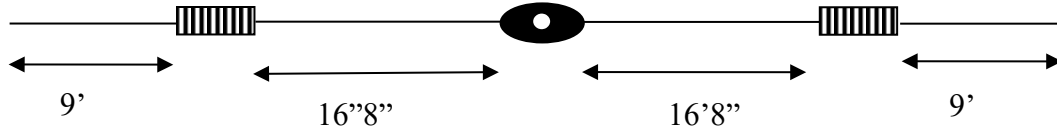


# Pacific Antenna Dual Band 20 and 40M Dipole Kit



**Diagram showing configuration and approximate lengths**



## Description

Our Pacific Antenna lightweight dual band, trap dipole kit provides operation on both 20 and 40M bands.

Two capacitors in series serve to resonate the trap coil and isolate the inner part of the antenna for 20M operation.

On 40M, the traps act as loading to shorten the overall length of the dipole

Total length is approximately 51ft rather than the 66ft of a full size 40M dipole.

The dipole weighs less than 5 ounces and can be used at RF power levels up to 100W.

## Recommended Tools

Wire cutter

Wire stripper

Soldering Iron and solder

Tape measure

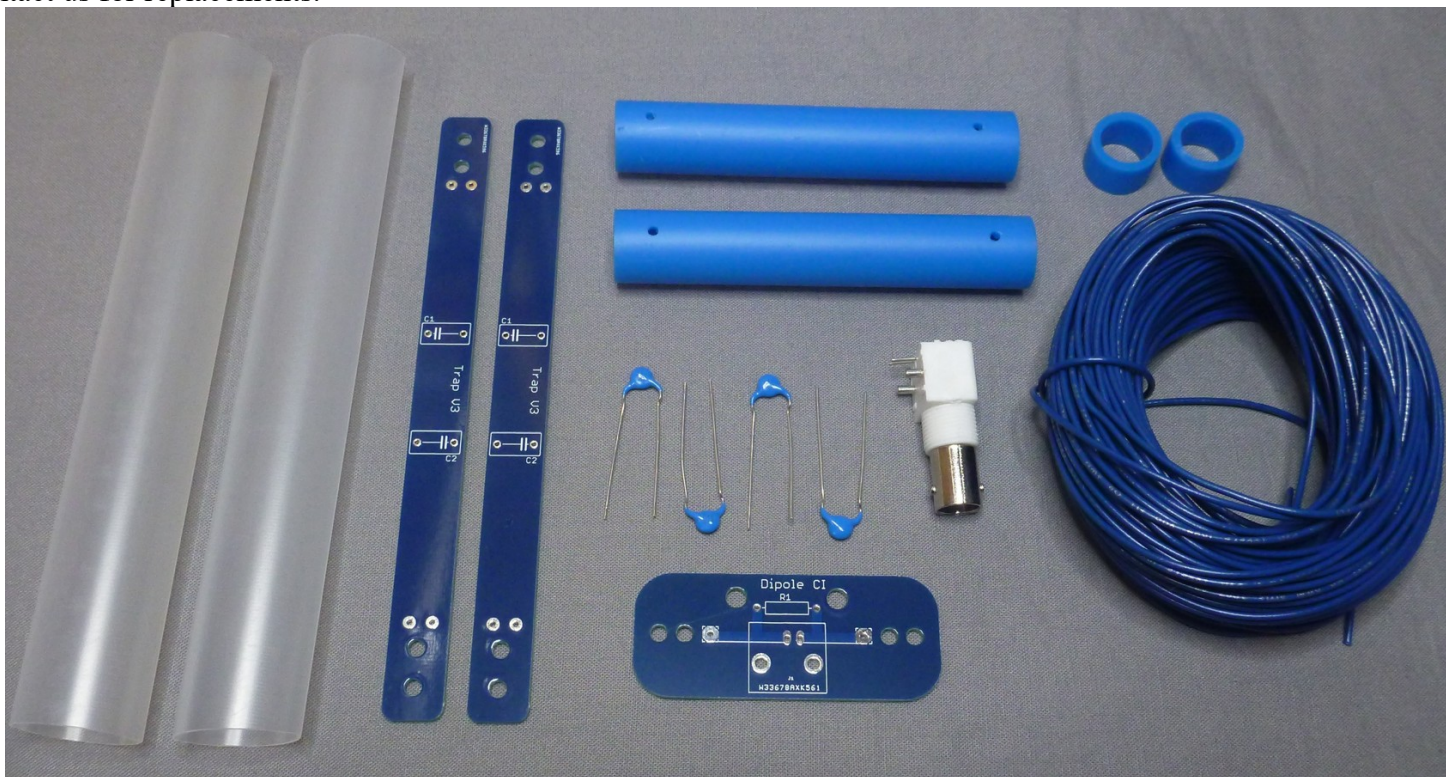
Heat gun or other heat source for shrink tubing

**Note:** This manual applies only to the latest version using blue coil form material.

If you have a previous version with black forms, use the earlier manual version found in our manuals archive.

