Dear Customer:

Thanks you for your order! We know you will be pleased with the operation of your antenna, once it is properly installed.

Each antenna is individually made aimed at the freqs. you gave us. However, every location is somewhat different with respect to the capacity to ground, as seen by one or both side of the antenna, so some adjustment of the element lengths may be necessary to arrive at resonances on the exact freqs. you desire.

Freq. adjustments are made by changing the lengths of the elements. The outer elements have tuning stubs on them so some adjustment can be made by lengthening or shortening the stubs. LENGTHENING A ELEMENT LOWERS THE FREQUENCY while SHORTENING THE ELEMENT RAISES THE FREQUENCY. So, winding the end tuning stub to make it shorter will raise the freq. and unwinding it will lengthen the element lowering the frequency.

Shortening can most easily be done by disconnecting the element from the coil, cutting off the desired length and reconnecting it to the coil per the STANDARD CONNECTION sheet. This is true of the outer and inner elements. (Don't forget, shortening will RAISE THE FREQ.) Inner elements can be shortened by the same method. (If you go too far, you can always add a standard tuning stub to bring the freq. back down.)

Lengthening any element (to lower the frequency) can be accomplished by adding a standard tuning stub to the RESONACTOR terminal at the the outboard end of the element. See the TUNING STUB sheet for the details on how to do this. Extra wire is provided for making stubs, if necessary. A sample is provided to you can see how it should look. The effect of the stubs on the higher freqs. (10 through 20M) appreciable. On the lower bands 160 through 40M, the effect is relatively small. So it may be necessary to splice additional wire into the element if the stub does not provide sufficient change to locate the resonant freq. where desired.

Be sure to study the "Transmission Line Length" sheet, as the line length has some appreciable effect particularly on the higher freqs. These shortened antennas tend to be quite reactive, so line length may be important.

If the SWR is too high, the antenna may require balancing. See the paragraph on "IMBALANCE" in the GENERAL CONSIDERATIONS sheet.

If the resonant frequencies are reasonably close to where you want them, you can simply use a tuner without any element length adjustments. Some of the internal auto-tuners are adequate for this matching function.

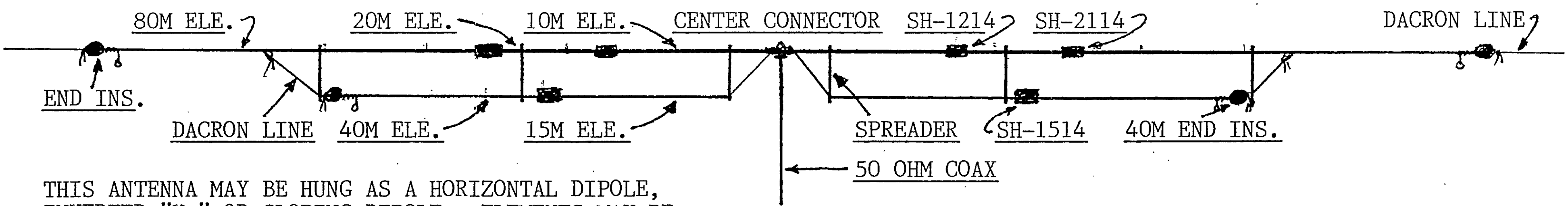
Keep the ends of the antenna as far away from everything as possible. Such "things" as foliage,, the ground, conductors, asphalt shingles within 3 or 4 ft. of the ends of the antenna, etc., tend to raise the feedpoint impedance, increasing the SWR and changing the resonant frequency.

By the way, you can convert to RTS (Ladder-Line Feed) at any time, by soldering a PL-259 on ladder line and plugging it into the center connector. This converts the antenna to a "TUNED SYSTEM" eliminating the need for any element length adjustments. But, you must use a wide-matching-range-tuner all the time.

You shouldn't have a problem, but please let us know with details if you need our help, as we want to be sure you get your antenna operating properly. GOOD HUNTING!

MPD-5C-78'

MPD-5C MAX-PERFORMANCE DIPOLE 78' — INSTRUCTIONS



THIS ANTENNA MAY BE HUNG AS A HORIZONTAL DIPOLE, INVERTED "V," OR SLOPING DIPOLE. ELEMENTS MAY BE HUNG SEPARATELY.

INSTRUCTIONS:

1. Unroll elements. Straighten wires.
2. Hang where you can get at it. Assemble one side at a time. Attach spreaders per spreader detail.
3. Support with pulleys, so antenna is accessible for adjustments.
4. Pull into operating position, with transmission line attached.
5. With transmitter on low power, to avoid any possible overload, find the minimum SWR freqs. (the freq. at which the minimum SWR occurs on each band.)
6. If the SWR on the desired freqs. are within the limits acceptable to the transmitter (usually less than 3:1 or 2:1, with solid-state transmitters) the antenna is ready to operate.
7. If the minimum SWR freqs. are too far removed from the desired freqs., the elements can be shortened to RAISE the freq., or lengthened to LOWER the freq.
8. Make adjustments to inner elements first. (10-15M) then work your way out on the eles. to the lower freqs.
9. Be sure to see the "TRANSMISSION LINE LENGTH" sheet, as 10 and 15M are sensitive to line length.
10. See the "STUB TUNING," and "END STUB TUNING" sheets, for latest and easiest methods of making element length adjustments. Also, read the "SUPPLEMENTARY INFORMATION-STUB TUNING AND TRANSMISSION LINE LENGTH" sheet.
11. Most tuners are able to provide the transmitter with a suitable load without making any element length adjustments. If the transmission line length is not too great, (under 50' or so) losses will be quite low.
12. If too great an imbalance exists as indicated by a overly high SWR, the elements can sometimes be brought into balance by "unbalancing" it physically. See the "IMBALANCE" procedure described in the "GENERAL CONSIDERATIONS" sheet.

