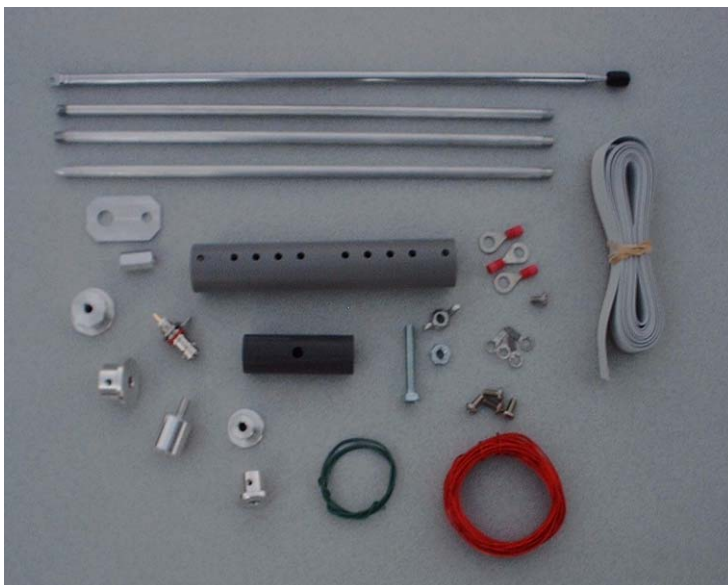




PAC-12 Kit Contents

<u>Part</u>	<u>Quantity</u>
Screws: 8/32 x 3/8"	8
Screws: 8-32 x 5/16"	2
Screw: 8-32 x 1/4"	1
#8 internal tooth washers	10
#8 solder lug ring terminals	6
Bolt: Aluminum, 1/4-20 x 1.5"	1
1/4" internal tooth washer	1
Nut: Aluminum hex, 1/4-20	1
Stainless wing nut, 1/4-20	1
1/4" ring terminals	4
BNC connector	1
BNC mounting plate	1
Stranded wire red and green	3"
Wire, 18AWG enamel copper	1
16 conductor ribbon cable	1
Feed point insulator PVC tube	1
Feed point insulator end caps	2
6" Coil form, PVC	1
3.5" Coil form, PVC	1
Coil form end caps	4
Aluminum Rods 12"	2
Aluminum hex coupling nuts	1
72" telescoping antenna	1
Antenna whip adapter	1
Aluminum ground spike	1



Tools Needed

Soldering iron
 Phillips screwdriver
 Wire stripper
 Wrenches, 7/16" and 1/2"
 Terminal crimp tool
 Pliers
 Solder

Feed point insulator assembly



Parts:

- PVC base tube (1)
- Aluminum end caps (2)
- 8-32 x 5/16" Phillips head screws (2)
- #8 star washers (2)
- #8 Size crimp ring terminals (2)
- BNC mounting plate (1)
- BNC connector (1)
- Red and green stranded wire (3')
- Stainless wing Nut (1)
- 1.5" 1/4-20 aluminum bolt (1)
- 1/4" aluminum nut (1)
- 1/4" star washer (1)

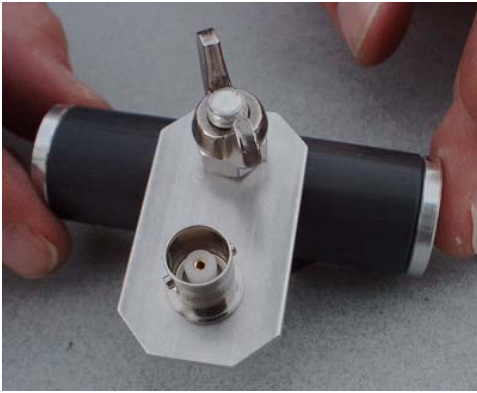
Start by inserting the 2 smaller aluminum end caps into the ends of the PVC tube to check the fit. Align the holes and secure using the two 8-32 x 5/16" stainless screws. Be sure to use the correct screws, as the longer 3/8" screws supplied for the loading coil will interfere with the threaded sections screwing into the end caps.

The screws should start smoothly and should not require much effort to tighten. If otherwise, make sure the threads are aligned properly. Be careful not to over tighten as the end cap metal is aluminum and is it possible to strip the threads. It will be necessary to remove the screws later but they are installed now to prevent crushing the tube while installing the BNC plate.



