

A \$10 antenna for 2 metres that anyone can build

Jim Tregellas VK5JST

Introduction

Want a gain antenna with a low radiation angle that you can make in 30 minutes with basic hand tools, which will last years and cost peanuts? Read on....

General

There is nothing new in this article, aside from a very streamlined method of manufacture, which on its own makes this antenna a great club project. The J pole to be constructed is a justifiably famous antenna, and works by driving a half wave vertical element with a quarter wave matching section. Viewed from above, it has an omnidirectional radiation pattern, and if viewed from the side, puts out maximum power along an upward sloping line of about 12-16 degrees relative to ground. This low angle radiation pattern often allows the J pole to outperform much more complex and theoretically better antennas. To avoid stray currents on the coaxial feeder, make two or three turns of around 75 mm diameter in the coaxial feeder close to the antenna.

Construction

A massive advantage is that all parts necessary can be acquired in a single visit to Bunnings. See the parts list for details.

Construction starts by bending the single 3 metre length of 10 mm diameter aluminium tube into its final U shape. Find yourself a piece of solid metal rod 10 mm in diameter. This could be the unthreaded shank of a large bolt, the shank of a 10 mm drill or a piece of steel rod.

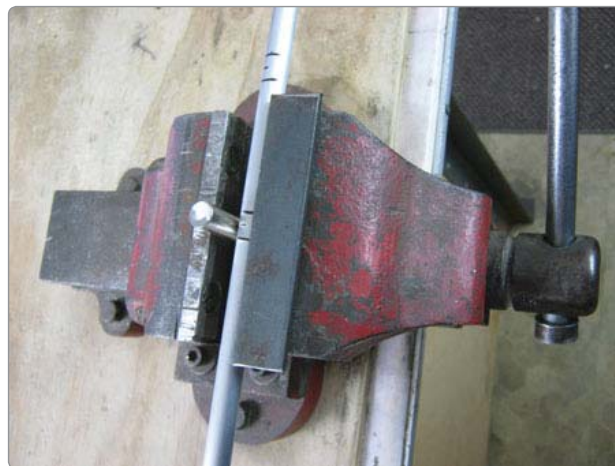
Mark out where the aluminium tube is going to be bent with a felt tip pen. The trick here is to bend both vertical sections of the antenna so they are a bit too long, and then



Photo 1: The completed J-pole antenna.

cut off the excess after bending. So make your two sets of marks at say 520/530 mm and 582 /592 mm from one end of the tube. Place both the aluminium tube and 10 mm rod into

Photo 2: Close up of the technique to bend the tube.



the vice as shown in Photo 2.

Note the “safe jaw” which provides a flat surface against which the tube is squashed. Make sure that the tube and 10 mm rod are at right angles and that the 10 mm rod is centrally placed between each set of marks (which are 10 mm apart). Then tighten the vice to squash the aluminium tube flat. Repeat this at the second set of marks, and then hand bend the tube to its final perfect U shape.

Cut each vertical antenna section to its final length (see the drawing) and remove any burrs with a file. Slip on the two stainless steel hose clamps.

Now mount your antenna on to its wooden base. There are two ways of doing this. If you have access to a bench drill, measure the centre to centre distance between elements (around 60 mm) and drill two 10 mm holes right through the 42 mm width of the wood using this dimension. Retain the antenna by drilling a small pilot hole centrally right through both the wood and the longer vertical element.

Use a plated self-tapping screw to lock everything into position.

If you cannot use this method then from the scrap tube left over, cut off four 21 mm lengths of tube

and flatten each of these totally in the vise. After drilling as per the drawings, use these parts to clamp the antenna onto its wooden mount. Using flattened pieces of the same tube from which the antenna is made has the great advantage that everything is the same metallurgically - meaning that



Photo 3: Close up of the antenna feedpoint and mounting method.

little corrosion will occur, even in hostile environments. Under no circumstances should brass fixings be used anywhere to retain the antenna. Corrosion will virtually occur before your disbelieving eyes. If you can get stainless steel retaining screws, use them for long life. Zinc or cadmium plated steel screws are an acceptable but inferior substitute.

Install the two plastic chair leg ends over the cut ends to complete and waterproof the antenna element.

Finally, take your piece of 50 ohm coaxial cable, and strip it back to expose appropriate lengths of sheath and central conductor, ready for connecting to the stainless steel hose clamps.

Next, immerse at least 75 mm of the cable end into marine varnish or clear polyurethane lacquer so that the varnish can “wick” up into the internals of the cable via the woven sheath. Let the cable sit in the varnish for 5 minutes or so, and then remove it and allow it to drain.

Photo 4: Close up of the antenna feedpoint and an alternate mounting method.