A change of one inch in an element length will result in approx the following frequency change: (each side)

10M =	140 KHz	per	inch	of	length change	(ea. side)
15M =	125 KHz	"	"	"	"	"
20M =	95 KHz	"	"	"	"	"
40M =	25 KHz	"	"	"	"	"
80M =	7.5 KHz	"	"	"	"	"

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General Considerations in Locating and Adjusting Horizontal Antennas

READ BEFORE STARTING

Antennas should be positioned where they will be used during adjustments, because objects influencing them, such as trees, structures, pipes, wires, gutters, etc., must be compensated for. This can only be done accurately with the ant. in its operating position. Since shortening is easier than lengthening, at least on "internal" elements, antennas are supplied a bit LOWER in freq. than the final operating frequency, so adjustments may usually all be made by cutting rather than splicing. If you find it necessary to splice, remember to solder all splices, once the antenna is completely "tuned."

Try to run the feed line away from the antenna at a right angle for a great a distance as possible.

HEIGHT:

W9INN test and developmental dipoles are erected at 45 height in an Inverted "V" configuration. This height is used, since it is slightly higher than the usual height at which most amateurs install their antennas. In most cases, the antenna is likely to be slightly long, making it possible to CUT to frequency, rather than SPLICE.

Should you install your antenna higher than 45 feet, it may be necessary to lengthen the elements. If you have given us the height, we will try to make a compensation, if necessary.

Height effects the resonant frequency of an antenna considerably. For example, lowering a 15 meter dipole from 45 to 25 feet can make a difference of 500 KHz. You will probably have to make some adjustment for height.

The outer ends of multi-band and loaded (shortened) antennas are particularly sensitive to height and nearby objects. An effort should be made to keep the ends of these, and for that matter, the ends of all antennas, as far from all objects as possible. Nearby objects can change the resonant frequency considerably and upset the balance of the antenna, making it difficult to obtain a low minimum SWR when feeding with coax.

In general, install the antenna as high and in the clear as possible.

RESONATING TO FREQUENCY:

For all practical purposes, the resonant freq. of an antenna is the frequency at which minimum SWR is measured, with a rise in SWR on either side of that frequency. When adjusting an antenna, it is necessary to carefully measure the SWR at short intervals across each band, and write it down.

Don't trust to memory. As you make adjustments, write down what you have done, and the results alongside. In making adjustments, you will be trying to determine what happens to the resonant frequency and SWR as you make changes. The process is considerably simplified if you have an accurate record of what you have done and the results.

If you erect your antenna and find it does not resonate in the band, and you don't know whether to lengthen or shorten it, proceed as follows: Carefully measure the SWR at each end of the band and write them down. You will probably find a slightly lower SWR at one end than the other. if the high frequency end produced the lower SWR, your antenna is probably too short. If the SWR on the low freq. end is lowest, it is probably too long. You will now have an indication whether you must shorten or lengthen.

When making adjustments, rememeber that loaded (shortened) and Multi-band antenna end sections are very sensitive, and require considerably less adjustment for a given frequency change than do full-size dipoles. Be careful, don't try to make too large an adjustment at one time.

If you use a little patience, and carefully adjust the antenna to frequency, you will find the time well spent and you will produce a fine, effective antenna.

IMBALANCE:

Should you find the SWR at resonance does not go below 1.5:1. the antenna should probably be balanced. This indicates one side of the antenna has greater capacity to ground or nearby objects than the other side. If it appears the antenna is unbalanced, your first step is to remeasure to be absolutely certain both sides of the antenna are the same length.

To correct the ELECTRICAL imbalance, you will have to PHYSICALLY unbalance the antenna, by making one side longer than the other.

Often you can visually detect which end has the greater capacity coupling. The end nearest the trees, wires, gutter, etc. is probably the culprit.

To correct, carefully measure the minimum SWR at resonance. Then shorten the element by several inches (more or less, depending on the type of antenna elements and frequency) from the end you suspect is the "high capacity" end. Again measure the minimum SWR and note whether it has increased or decreased. If it decreased, you are adjusting the correct end, if it increased, you will have to increase the length of that element, rather than shorten it.

>Inner elements are most easily adjusted at the coils. Undo the connection at the coil, lengthen or shorten by cutting or splicing, and remake a "Standard Connection" to the coil. When splicing, if you want to add 6" for instance, it is a good idea to remove 24" and add 30" to avoid having the splice fall in the connection to the coil. (Of course you must be careful to add enough wire to have a "net 30" as about 2½" will be used in making the splice.)

If you already have the antenna adjusted to frequency and no change in frequency is desired, it will be necessary to shorten one end and lengthen the other end EXACTLY THE SAME AMOUNT.

Sometimes there will be metal in a roof or underground, or something unseen, that will require your corrections to be made in the opposite direction from that you expected. The SWR readings are the criteria, and the object is to obtain a minimum SWR, so do whatever reduces the SWR.

In any case, it is necessary to keep a careful record of SWR readings before and after each change, to detect the change is being made in the right direction. Also, remember to return the antenna to the operating position for each measurement.

You should be able to adjust any W9INN antenna to the desired operating frequency with very close to a 1:1 SWR at resonance. If you have suspended it reasonably in the clear, it will probably be balanced, making correction for imbalance unnecessary.

TUNERS:

One of the most misunderstood subjects relating to antennas, is that of the roll of the tuner. But, the SCIENTIFIC FACTS are fully understood and the subject is not a matter of OPINION. I will just say here, the myths about feed lines, SWR, losses in tuners, and baluns are just that, MYTHS. Power reflected back down the feed line is not lost. A 1:1 SWR at the transmitter end of the feed line does not result in the strongest signal, necessarily. Reflected power does not get back into the amplifier causing overheating etc. A balun in the center of the antenna is not required, necessarily. (Transformer type) The proper tuner does a lot more than "fool the transmitter." It provides the transmitter with a proper load!