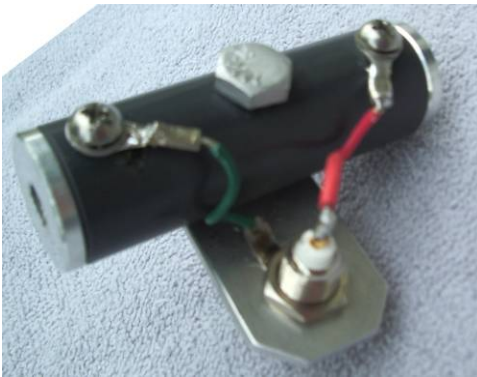
Using the 1/4 -20 x 1.5" bolt, lock washer and nut, attach the BNC mounting plate to the feed point insulator PVC tube by inserting the bolt through the PVC tube and then through the aluminum bnc mounting plate.

Secure with a lock washer and the 1/4-20 nut. Tighten from the bolt head side while holding the BNC plate in position.



Mount the BNC in the plate and secure using its nut. The BNC connectors may be supplied with a red rubber gasket that should be removed before installation

Install the stainless wing nut screw onto the end of the 1/4-20 bolt in the center. It is used to secure the ring terminals for connection of the radials.



Once the BNC is securely installed, use the sections of green and red wire to connect from the BNC to the crimp terminals. The red wire goes the center terminal of the BNC. The red wire will indicate the antenna end of the feed point.

Measure the necessary wire and crimp and or solder the terminals to the wire. Next, remove each screw and place it through the ring terminal and reattach to the end cap.

This completes the assembly of the feed point insulator. Check for continuity using an ohmmeter between the center and shell of the BNC and the end caps of the antenna. Resistance readings should be no more than one or two ohms including the meter lead resistance. Also verify that there is no short by checking resistance between the end caps or across the BNC. Resistance should read very large or infinite here.

Note that the feed point insulator is symmetric. This feature allows the antenna to be used as a dipole as well as a vertical. When used as a dipole, the bolt in the center serves as the antenna support point for attaching to a mast. When using the antenna as a vertical, make sure to install the feed point insulator with the center conductor of the BNC connected to the antenna and the shell to the radials.

Loading coil assembly



Parts:

- PVC coil form, light gray (1)
- Aluminum end caps (2)
- 8-32 x 3/8" Phillips screws (4)
- #8 internal tooth lock washers (4)
- #8 crimp ring terminals (2)
- #18 enameled copper wire



This is what the coils will look like when completed. The instructions below will step through the process of assembling and winding the coils for your PAC-12.

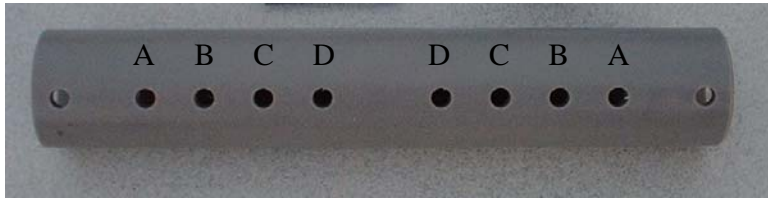
The loading coils are assembled using the 2 larger end caps, the larger light gray PVC coil form, 4 of the 8-32 x 3/8" screws and four #8 lock washers.



Insert the end caps and align the holes

Install these one screw and washer in each end cap on the same side of the coil form. The other side will be used for securing the coil windings.

Full Size Coil Form



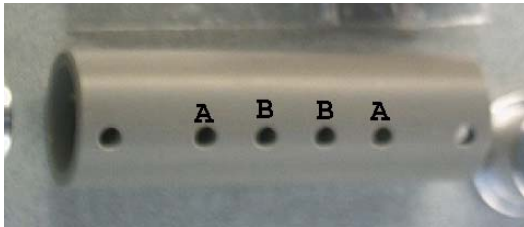
Once the end caps are installed, the coil form is ready for winding the coil. The coil form has a series of holes used to secure the ends of the winding. Depending on which band you plan to construct the coil

for, you will use different sets of the holes. The full size coil form can be built for any band but it is typically constructed for the 40 or 60M bands and the compact coil kits used for higher bands. The charts show which set of holes to use for each band.

Chart for full size coil winding

Band Meters	Turns to wind	Hole set(see photo)
10	1 or jumper	D
12	4	D
15	8	D
17	11	D
20	17	D
30	29	C
40	57	B
60	93	A

Compact Coil Form

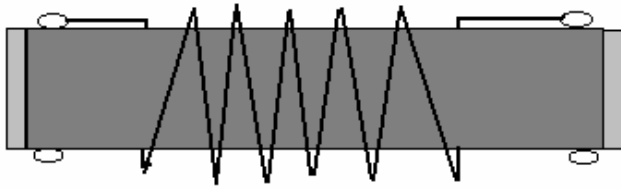


For winding the compact coils, use the same technique and winding chart as for the full size 6" coils. There is sufficient space on the form for winding coils for 30M and higher.

