

4x Power Splitter for 2M or 70cm

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To : TECH@WW

By G8MNY

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Unlike Phasing Harness made from coax, a power splitter is a solid engineered device. It has to make a quarter wave of solid coax of a defined impedance.

PRINCIPLES

For matching from 4x 50Ω (Z1) aerials to 1x 50Ω (Z2) feeder you need a ¼ wave length of matching line of this Z...

$$\frac{1}{4} \text{ Wave Matching } Z = \sqrt{Z1 * Z2} = \sqrt{(50/4) * 50} = \sqrt{625} = 25\Omega$$



This impedance can be made from a 52cm long 15mm diameter copper pipe inside a 22mm hole made from a 25mm outside diameter aluminium square tube 55cm long. For 70cms the line length should be divided by 3 & the aluminium tube shortened to fit.

HARDWARE

- 55cm of 25mm Square Aluminium tube 22mm inside hole.
- 52cm + of 15mm Copper Pipe.
- 2x 22x22x6mm Aluminium Blanks (off old heatsink?)
- 5x Chassis N sockets (or SO239s)
- 9 Screws eg Steel 4BA CS.
- 16 pop rivets
- 40cm of Scrap UR67 (For tuning)

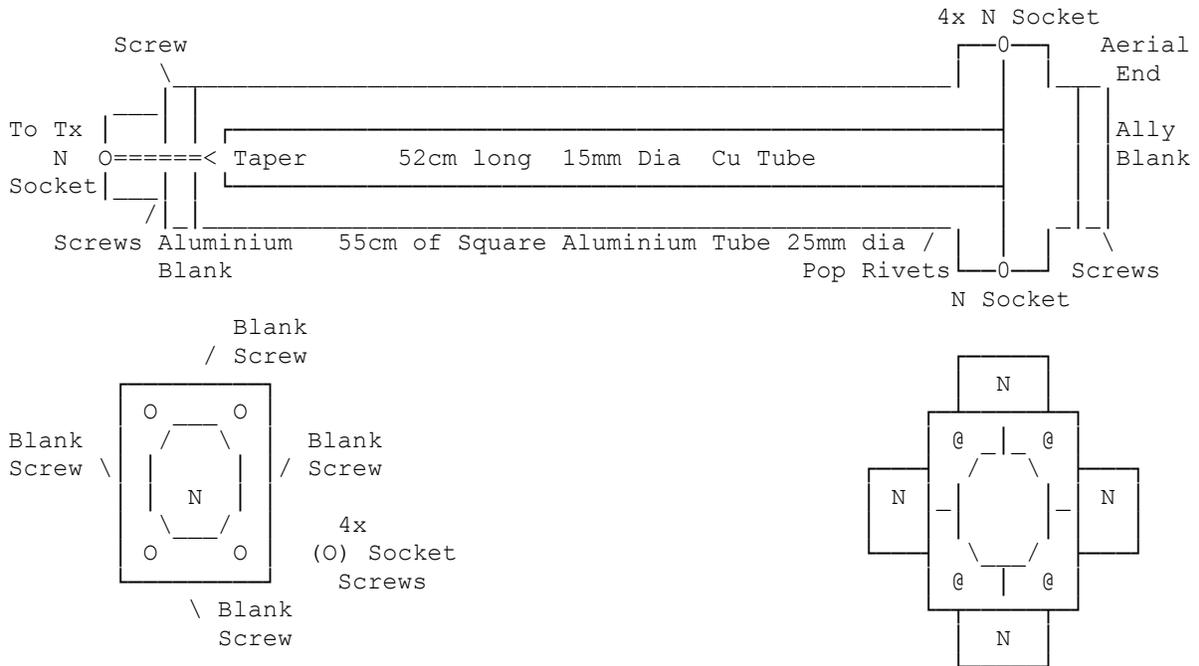
TOOLS

- Metal Saws
- Metal Files
- Taps for screws
- Pop Rivet Gun (with tube collar!)
- Drill & bits for Screw tap & clearance
- SWR Bridge & 4 good Dummy loads
- 2M Tx

CONSTRUCTION

- 1/ Two Aluminium blanks need to be made to closely fit inside the ends of the tubing, 6mm thick plug can be drilled & tapped to make screw fixing easier.
- 2/ The Tx end one is drilled out to take the N socket (or 239) & 4 screws holes tapped. Do not fit the socket to the blank yet.
- 3/ Now fit both plugs & drill 4 under sized holes one per side in the Tx blank to take the tube fixing screws. Repeat with 1 hole for the aerial end blank. Mark the blank positions, then remove & tap blanks for the screws. Drill out the clearance holes the tube (Counter sunk?).
- 4/ Fit the Tx N socket to the blank with screws.
- 5/ Drill holes for the 4 N sockets in the tube. Pop rivet them in place using an extension tube to clear the N sockets.
- 6/ To make the copper line taper neatly to the Tx N connector, cut 4 V shaped radial slots 1cm long in one end of the copper pipe. Taper this down to fit on to the Tx N socket.
- 7/ Solder the copper tube to the Tx N socket.

- 8/ Fit the Tx N socket plug & estimate how much to cut the pipe to just mate to the 4 N sockets. Filing 4 U notches in the pipe will help keep the pipe properly seated onto the 4 sockets.
- 9/ Once the fit looks good, screw in place the Tx N socket blank to the tube. Then solder up the 4 N sockets.
- 10/ Fit end blank after all testing done, & apply varnish to all cracks & screws.



TUNING UP

Although it is not possible to tune by altering the length of the line, but it is possible to add dielectric into the air spaces (@). So using 4 good dummy loads you can measure the SWR & see if adding slivers of UR68 poly insulation improves the SWR to perfection.

IN USE

This power splitter has been used to split 400W into 4x 17element 2M Tonna aerials (22ft long) to mounted 11ft apart in a box @ 44ft centre to give a 40KW ERP array. Although very time hungry to set up /P, in use this gave a very sharp beam bringing weak stations to 59+ & attenuating strong stations off the side of the array.

See my bulletin on Stacking, Baying or Boxing Ant.

Why Don't U send an interesting bulletin?

73 De John, G8MNY @ GB7CIP