Most modern transmitters and transceivers are built so power output is reduced as SWR increases. A "tuner" serves the purpose of keeping the transmitter looking into a proper load, so it will continue to develope full power, despite a mismatch at the end of the line with the fixed 50 ohm output of the transmitter.

A "tuner" makes it possible to operate the antenna system quite widely separated from its primary resonant frequency that, without a tuner, would produce such a high SWR, the transmitter output would be severly curtailed, or cut-off entirely by the built-in protective circuits in the transmitter.

The loss created by the tuner is insignificant.

If you are really interested in understanding the subject, we are fortunate in having available a copy of a talk by John Haerle, WB5IIR, Tech Coordinator, ARRL. This comprehensive, clearly written, layman terms, paper is the best and most complete treatment of this subject I have seen. A copy is available for $2 to cover printing and postage. He covers: Antennas of non-resonant length, Line attenuation, The Transmatch, and The Balun. The myths are exposed and the realities explained. It is entitled, "The Easy Way."

REMOTE TUNING SYSTEM:

Of course, if you are using our RTS system, no adjustment of element lengths are required. As outlined elsewhere, it may be necessary to change transmission line length if a low SWR between the tuner and the transmitter is not found on one band or another, but that need is quite unusual.

AUTOMATIC TUNERS

Tuners such as the Kenwood AT-250, Icom AT-500 and AT-100* will work very well with our antennas when coax fed. Most of the 80M band and 160M band can be covered with antennas that have natural resonance on those bands. They do not have sufficient range to use with RTS. But, with relatively short transmission line length, say 50 ft. or so., efficiency is almost as high as with ladder line, so, many of the advantages of RTS may be enjoyed.

*The AT-100 does not work on 160M.

SAFETY:

Be sure to keep your antenna away from power lines. While the insulated wire supplied with all our wire antennas provides some protection against electrocution from 110 to 220 volt lines, it provides none against the voltages commonly found on outside power lines. The insulation does provide an additional benefit by minimizing noise pickup generated by an antenna touching another object.

Remember that the outer portions and particularly the ends of antennas are "hot" with RF voltage when the transmitter is operating. With full legal limit transmitters this voltage will be many thousands of volts. Keep the outer sections and, in particular, the ends well clear of people, pets, the residence, and other objects where a fire could be started, or an RF burn could occur. Maintain at least a two-foot distance between the ends and flammable material. The antenna system should be provided with a means of lightning protection. It should be disconnected from your equipment and grounded when not in use. Do not use during electrical storms. Refer to the Radio Amateur's Handbook for more information on this important subject. Failure to provide adequate lightning protection could result in serious property damage, personal injury, or even death.

While we attempt to use strong materials and designs in our antennas, unusual ice or wind conditions, falling objects, tower blowdown, etc., could cause breakage. It is the responsibility of the user to insure that he places his antenna so that failure will not cause it to fall on a power line or endanger people. Keep in mind that power lines sometimes fail also, and keep your antenna away from underneath them. Antennas by necessity are electrical conductors, a fact you should always remember. In testing our various wire antennas and designs for strength, we have suspended them slightly above ground, and they have all withstood the weight of a 200 pound man. As we have no control over the user's assembly methods, and as exposure to the elements could cause material deterioration, do NOT expect them to support your weight, either directly or be leaning a ladder against them. We haven't, and have no intention of, testing our antennas by swinging from them 45 feet in the air.

BILT-IN AUTOMATIC TUNERS:

The tuners built-in to rigs such as the TS-940S have quite wide matching range, as they are T-network circuits. However, the components are so tiny, they tend to heat up, if operated into a high-SWR load. So, you should be cautious about using them into these loads. They give some warning, as the SWR starts to climb after operating a short period of time. Some people have advised of component failures when they operated for too long into a high SWR. However, we are told these rigs work very well with all of our dipoles and slopers with which they have been used.

VALUABLE INFORMATION: PARALLEL-WIRE TRANS. LINE LENGTHS TO AVOID

LENGTH FT.	BAND EFFECTED	LENGTH FT.	BAND EFFECTED
7'8"	10M	86'4"	10M
10'6"	15M	93'11"	40M
15'9"	20M	95'5"	15M
23'6"	10M	102'0"	10M
31'6"	40M-15M	110'7"	20M
39'3"	10M	115'6"	15M
47'5"	20M	117'9"	10M
52'6"	15M	121'0"	160M-15M
55'0"	10M	133'0"	10M
59'8"	80M	136'6"	15M
70'8"	10M	142'2"	20M
73'6"	15M	156'6"	40M
79'0"	20M		

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[redacted]

SUPPLEMENTARY INFORMATION

RESONACTOR COATING:

The Resonactors are wrapped with a high-grade electrical tape. We used to add a coat of plastic over the tape, but finally discovered this looked great, but tended to retain heat which really needed to be dissipated, so we have discontinued this coating.

The RESONACTOR windings beneath the tape are sealed with a plastic coating to keep out moisture. This treatment has proven to be every effective.

WET ANTENNA EFFECT:

When the antenna is wet, you will notice a distinct shift lower in freq. of the minimum SWR freq. When it dries, the antenna will immediately return to the original frequencies. (All antennas shift freq. when wet.)

The shift can be compensated for with any reasonably wide-matching range tuner. If the tuner does not bring it in, you may want to consider re-checking the natural resonant frequency and perhaps shifting it, by adjusting lengths or stubs, so the tuner can bring the SWR to a reasonable level.

ELEMENT WIRE:

Our element wire is especially made to our specifications. It is Solid 14 ga. annealed wire with a single protective coating, which is highly resistive to U.V. deterioration. Annealing provides easy connections to the coils, which can be made many times without breaking the wire. Yet, it is tough enough to not stretch easily. The black color makes it almost invisible where there is foliage.