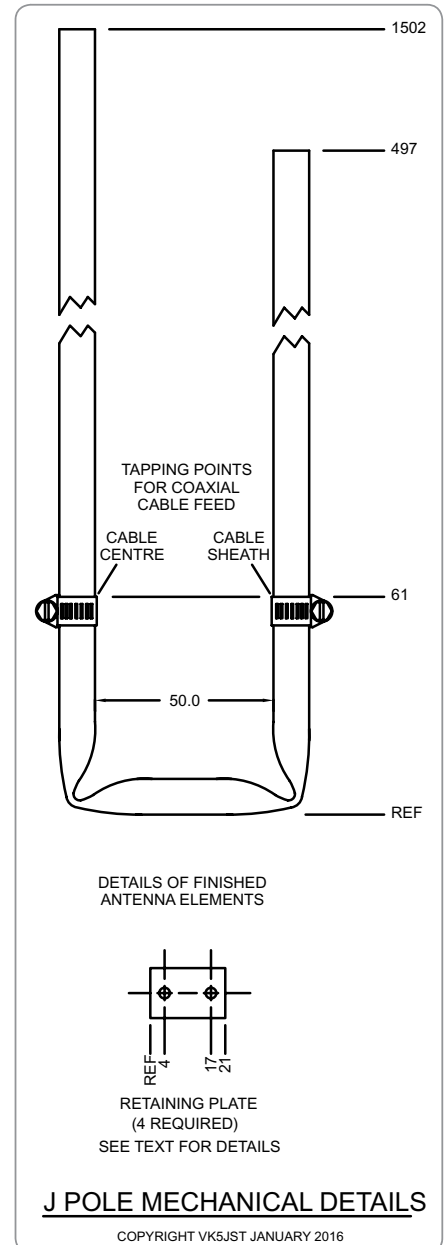


Figure 1: Mechanical details of the antenna.

Wipe down the cable exterior, and while the internals are still wet, finally fit it to the hose clamps and wooden mount. This process waterproofs the cable for many years, avoiding the need for self-amalgamating tape and expensive connectors.

If you want to disconnect your antenna quickly then put your connector on the other end of the cable out of the weather. Note that to assist in waterproofing, the cable is connected to the antenna from the top, so that water drains off the cable rather than into it.

Attach a short length of mast, and then adjust the position of the hose clamps to obtain the lowest SWR on your antenna analyser or SWR meter. Whilst doing this, keep the antenna positioned at least 2 metres away from ground and from anything metallic. With a little care, an SWR of well under 1.2 is easily obtainable. The prototype had an SWR of less than 1.15 from 143 to 150 MHz.

Finally complete your antenna by giving everything several really good coats of marine varnish (or similar waterproof UV resistant finish) and allow to dry.

You will be surprised when you put it on air- these are great antennas.

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Parts list

3 metre length of 10 x 1 mm

aluminium tube Bunnings
Metalmate RCR \$6.69

1 set of 9.5 mm plastic leg tips
Bunnings 25713 \$2.04

2 @ 6-16 mm dia. stainless steel
hose clamps Bunnings Toledo
3100207 \$2.16 total

1 metre length of pine or hardwood
– dressed size 42 X 19 mm

8@ 25 mm long 3 mm diameter
stainless steel screws (if required).



WIA Contest Champion 2015

Peter Richardson VK2PR

With the 2015 Oceania DX Contest results now officially released, the 2015 WIA Contest Champion has been determined.

Congratulations to Peter Richardson VK2PR for taking this year's trophy with a score of 316 points, only 16 points ahead of equal second place getters Iain Crawford VK5ZD, Timothy Dixon VK5ZT and LL Mew VK5LJ.

The top 10 places were occupied by 10 operators with scores ranging from 316 to 200 points.

Interestingly, only two of the top 10 operators participated

1st:	Peter Richardson VK2PR	316 points
Equal 2nd:	Iain Crawford VK5ZD, Timothy Dixon VK5ZT, LL Mew VK5LJ	300 points
5th:	Douglas Hunter VK4ADC	280 points
Equal 6th:	WI Jirgens VK1WJ, Andrew Davis VK1DA, GA Hill VK2IO	260 points
9th:	Allan Mason VK2GR	240 points
10th:	Hilary Bridel VK2IUW	200 points

in the Ross Hull Memorial VHF/UHF Contest and only three of 10 participated in the Oceania DX Contest while another 9 of 10 participated in the John Moyle Memorial Field Day, 9 of 10 participated in the Remembrance

Day Contest and 7 of 10 entered at least one VHF/UHF Field Day.

The complete Contest Champion List can be found at the following webpage.

<http://www.wia.org.au/members/contests/contestchampion/>



Hamads

FOR SALE – VIC

ICOM HF Transceiver model IC-707. In box with mic. Mint condition. \$400. wilmax@vic.chariot.net.au Max VK3GMM.

Yaesu FT-480R, 2 m all mode transceiver E.C. with manual, \$300. Mirage 2 m amplifier B-108 E.C. with remote control, \$200.

Phone Brewster Wallace VK3YBW on 03 9527 2661 after 6 pm, if no answer please leave a message.

WANTED – VIC

Relay for 2 m linear amplifier model ELH 230. Battery type 3A5 twin triode.

Icom IC-730 HF transceiver handbook or copy of same and any other information regarding circuit and Service Manual.

Any information on ICE Inoue Communications Equipment Corp. 6 m transceiver model FDAM 3 circa 1968.

Word Processor Citizen model CBM 10 WP, working or not but the LCD screen must be complete and undamaged.

Any one that can repair old model Yaesu and Icom gear.

Phone Brewster Wallace VK3YBW on 03 9527 2661 between 6 and 10 pm, if no answer please leave a message.

WANTED – NSW

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