## Before you start

We suggest that you inventory the parts according to the contents list to be sure the kit is complete. If not please contact us for replacements.



## Contents

75ft of #24 stranded wire

BNC connector (1)

Dipole center insulator PCB (1) **Note:** The current version may be different from the illustration above.

Trap capacitors PCB (2)

Coil forms (2)

27pF 3KV capacitors (4)

Clear heat shrink tubing (2)

End insulators (2)

## 1. Wire Preparation

**Measure and cut the supplied wire to the following lengths\*:**

- 2 Sections each measuring 9 feet, 0 inches (outer antenna sections)
- 2 Sections each measuring 16 feet, 8 inches (inner antenna sections)
- 2 Sections each measuring 10 feet, 4 inches (coil windings)

These measurements include extra wire for making connections at the traps and center insulator and trimming to final length

**\*Note:** Measure carefully and double check the lengths of wire before cutting to reduce any errors. The old saying that applies here is “measure twice, cut once”



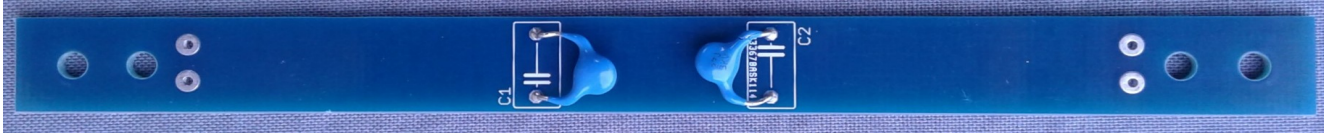
## Traps

The traps are constructed from capacitors and an inductor (coil) to form a resonant circuit. Two 27pF capacitors are placed in series by soldering to the long circuit boards and connected in parallel with the loading coils to form the traps.

## Trap Capacitors

Insert the capacitors into the long circuit boards in the marked positions.

Before soldering, bend the leads over as shown below so that the capacitors lie flat on the board. This is to allow them to fit inside the coil forms.



Solder the capacitors and trim the excess leads so that the board appears as shown in the photo above.

## Trap Coils

The coils use the 10' 4" sections of wire that were prepared previously to wind coils with 51 turns.

Start by inserting the wire through one of the holes of the coil form leaving about 2".

Wind the coils counting one turn each time the wire passes the starting point. Keep the wire as tight as possible and the turns together during winding.

You can tighten the coil by holding one end and with the other hand, twisting the wire on the form in the direction of winding to remove slack.

A turn is counted as each time the wire passes the starting point as it wraps around the coil support tube.



You may find it helpful to make temporary dots as shown in the photo above to mark each 10 turns for easier counting.

Double check by counting the turns to verify the total number of turns is 51 before cutting off the excess wire in the next step.

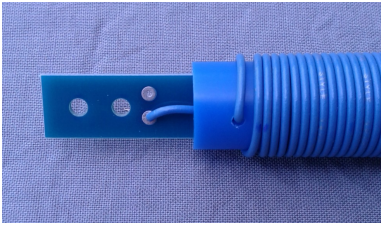
**Note:** Tape may be helpful to temporarily hold the turns in place while winding.

## Trap Assembly

Trim the leads of the coils to approximately 1 inch and strip the insulation leaving approximately 3/8 to 1/2 inch of the insulation past the coil ends as shown below.



Insert the capacitor board into the coil form so that it is centered in the form, insert the stripped coil wire ends into the board and solder the wires to the boards.

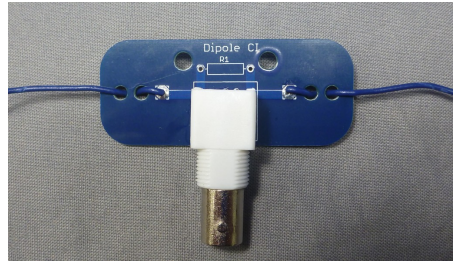


Repeat this process with the other coil to complete the trap set for the dipole.