TIGHTEN NUTS:

Periodically, it is a good idea to inspect the tightness of the nuts making connection to the coil winding wires to be sure they have not loosened. Expansion and contraction of the coil form can cause the nuts to loosen over a period of time. If loose they should be re-tightened. But, don't tighten too severely as you might break the coil wire.

SEAL ENDS OF DACRON LINE:

Ends of Dacron line should be sealed with a match or soldering iron to keep it from unraveling after cutting.

END INSULATORS: Our end insulators are chosen for their ability to dissipate corona. They have surprising area and permit running considerable power with very short antennas.

160M OPERATION WITH 80M ANTENNAS

Any 80M Dipole may be operated on 160M if a transmission line 40' to 85' is used. The transmission line must be hung in the clear, or at least not taped to conductors such as pipes, tower legs etc. A wide-matching-range tuner must be used.

The two sides of the transmission line are connected together at the tuner. (the center conductor and shield coax are connected to each other, and the two legs of ladder line are connected together). The shorted transmission line is connected to the Single-Wire terminal of the tuner.

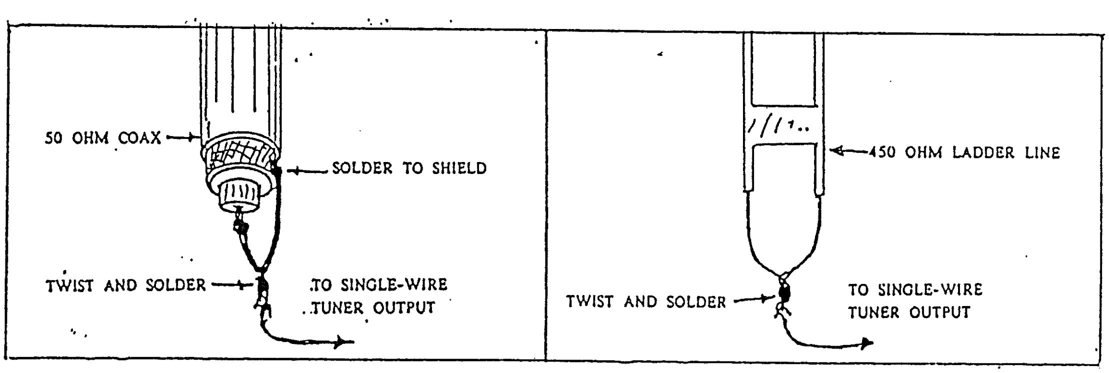
The whole system, antenna and transmission line are tuned as a single-wire antenna. In this configuration, the transmission line becomes the radiating element and the flat top becomes a "top hat" and radiates little, as the two sides are in phase.

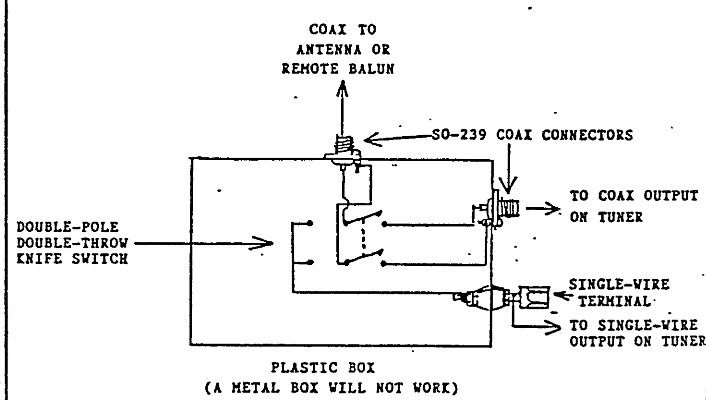
When used this way, the antenna should be hung as vertically and as high as possible. The whole system is approximately a ¼-wave long with the flat top providing one eighth-wave and the transmission line providing the other. Ideally, the transmission line length will be about 66 ft. long , but most tuners will have sufficient matching range to operate with lines 40' to 85' in length. (A trans. line length 66' to 85' in length may be a little more effective, if the tuner can match it, as the longer length will provide a longer "high-Current " max. radiating section than would a shorter trans. line.)

Since the whole system is electrically equivalent to a ¼-wave vertical, "Something" must provide the "Image Function," (the missing half of the antenna.) (A ¼-wave will neither take power or radiate) So, the tuner should be connected to as good a RF ground as is available, to provide the "Image Function." A radial system is ideal, but the antenna will operate reasonably well with a single radial (as long as possible up to 120') A chain-link fence makes a fair radial, any large conductor such as a an anuto sprinkler system can be tied into. However, the more effective the ground the more efficient the antenna, as with any antenna tuned against ground.

Of course, the transmission line should be treated as a radiating antenna element. If you have any concern about being in a RF field, keep the the trans. line in the shack as short as possible, and locate the tuner as far from the operator as possible.

If the antenna is hung 40' or higher, with 60' or so of transmission line, connected to a good ground system, a very effective Marconi 160M antenna results!