The coil forms have 4 holes used for securing the ends of the coils during and after winding. See the photos and chart below for information:

Chart for compact coil winding

Band Meters	Turns to wind	Hole set (see photo)
10	1 or jumper	B
12	4	B
15	8	B
17	11	B
20	17	A
30	29	A



This drawing shows how the wire is routed when winding the coils. When using the inner sets of holes, the wire can be run through the hole set at the end of the coils and then looped back through the next hole set to provide additional security and protect the wire.

The next photos illustrate the assembly of the compact coil form. The assembly process for the full size coil is the same except that different hole sets may be used



First, tin the end of the enamel wire by heating with a blob of solder. Feed extra solder in as necessary and you will see the enamel begin to peel off and the solder will coat the bare end. Tin approximately 0.25 to 0.5" of the wire to prepare it for connection at the crimp terminal later.

Determine the hole set to be used from the winding chart and pass the end of the enameled wire through one of the holes so that it passes through the coil form from one side to the other.

If the inner set of holes are being used, pull enough extra wire to loop back through hole set A and to reach the screw on the end of the coil form.

Attach a ring terminal by crimping and or soldering to the tinned end of the copper wire. Be sure that the terminal is securely attached to the wire.





Attach the ring terminal on the end of the wire to the end cap of the coil with a screw and lock washer.



Begin winding the coil by turning the form while feeding the wire onto it. Using the thumb and forefinger will work to guide the wire. Wind the specified number of turns on the coil. A turn counts each time the wire loops completely around the coil from the starting point. If in doubt, put on extra turns as it is easier to remove an extra turn than to rewind the coil. When finished, cut off the excess wire leaving about 6". This will allow the end to be passed back through the coil form.

While winding, you may find it necessary to occasionally push the turns together for a tighter coil. On most coils except for 60M, there is extra space and this is not strictly necessary, it just improves the appearance.

Pass the wire back through the coil form and align with the hole in the end cap. Check the required length to reach the end cap plus enough to go around the screw, cut off the excess and tin the end.

If you do not plan to optimize the coil tuning, simply attach the ring terminal by crimping and or soldering



To allow adjusting the coil turns, attach this end as shown in the photo. This is temporary to allow removing turns if necessary to optimize the coil.

Coil Optimization

Optimizing the coil is done by assembling the antenna, and checking with an antenna analyzer or SWR bridge. The coil should be adjusted so that the whip has approximately one half section collapsed at the low frequency end of the band. This can be done after the antenna assembly is complete and ready for testing.



This is how a compact coil looks when completed.

This coil is wound for 30 meters.

A complete set of coils for 40, 30, 20, and 17M



Note in the photos of the entire coil set how the wires pass into the form on one side and along the form on the opposite side to secure the coils. From one side you should have the coil ends disappearing into the coil form and from the other, the wires emerge, lie along the coil form and re-enter at hole set A, pass through and connect at the solder lugs. If using the inner hole sets, you can loop the wire back and forth through the unused hole sets to prevent a long run down the coil form on one side. Secure the terminal and fold the wire down to lie flat along the terminal.

Once complete, check the end-to-end resistance of the coil using an ohmmeter. It should be no more than one or two ohms or less for any of the coils. If a higher resistance value is noted, recheck the tightness of the screws and that the solder joint and loop make good contact.

Telescoping Antenna Assembly



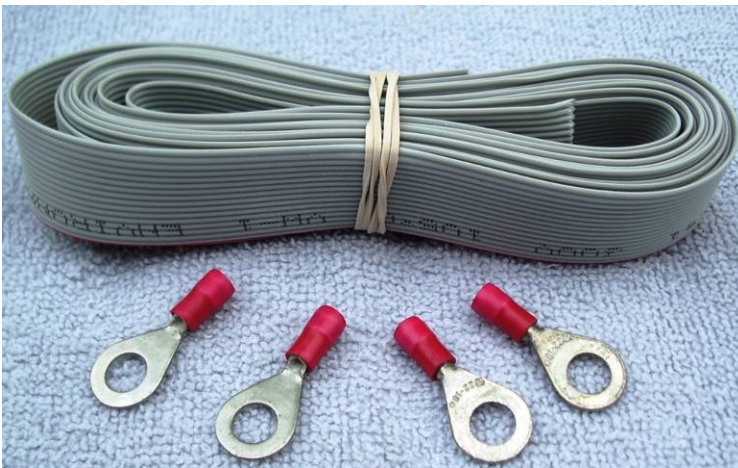
Parts:
72" telescoping whip (1)
Aluminum whip adapter 1)
8-32 x 1/4" Phillips head screw (1)

To assemble the whip, slip it into the whip adapter until it hits bottom. If the fit is tight, it may require rotating the whip slightly while inserting.