If you have access to a means to check the trap resonance (analyzer or dip meter) the assembled traps should be resonant around 14.1Mhz. If not, double check the turns count on the coils.

## Center Insulator

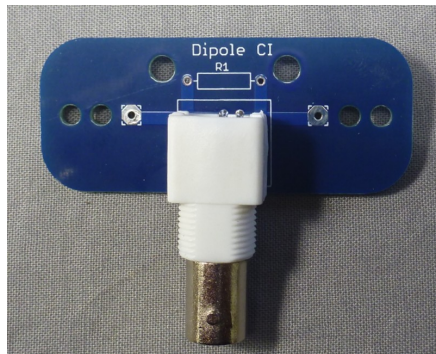
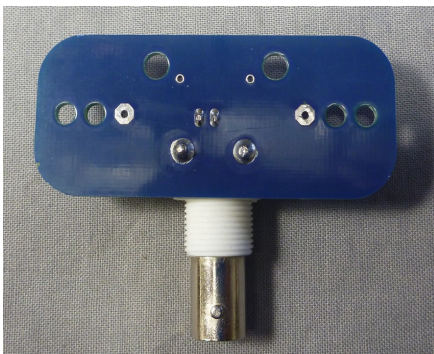
The center insulator circuit board has pads for mounting the BNC connector and attaching the antenna wires as shown in the photos below.



**Note:** R1 is optional and not required for use of the dipole antenna.

Position R1 was included for adding an optional resistor for static dissipation and if you want to do so, any value in the range of approximately 10K Ohm to 1M Ohm and wattages of 1/4W or 1/2W will work. The value is not critical.

Start by soldering the BNC connector in place. Insert it into the board making sure all of the pins and leads go through the board holes.

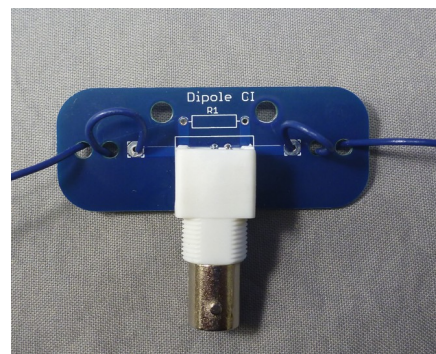
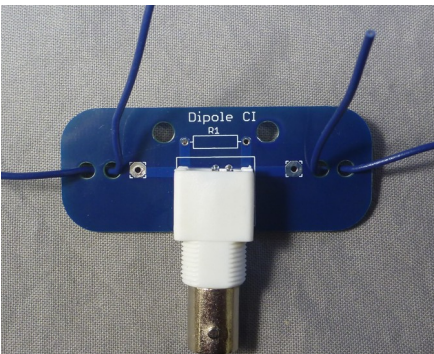


Solder one of the large pins first and check alignment. This way, you can remelt that pin and settle the BNC onto the board.

If you press down and hold the board on the BNC after soldering, it will sit flush.

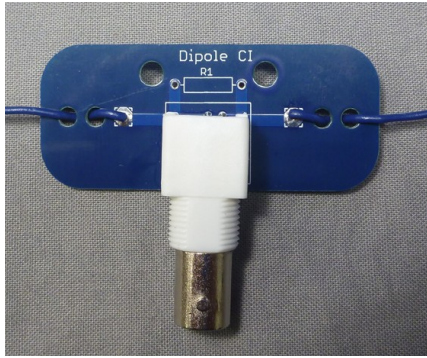
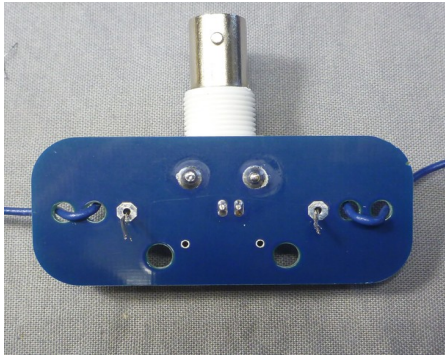
Next, solder one end of each of the 16' 8" sections to the feedpoint insulator as shown below.

The wires are looped through the board holes and soldered to the adjacent pads as shown.



Feed the wire through the outer hole from the front side and loop back through the inner hole leaving sufficient length to make the solder connections.





Strip the ends of the wires approximately 1/4 inch, push them through the board pads and solder to the board as shown here.

After the wire is soldered, the excess pull the excess back through the holes to secure the wire in place and prevent movement of the solder connections.