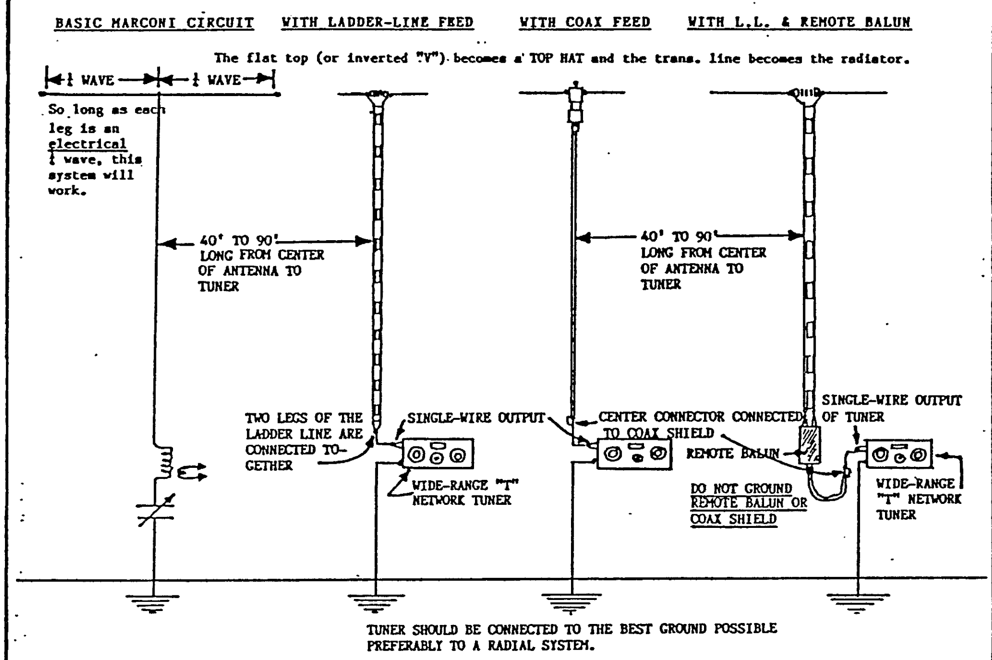


SWITCH BOX FOR SWITCHING BETWEEN MARCONI AND HERTZ FEED

WHEN USING COAX OR COAX AND REMOTE BALUN

Switch provides normal straight-through coax operation, or shorts coax center conductor to shield and connects to the single-wire terminal of tuner.

MARCONI FEED PERMITS USING A 80M ANTENNA ON 160 METERS



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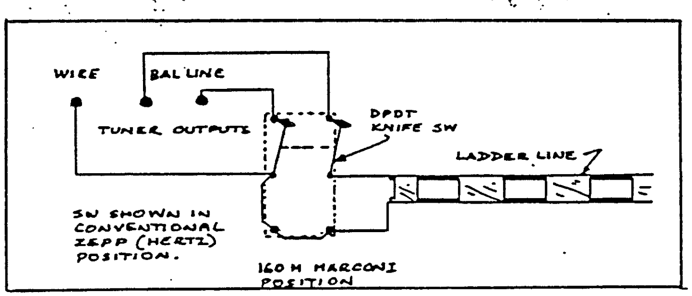

SWITCHING LADDER LINE FROM HERTZ TO MARCONI

TRANSMISSION LINE LENGTH

Try this system if the SWR is too high on 20M-10M. It works best with "shortened antennas," which are fairly reactive.

The resonant frequency and SWR are effected by the length of the transmission line. The higher the freq., the greater the effect. 10-12-15M may show a frequency shift as much as 500 Khz or so, with a somewhat lesser effect on 20M .

Actually, the freq. and SWR of all bands are affected by changing the trans. line length, but the lower freqs. (40-160M) require such a great change in length to cause an appreciable change in resonant freq. and SWR, you normally won't have to consider this method of adjustment for that part of the spectrum.

It is much easier to change transmission line length than antenna element lengths, so it is a good idea to try adjusting the resonant freq. and SWR by this method.

One ideal way to do this is to make several lengths of coax of the same type you use in your line, with a PL-259 on each end. These can be combined with PL-258 connectors in a binary combination, to make one foot increments from 1 ft. through 15 ft., with just 4 length. (one ft., two ft., four ft., and eight ft.) (The addition of a 16 ft. length will provide 1 ft through 31 ft. increments.)

By adding to your transmission line length in one ft. incrments, you can find a "BEST LENGTH," for the bands 10 through 20M. When the "BEST LENGTH" has been found, a single length can be made up to replace the test line. It can be coiled up and located in a suitable place near the operating position.

As you increase the length, one ft. at a time, write down the length added, the resonant freq. (the freq. at which the minimum SWR occurs), and the SWR. You will see the resonant freq. and SWR change at a different rate for each band. (check all of the bands after each change). This is due to the different physical wavelength of the line on each band.

If the resonant freq. (where the lowest SWR occurs) is not where desired, the element lengths may have to be adjusted, as well as the line length. By juggling the two, you should be able to get the ant. to resonate where desired.

This process will often result in greater bandwidth, lower SWR, and a happy transmitter, when applied to any HF antenna. Of course it reveals the lack of a resistive load, but it is almost impossible to have a perfect load on multi-band ants. They will take power, and radiate effectively, however.

With most of our antennas, the SWR and frequency will be close enough to require only minimal element length adjustments. Usually, the STUB TUNING method can be used to simplify the process, if needed.

You will find the method of adjusting the antenna relatively easy, and quite interesting. (At least it is something you can do in the shack) The test cables can be retained for future use on other antennas, and considered just another useful tool.

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STUB INSTRUCTIONS

1. Determine the minimum SWR freq. for each band.

2. If any freqs. are too LOW, shorten the appropriate element to raise it by disconnecting from the coil, shortening, and reconnecting to the coil.

3. If any freqs. are too HIGH, use a stub to lower it, by installing on the inboard screw of the coil on the outboard end of the element.

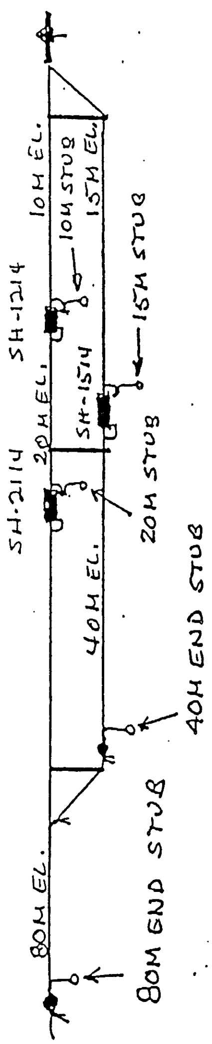
4 Clip the stubs as required to get right on freq. (In small increments, an inch at a time. If you clip too much, make another stub and start again.

