

JM-137-DCA-KIT **For NOAA POES APT**

◀ 137 MHz Double Cross Antenna ▶



The Cross Concept by
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Table of Contents

1.Introduction.....	3
2.COAX Harness.....	4
3.Assembly Instructions.....	5
3.1.Fastening the frame.....	5
3.2.Fastening dipoles.....	6
3.3.Dipole alignment.....	7
4.Partlist.....	8

1. Introduction

The Cross Concept was conceived by Jerry Martes, KD6JDJ, in 2004 while driving on the Los Angeles freeway.

The DCA is two pairs of dipoles, each pair crossed to produce circular polarization along their support axis. When one pair is fed 90 degrees later than the other, the DCA has an elliptically polarized pattern over the entire hemisphere above it.

For 137 MHz reception of APT signals from Polar Orbiting Earth Satellites (POES) the opposite dipoles (North-South) are spaced about $\frac{1}{2}$ meter, and both tilted about 30 degrees from vertical. The dipole lengths are 1 meter.

This kit is built using low cost PVC pipes, RG58 COAX, 3.2 mm TIG aluminum welding rods, ferrite beads, plexiglass and M4 screws. It's weight is less than 1 kg.

No soldering is needed when assembling. To assemble the kit you will need a 6 mm screwdriver, screwdriver with a cross bit and screwdriver with a straight bit. The image below show all part.

