A WORD ABOUT TUNING NARROW BAND ANTENNAS WITH GRAPHING ANTENNA ANALYZERS.

Analyzers like the Rig Expert series sample only so many points when constructing a graph. 80 points in the case of the RigExpert series, when not being controlled by a PC. If you are sweeping say +/- 4MHz, a sample is taken every 100KHz. On an antenna with a 2.62:1 SWR bandwidth (-3dB points) of 16KHz, the dip may not be seen or will be quite shallow. Once you find the dip, center it, narrow the Range and resweep.

Typically, on 40M as an example. I do the final tuning with a sweep range of 40KHz. This will give a true indication of SWR.

TUNING SMALL LOOPS IN GENERAL

Antennas are a function of their environment. They “see” objects near to them. So in order to avoid detuning the loop by being close to it: Make a small adjustment and step away from the loop—ideally staying at right angles to the plane of the loop where it has nulls. Take a reading, make a change if required and again step back to take a reading.

Once you have the SWR centered on your operating frequency, you may wish to make small adjustments in the coupling loop height to achieve even lower SWR. Use the same procedure as above—step away from the loop while making your adjustment.

The unique hybrid matching network makes height adjustments of the coupling loop less necessary than would be the case with a classic coupling loop.

SPECIFICATIONS

Coverage: 5.3MHz–29.4MHz
Polarity Low Angle: Vertical
Polarity High Angle: Horizontal
Loop Diameter: 45"
Design Z: 50 Ohms
Power Handling: 15W SSB/CW 10W DIGITAL
Weight: 3 lb
Shipping Size: 16 X 16 X 3"
Materials: 6061-T6 Aluminum, CPVC,
Hardware: Stainless Steel
Connector: Female gold/teflon BNC

SMALL RX/TX HF LOOP
MODEL W4OP
60-10M STL

PARTS LIST

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<th>PART NO.</th>
<th>QTY</th>
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<td>SUBL1001</td>
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<td>MAIN RADIATOR ASSEMBLY</td>
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<tr>
<td>SUBL1002</td>
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<td>COUPLING LOOP ASSEMBLY</td>
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<td>L1003</td>
<td>1</td>
<td>COUPLING LOOP THUMB SCREW</td>
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<tr>
<td>SUBL1004</td>
<td>1</td>
<td>3 PIECE SUPPORT MAST</td>
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<td>L1005</td>
<td>1</td>
<td>TABLE/RAIL CLAMP</td>
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<tr>
<td>L1006</td>
<td>4</td>
<td>STABILIZER FOOT 1&quot; x 8&quot;</td>
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<td>RED STABILIZER FOOT THUMB SCREW</td>
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<td>L1011</td>
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ASSEMBLY

1. UNPACK THE SUBASSEMBLIES AND LOCATE THE TUNING BOX AND THREE PIECE SUPPORT MAST.

2. THE LOWEST MAST SECTION HAS A FEMALE 1/4-20 THREAD. FIRMLY SCREW THIS SECTION INTO THE TUNING BOX.

3. ASSEMBLE THE REMAINING TWO MAST SECTIONS INTO THE LOWER PIECE IN ANY ORDER.

4. LOCATE THE HYBRID TUNING LOOP AND INSTALL IT INTO THE UPPER TUBE. LOWER IT SO THAT THE TOP OF THE LOOP IS BELOW THE TOP OF THE UPPER TUBE AND LOCK IT IN PLACE BY TIGHTENING THE BLACK THUMBSCREW.


6. LOCATE THE 4 BLACK STABILIZING FEET, OR THE BLACK TABLE CLAMP. IF USING THE STABILIZER FEET, ATTACH THEM TO THE TUNING BOX WITH THE 4 RED THUMBSCREWS. LEAVE THE FEET A LITTLE LOOSE AT THIS TIME.


9. THE STABILIZER FEET CAN BE ARRANGED AS NEEDED. IT IS OFTEN EASIER TO GRASP THE RED THUMBSCREW AND ROTATE THE FEET. IF NOT USING THE STABILIZER FEET, ATTACH THE CLAMP NOW TO A TABLE OR RAILING TO SECURE THE ANTENNA. IF USING THE CAMERA TRIPOD OPTION– SEE ITS INSTRUCTIONS.

10. THE TOGGLE SWITCH ON THE LEFT SIDE IS PLACED IN THE UP POSITION FOR ALL BANDS EXCEPT 60M AND IN THE DOWN POSITION FOR 60M ONLY.

11. A LOOP & HOOK TIE WRAP IS PROVIDED TO SECURE YOUR FEEDLINE TO THE SUPPORT TUBE. DEPLOY IT AT THE BASE OF THE SUPPORT TUBE.

TUNING

1. DEPLOY THE LOOP AS HIGH AS POSSIBLE OFF OF THE GROUND TO REDUCE GROUND LOSSES.

2. THE TUNING SCALE IS DESIGNED TO GET YOU INTO THE BALLPARK. THE CAPACITOR HAS A 6:1 REDUCTION DRIVE– THUS IT TAKES 3 TURNS TO GO FROM MAXIMUM CAPACITY TO MINIMUM CAPACITY. AS AN EXAMPLE: 40M/1 MEANS THAT THE 40M MARK IS ON THE 1ST REVOLUTION. THE 20M/2 MARK IS ON THE 2ND REVOLUTION AND 12M/3 IS ON THE THIRD REVOLUTION.

3. INITIAL TUNING MAY BE DONE BY TUNING THE VARIABLE CAPACITOR FOR MAXIMUM RECEIVER NOISE. FINAL TUNING IS BEST DONE WITH AN SWR METER OR ANTENNA ANALYZER. THE GRAPHING ANALYZERS MAKE QUICK WORK OF TUNING. ONE UNIQUE FEATURE OF THIS ANTENNA IS THE CAPABILITY OF PRECISION ADJUSTMENT OF THE COUPLING LOOP WITH REGARD TO THE MAIN LOOP. THIS FEATURE ALLOWS FOR ADJUSTING THE SWR TO CLOSE TO 1:1 REGARDLESS OF THE MOUNTING LOCATION– I.E. PROXIMITY TO GROUND, BUILDINGS ETC.

4. TO TAKE ADVANTAGE OF THIS FEATURE, TUNE THE VARIABLE CAPACITOR TO YOUR OPERATING FREQUENCY. MEASURE THE SWR. RAISE OR LOWER THE COUPLING LOOP BY 1/4” AND REMEASURE THE SWR. SLIGHT RETUNING OF THE VARIABLE CAP WILL KEEP THE LOOP ON YOUR FREQUENCY. MAINTAIN THE COUPLING LOOP PARALLEL TO THE MAIN LOOP.

4A. IF YOU LEAVE THE COUPLING LOOP ABOUT 1/2” ABOVE THE MAIN RADIATOR, YOU SHOULD BE ABLE TO ACHIEVE SWR ON ANY BAND UNDER 1.5:1.

4B. REMEMBER, THE NARROWER THE FREQUENCY COVERAGE FOR A GIVEN LOOP CIRCUMFERENCE, THE MORE EFFICIENT THE ANTENNA. ONE MANUFACTURER TOUTS HIS LOOP COVERING ALL OF 40M WITHOUT RETUNING. ANALYSIS OF THAT ANTENNA REVEALED IT IS OVER 10DB BELOW THE W4OP LOOP ON 40M.