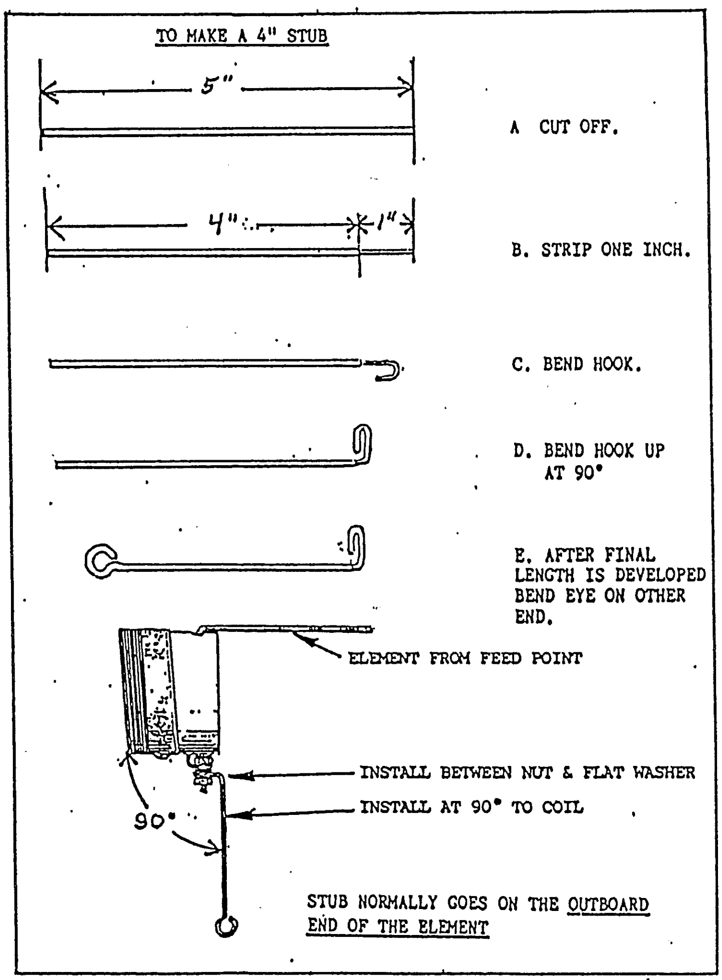
5. After each change, check the resonant freqs. of all bands. Write down every change and the resulting freq. shifts.

6. Alternate adjustments. Don't go too far with any one element at one time. bring freqs. along together.

7. You should find it possible to locate all freqs. where desired.

8. When all adjustments are completed, bend eyes on tend of the stubs. (It is a good idea to make adjustments so element freqs. are about 10KHz LOW, as forming the eye will raise the resonant freq. slightly.





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STUB TUNING

STUB TUNING provides a method of adjusting individual band center frequencies without the need to actually change element lengths.

By adding a stub at the outboard or inboard end of ant element section, the length can be increased without splicing in an additional length. If the element segments are initially made a little short, so the natural resonance (the frequency at which the minimum SWR occurs) is located at the high-freq. end of the band, stubs can be used to lower the freq. to the desired parts of the bands without changing the physical length of the element by disconnecting from the coil, splicing in an addition length and reconnecting to the coil.

Stubs are mad of the same 14ga. solid wire used to make the antenna elements. Stubs can be cut in small increments to adjust the resonant freqs. to the desired point. If you should cut too much off of a an element, it is easy to make a suitable set of stubs to bring the freq. back to the point desired.

The freq. change caused by the stub is slightly less than the change that results for actually changing the element length. There is some coupling between the band you are adjusting and the adjacent band, but it appears the change is less than would occur by changing the element itself.

Sample stubs are included in the package. The sample will show you how it should be formed with a pair of long-nose pliers.

To connect to the coil, just loosen the nut, slide the hook on the stub between the nut and the fl washer, and retighten the nut. Bend the stub so it projects at 90° to the coil, sticking straight out.

There is a practical limit to the length of the stub that can be uised. 15" to 18" seems to be thoroughly practical. 24" will also work in most cases. If a greater length increase is required, it is probably a good idea to length the element in the usual way by splicing in additional wire.

When making adjustments, it is a good idea to be scientific about it and keep a careful record of each change and the effect of EACH resonant freq. Changes should be small and alternated between elements. Every time a change is made, it will effect all freqs. slightly.

A stub can be added to the outboard coil with the capacitive end section attached to it, if the end tuning stub provides insufficient adjustment. In this case the stub is attached to the OUTBOARD screw.

The "eye" formed at the end of the stub is made to reduce the possibility of CORONA. The voltages developed on short antennas are appreciable, particularly if you use a linear amplifier. The stubs seem to reduce the possibility of corona by increasing the surface area of the element and dissipating the electrostatic charge. High-Power tests made so far have not revealed any problems.

End insulators should be located so they cannot cause a problem if they should melt or ignite, with any antenna. Any plastic insulators have the potential to burn or melt. End stubs and our high-area end insulators reduce this potential.

Stubs have a greater effect on the higher bands, and less effect on the lower bands due to the lengthening effect being a function of wavelength. They can be used on Dipoles or Slopers. With a Dipole you should do the same thing to both ends of the antenna. If there appears to be an imbalance as indicated by too high an SWR at the minimum SWR freq., the "IMBALANCE" procedure outlined in tl "GENERAL CONSIDERATIONS" sheet, supplied with each Dipole, can be applied with stubs, by shortening one and lengthening the other by unbalancing physically to balance electrically.