### Testing 20M Resonance

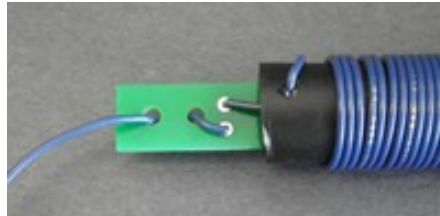
At this point, with only the inner wire sections for 20M connected, set up the antenna in a test location in the configuration it is planned to be used ( inverted V or dipole) and check SWR or impedance on 20M frequencies only.

If needed, trim the antenna section wires no more than one inch at a time equally and test SWR on 20M each time being careful not to trim too far. It is always easier to make a wire shorter than longer.....

Once this is done, and the SWR on 20M is good, the traps and outer wires for 40 meters can then be connected to the ends of the 20 meter sections as described in the next section.

### Adding Traps

Each trap will be connected to the end of one inner section wire and one 9' wire by feeding the wire through the outer holes, back through the next hole on each end of the trap board.

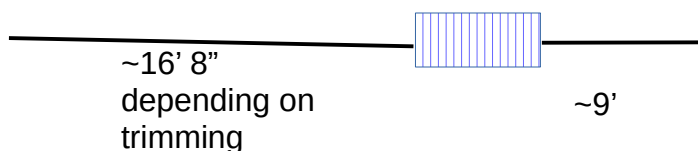


Strip approximately 1/4" of the insulation from the antenna wire, feed it through the solder pad hole and solder the wire to the board.

Pull the end of the wire to remove any slack and to hold the wire in place in the board.

Repeat this process on the other end of the trap with the complementary wire and then do the same with the other trap.

The dipole should now have the inner wire attached to the feedpoint on one end and the other end to the trap with and a 9' wire attached to the other end of the trap.



Each section connected to the center insulator should like like the illustrations above

## End Insulators

The kit includes a pair of insulators for connecting supporting string to the antenna ends that are formed from small sections of coil material.



Attach these by simply twisting or tying a knot the ends of the wire around the rings.

After final tuning of the antenna is completed, the wire can be secured to the insulators with tape or heat shrink to prevent slippage during use.

## Tuning the Dipole

**Note:** A horizontal dipole can have an impedance of approximately 75 Ohms so the best match may be 1.5 SWR.

An antenna analyzer makes tuning the antenna easier but it can also be adjusted by checking the SWR at the lower and upper end of each band.

First, set up the antenna in the chosen configuration (dipole, inverted V, V, etc) and test. It is recommended to try the antenna at a few heights and different configurations before cutting the wire.

If the SWR is higher at the highest frequency, then the antenna is too long and if highest at the lowest frequency, it is too short.

The inner, 20M section will usually need no trimming at this point.

If it does, trim it first from the center insulator or trap connections in small increments (1" or so) and trim each side equally, rechecking SWR after each adjustment.

Once the antenna is giving a good match on 20M, move on to trimming the outer sections for best 40M match.

Depending on how the antenna will be used (height, configuration, etc) the length of the outer section of the antenna will likely need to be adjusted for best match on 40M.

**Note:** Depending on how it is configured and height above ground, a dipole will have an impedance of approximately 75 Ohms so the best match may be ~1.5 SWR at resonance.

**Note:** Before trimming the outer sections, we recommend that you first try tightly coiling or wrapping up some of the antenna end back on itself. This electrically shortens the antenna and may provide sufficient adjustment to provide a low SWR without any trimming.

**Note:** Configuration and height above ground will affect the match, especially on 40M.

**Note:** It is important to test carefully and verify the need for trimming and be very careful not to remove too much. In most situations, it should not be necessary to cut the outer section shorter than approximately 8 ft 8 inches.

## Apply Heat Shrink to Traps

The included heat shrink is used to secure and protect the traps once all tuning is completed.

Carefully slip a section of heat shrink tubing over the wire from the ends of the antenna to cover each of the coil forms.



If some turns of the coil become displaced or separated, use a small flat stick or tool to push them back in place before shrinking the tubing.

Shrink the tubing using a heat gun or other heat source. Use caution to avoid overheating the coil form or causing injury.



Tips on shrinking the tubing can be found here:

<http://www.doityourself.com/stry/8-ways-to-heat-your-heat-shrink-tubing>

**Congratulations, your Pacific Antenna 2040 dipole kit. is now complete!**

If you have any questions, please contact us: [qrpkits.com@gmail.com](mailto:qrpkits.com@gmail.com)

**Thanks from the Pacific Antenna Team!**