Once in place, secure using the 8-32 x 1/4" Phillips head screw. This completes the whip assembly.



Radial Ground coupling system



Parts:
16-conductor ribbon cable
4 -1/4" ring terminals

The ribbon cable supplied is used to produce a set of short radials. These are intended for operation when the antenna is ground mounted as an earth coupling system.

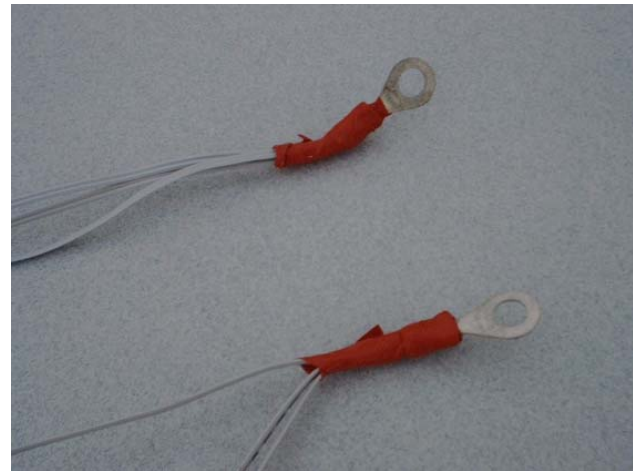
If the antenna is to be mounted above ground, a set of at least 3 or 4-quarter wave radials ideally should be used for each band.



First, separate the 16-conductor ribbon cable into 4-conductor sections giving a total of 4 sections of 4 wires each.. .



Strip the ends of the wires back a half-inch or so, and twist them together.



Crimp the terminal and use electrical tape or heat shrink tubing to strain relief the connection. Separate the sets of 4 wires into two wire sets from the end up to the strain relief on the ring terminal. This will form 2 radial wires connected to each ring terminal. Each radial will have 2 parallel conductors.

Cautions

As with any antenna, do not use near electrical wires either overhead or buried.

Use caution whenever using the ground spike to make sure the area is clear of buried plumbing or electric wires. If in doubt, do not use the ground spike.

Also, use caution with the ground spike as the end is sharp and can cause injury. Do not allow children to play with the antenna.

Assembling the antenna

To assemble the antenna, gather the parts that have been prepared. In addition to the components that you have already assembled, you will need the 2- 12" aluminum rod sections, coupling nuts and the ground spike (if ground mounting the antenna).

If it is available, some aluminum antioxidant grease will make assembly and disassembly of the antenna easier as well as maintain good conductivity between the sections. Small tubes of a suitable material can be found in the electrical sections of most hardware stores where it is sold for use with aluminum house wiring and interconnects.

Screw the ground spike into the grounded side (BNC shell) of the feed point adapter. Screw a 12" rod section into the other end. Place a coupling nut on this rod and add the second section of rod. The loading coil screws onto the end of the second rod. Tighten all connections securely but do not over tighten as the threads may be damaged.

Connect the whip to the other end of the coil by screwing the adapter into the threaded opening in the coil. This completes assembly of the antenna.





For operation, connect the radial wires or counterpoise to the 1/4" bolt in the center of the feed point using the supplied wing nut to secure the ring terminals on the radial wires. Deploy the radials around the base of the antenna as uniformly spaced as possible.

The antenna will also mount on any standard camera tripod using a 1/4-20 thread.

If mounted above ground, it may be necessary to use resonant radial wires for best performance. The radial kit supplied is intended for close ground mounting and is designed for coupling to the ground under these conditions.

When the ground is not present, longer, resonant radial wires will improve performance.

Testing

Assemble the antenna and test for lowest SWR. You may need to collapse up to one full section or more of the whip to achieve a low SWR at the low end of the band. The coil turns specified above will put the SWR minimum at or near the low end of each band. To go higher, you simply collapse the whip. You may need to collapse up to one full section or more of the whip to achieve a low SWR at the low end of the band. If more than one section is collapsed, remove a turn from the coil and retest. Once you are happy with the coil, you can solder the end to a solder lug or just leave it looped under the screw.

Thank you for purchasing the PAC-12 antenna kit, please contact us via email if we can help in any way.

The latest version of this manual will also be posted on our website.

James
KA5DVS

Email:

support@pacificantenna.com

Website:

www.pacificantenna.com