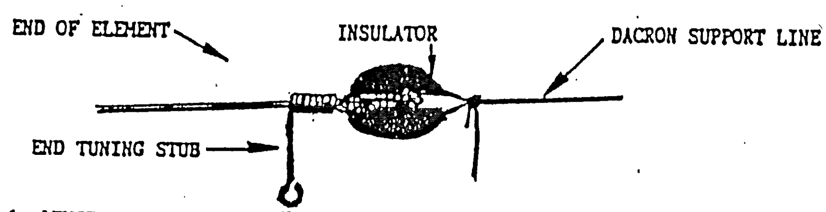
END STUB TUNING

This antenna incorporates a new method of adjusting the length of the 80m & 40m end sections. This feature provides a method of adjusting the length with a lot less cutting and splicing, as most of the adjustments can be made with the stub itself.

To LOWER the freq. (lengthen the element), simply unwind the stub a turn at a time and straighten. Be sure to bend it so it projects out at a 90 degree (right) angle to the element.

To RAISE the freq. (shorten the element), wrap additional turns, shortening the stub. Of course, both ends of DIPOLES must be adjusted.

If the freq. is still too low with all of the stub wound up, we find it easiest to shorten the element at the RESONACTOR. Just disconnect the element from the coil, cut off the desired amount, and reconnect to the terminal per the "STANDARD CONNECTION" instruction sheet.



1. LENGTHEN STUB BY UNWINDING TURNS. STRAIGHTEN.
2. SHORTEN STUB BY WINDING ADDITIONAL TURNS. (TIGHTLY)

This maintains the stub for "tweeking" and avoids having to totally unwind it, cut off the desired length, and rewind it to restore the stub. Though, the element can be shortened this way if you prefer.

The effect of the stub is much greater on the higher freq. bands than on 160-80/75 meters, where it is useful for "tweeking" to freq.

Extra wire is provided for splicing (to lengthen the elements), and/or making internal stubs.

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P. O. Box 393
Mt. Prospect, IL 60056

STANDARD DIRECT CONNECTION TO RESONACTORS

This method of making connection to coils was developed to make it easier to adjust element lengths, than with other methods. It eliminates unneeded and unwanted lumped inductance and capacity at the ends of the RESONACTORS, which provides a much "cleaner" mechanical and electrical condition.

TO MAKE CONNECTION:

1. Loosen nut on end hardware stack, disconnect from screw and straighten stripped end of wire.

2. Straighten wire and remove from coil form end.

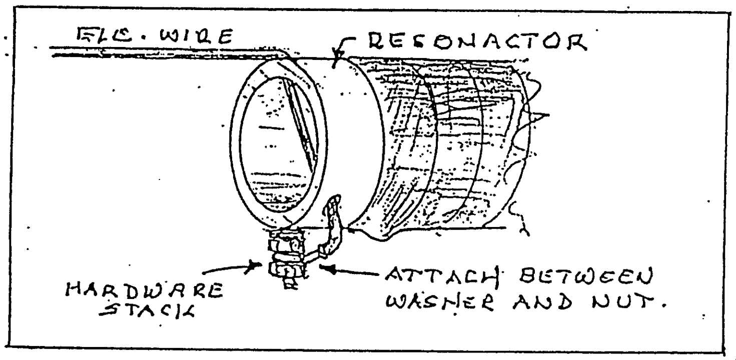
3. Cut off desired amount (to raise resonant freq.), strip 3/4" at end.

4. Insert through center hole (opposite hardware stack) and hole next to hardware stack

5. Bend around terminal, and tighten nut.

If the frequency is too high and needs to be lowered, a tuning stub can be attached to the screw terminal per "STUB TUNING" instruction sheet. If more length is required than can be provided by the stub, an additional length of wire can be spliced onto the element and connection made as outline above.

This simplified method of connection has been thoroughly tested and makes an excellent mechanical connection. The center hole is counter sunk to provide a radius bend for the element reducing the possibility of fatigue.



SPREADER INSTRUCTIONS

With dipoles, plan to attach spreaders to one half of the ant. at one time.

Hang the element in a convenient location where you can stretch it out in order to attach the spreaders and properly rig them. Hang the primary element (top one) so you can suspend the secondary element from it.

INBOARD SPREADER;

1. Locate the spreader 3 ft from the center connector or sloper mounting bracket.

2. Position the spreader so the primary element runs along side the hole. Run a tie wire through the hole and wrap the ends around the element to hold the spreader in place.

3. Attach the secondary element the same way, as shown in the sketch.

OUTBOARD SPREADER

1. Find a spreader with line tied on one end and tie the 18" to the end insulator of the secondary element.

2. Position the spreader on the primary element so there will slight sag in the secondary element of several inches in the center.

3. Attach with a tie wire - loosely, until the final position of the spreader is established.

4. Attach a tie-point loop to the primary element as shown in the sketch. Don't wrap it too tight initially as you may want to slide it along the primary element later if adjustments are required.

5. Run the long length of line from the spreader through the loop and tie.

6. Rig the other side of a dipole in the same way.

7. See the antenna instruction sheet, and stub instruction sheets for length adjustments, if required.

8. After all adjustments are made, tighten the spreader tie wires and loop tie wires to hold the spreaders and loop in position.

INTERMEDIATE SPREADERS: Locate intermediate spreaders in a similar way.

