions of the 160M band.

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 Broadcast Results

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

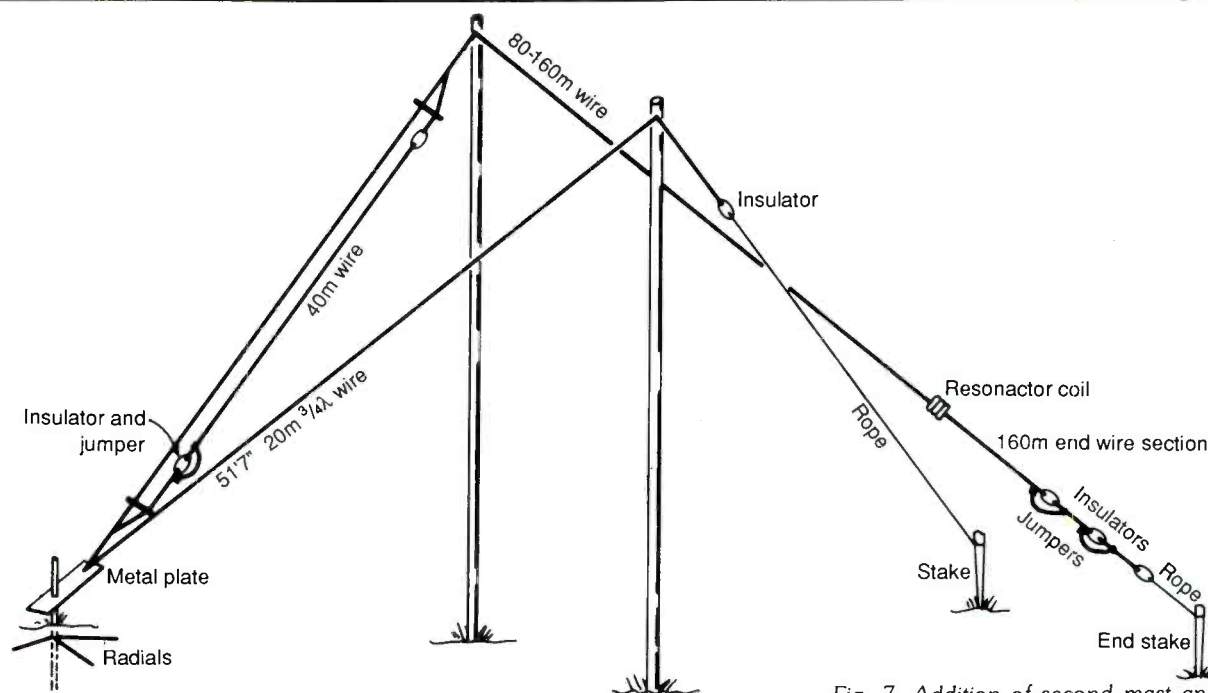


Fig. 7. Addition of second mast and $\frac{3}{4}\lambda$ 20M wire plus other changes.

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.

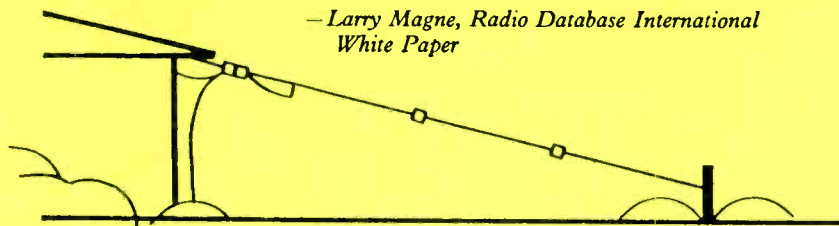
The total length occupied by this modified antenna from feed point to end stake is 116'. It's really an all-bandner. **PC**



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

"The Best Results throughout the Shortwave Spectrum."

—Larry Magne, Radio Database International White Paper



Get world-class, multi-band reception with
ALPHA DELTA DX-SWL SLOPER ANTENNA
Just \$69.95 plus shipping from your Alpha Delta dealer!

- Fully assembled, ready to use and built for long life. So strong, it can even be used to transmit—up to 2 kW!
- Superior multi-band performance on 13, 16, 19, 21, 25, 31, 41, 49, 60, 90, 120 meters plus the AM broadcast band (.5-1.6 MHz). All in a single compact antenna. Alpha Delta first!
- Efficient multi-band frequency selection by means of special RF choke-resonators—instead of lossy, narrow band traps.
- Overall length just 60 feet. Requires only a single elevated support—easier to install than a dipole
- 50 ohm feedpoint at apex of antenna for maximum DX reception! A UHF connector is provided on the mounting bracket for easy connection to your coax.
- A top overall rating in Radio Database International's hard-hitting White Paper, "RDI Evaluates the Popular Outdoor Antennas."

ALPHA DELTA

P.O. Box 571 • Centerville, Ohio 45459

There's alot happening on the shortwave broadcast bands. Don't miss a thing by skimping on your antenna. Get world class, multi-band DX reception with the Alpha Delta model DX-SWL Sloper. Just \$69.95 plus shipping from your local Alpha Delta dealer.