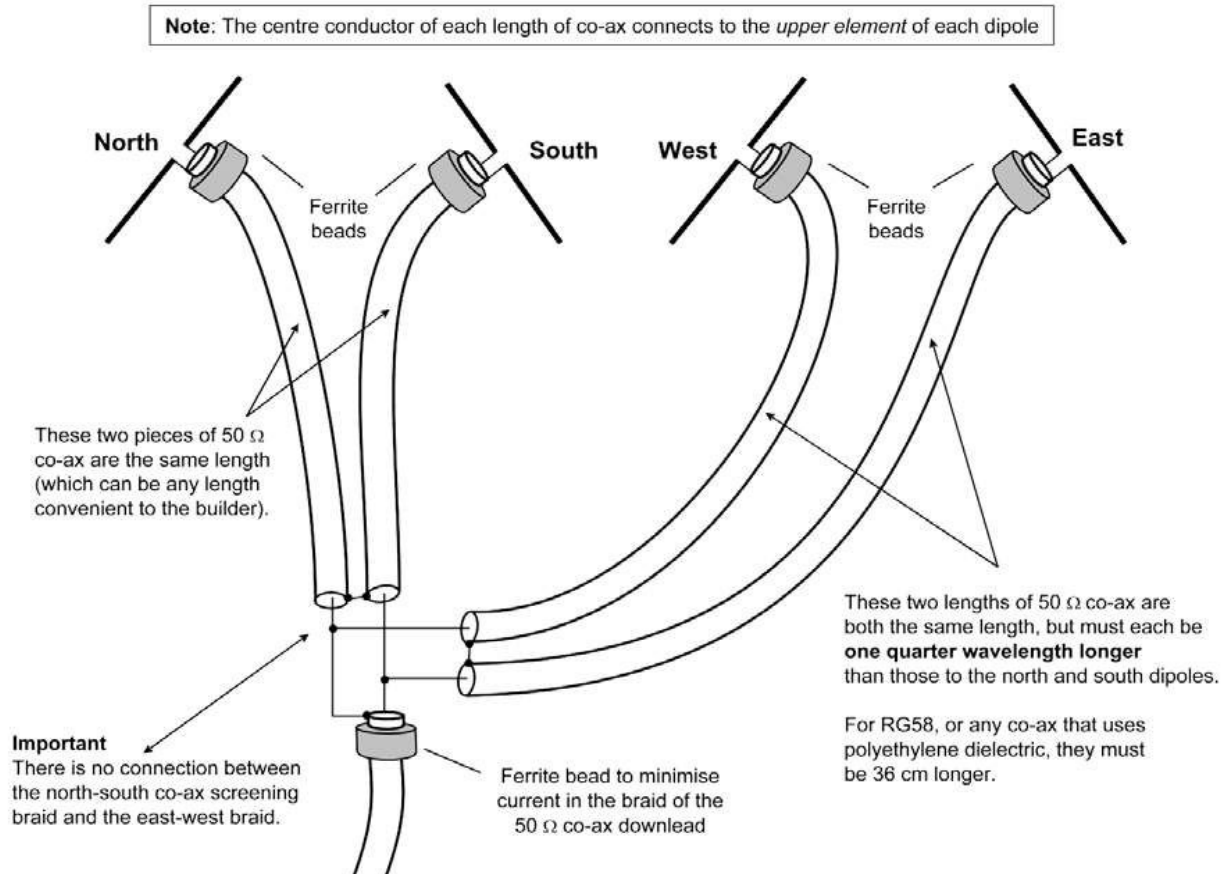


2. COAX Harness

The RG58 COAX harness length and connection shown in image below. The North/South COAX are 360 mm and the East/West are 720 mm long. The East/West are $\frac{1}{4}$ wave length longer.

Ferrite beads are either FB43-2401 or RI-14.2-15-6.4.

The connector to the shack is a female BNC twist-on.



Once the DCA is assembled, there is no need to twist the antenna so NESW are considered.

3. Assembly Instructions

To assemble the kit is trivial. To fasten the frame two M4 screws is used, dipoles are fastened using screw terminals and the mast pipe is fastened using M4 screws.

It can be assembled using a Swiss Army Knife and wont take longer than an hour.

3.1. Fastening the frame

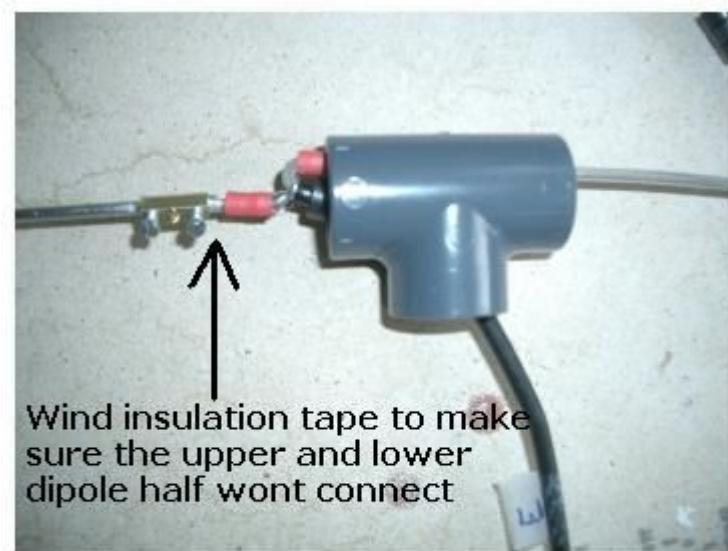
First fasten the arms using the longer screws, 30 mm M4, using a 6 mm screwdriver.



3.2. **Fastening dipoles**

It is important to connect the dipoles correctly. Four dipole halves are marked C and will connect to the center lead of the COAX and are the upper elements.

It is important that the dipole halves do not connect. Wind insulation tape on one connection to be sure.



After the dipoles are connected, fasten the 50 mm mast pipe to the plexiglass using the 20 mm M4 screws.

3.3. Dipole alignment

As seen from the side, tilt every dipole to the left 30 degrees from the vertical.



4. Partlist

<i>Part</i>	<i>Dimension [mm]</i>	<i>Quantity</i>
Plexiglass Acrylic	150 x 150 x 3	1
Frame PVC Tube	20 x 480	2
Dipole PVC Tube	20 x 200	8
End Cap	19 (white or black)	8
PVC T	20 (white or gray)	4
Aluminum ½ Dipole	500 x 3.2 TIG Welding Rod	8
RG58U Harness	360 N/S + 720 E/W + 300	1
Mast Pipe	350 x 50	1
Angle	50 x 50 x 2	2
Screw	30 x 4 (M4)	2
Screw	20 x 4 (M4)	2
Spacer	M4	8
Nut	M4 (lock)	4
Connector	BNC Female twist-on	1
Screw Terminal	D4	8
Ferrite Bead	FB43-2401 or RI-14.2-15-6.4	13 or 5
USB or DVD	Documents and software	1