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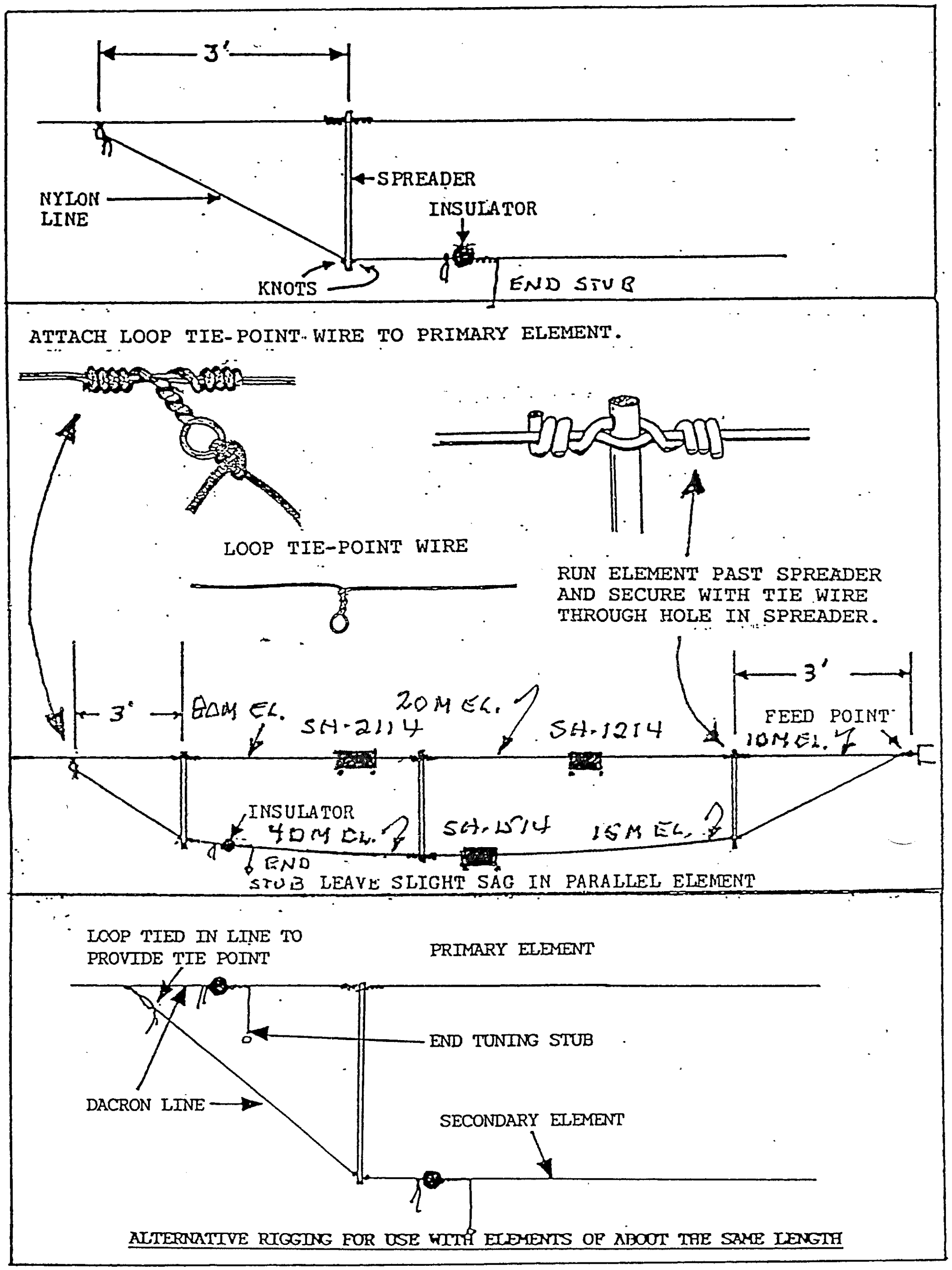
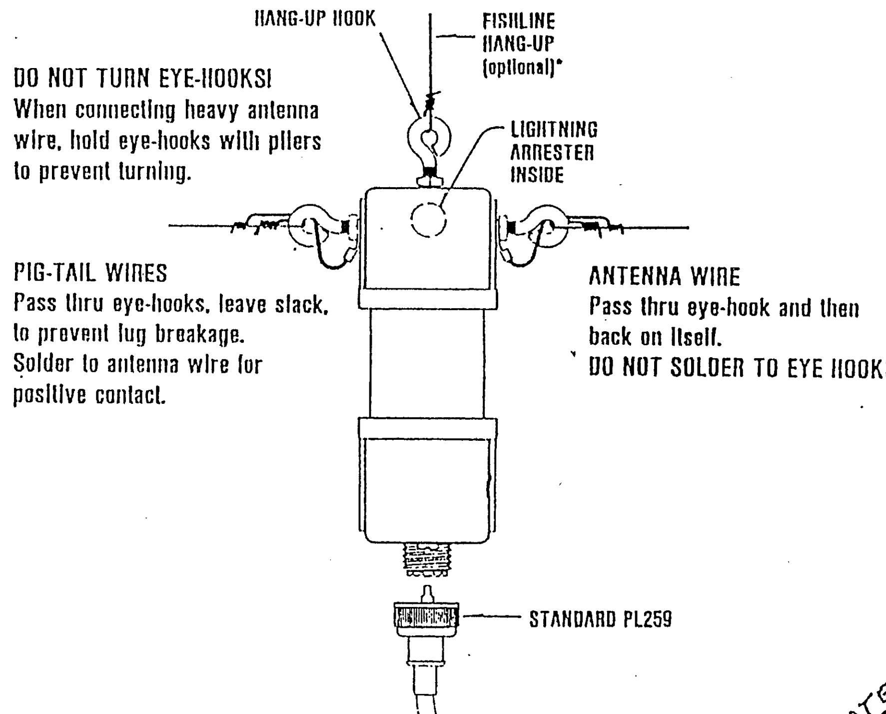


Instructions for W2AU "ANsulator"™ Antenna Center Insulator



NOTE

* If you wish to use the hang up hook as support, DO NOT USE WIRE! Use non-metal cord (#80 test fishline, monofilament, insulated is recommended).

NOTE

DO NOT TURN EYE-HOOKS
These are set for internal lightning arrest and bonded in place. Hold with pliers to prevent turning.