## High Gain VHF/UHF Collinear J Pole with Phasing SHORT Spaced Coils 146 MHZ By WB3AYW and KK1CW

A collinear (or co-linear) antenna array is an array of dipole antennas mounted in such a manner that the corresponding elements of each antenna are parallel and collinear, that is they are located along a common line or axis.

A collinear array is usually mounted vertically, in order to increase overall gain and directivity in the horizontal direction. Theoretically, when stacking idealised lossless dipole antennas in such a fashion, doubling their number will, with proper phasing, produce double the gain, with an increase of 3.01 dB. In practice, the gain realised will be below this due to losses. (From Wikipedia)

This antenna project will allow you to design a collinear antenna for either the 2 meter or the 70cm (440) ham band that will give you lots of gain using the calculator in the download.

## **Quick Specs and description**

Antenna pattern is OMNI Directional Very high gain and low to horizon radiation angle

## Lengths and dBd gain

2 meters length and dBd gain	440 band length
3 element = 12 feet long 7.2 DBD's gain	5 ft.
5 element = 19 feet long 9.7 DBD's gain	8 ft.
10 element = 36 feet long 13.0 DBD's gain	14 ft.
15 element = 55 feet long = 14.45 DBD's ga	in 17 ft

More than 15 elements not recommended as the radiation pattern gets too tight for normal use.

Gain on a 15 element is 14.45 dBd

Could be built as a dual band but I, myself do not recommend it as a dual band design.

This antenna design does NOT use radials, it uses the J POLE bottom feed system, so it will match any feed line. Antenna gets very long (tall) when more than 5 elements on 2 meters but much shorter on the 440 band!

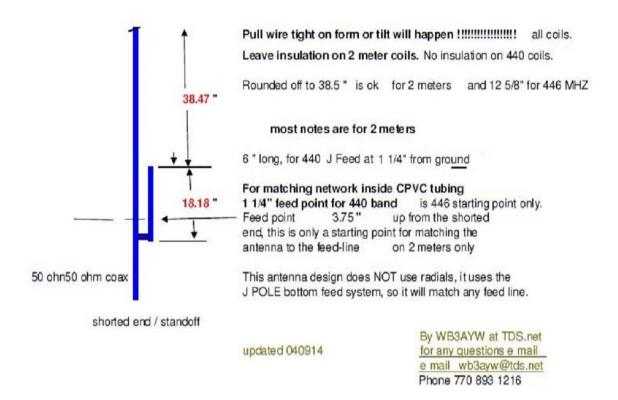
Below "graphics" were taken from the original xls file document. The xls document contains a working calculator to design for your particular frequency on the 2 meter or 440 ham band and are not working on this web page. The xls document contains 3 pages.

You must download the xls document and open it in a program that will read an xls document such as Open Office Org or similar program. Then the calculator will work!

See bottom of this article for downloading instructions. Drawings are much more clear in the xls document download than on this web page.

## High Gain VHF/UHF Collinear J Pole with Phasing SHORT Spaced Coils 146 MHZ Could be built as a dual band but I, myself do not recommend it as a dual band design. By WB3AYW and KK1CW add top loop 1/2 " in diamater Antenna pattern is OMNI Directional This is not a BEAM! NO ROTOR NEEDED 440 top elemen 12 3/8" for 446 top element only! 1/2 wave ele. 37.58 " With end effect and loop to hang the antenna Loop diamater 1/2" rounded off to 37.5 is ok for 2 meters only Add 1/4" for up tilt on the 1 1/2" length spacing of coils in design. Subtract 1/4" for down tilt on 2 meters only. For on a mountain top repeater instalation! 1/8 inch changes the 440 design for up or down tilt. 1.50 " 3 turns on coil .625" .625 OD coil form wound between the 2 end wires wire of 8 3/4" long wound over 1 1/2" spacing for 2 meters or 5 turns? leave 6 3/4" of insulation on wire for 2 meters only. On 440 band only 2 turns between the two end wires. or a total of 4 turns! http://lrcov.crc.ca/main/index.php two meters 440 band 3 element = 12 feet long 5 element = 19 feet long 7.2 DBD's gain 5 ft. 9.7 DBD's gain 8 ft. 10 element = 36 feet long 13.0 DBD's gain 14 ft. 15 element = 55 feet long 14.45 DBD's of gain 17 ft 38.47 " 2 meters. 12 5/8" for 446 radiator. 1/2 wave ele. 1 1/8" length spacing for 440 band is critical for no tilt. Hot / Cold CPVC tubing from building supply for the 1.50 " Coil forms is 5/8 inches outside diameter. most notes are for 146 More than 15 elements not recommended as the radiation pattern gets to tight for normal use. Gain on a 15 element is 14.45 DBD;s Time to go to a yagi design! per W7EL's 5.0 by WB3AYW my opinion ! 1/2 wave ele. 38.47 12 5/8" radiator length for 446 center of band. The 1 1/2" is critical foron two meters The 1.125 is critical for the 440 band Less turns on 440 band 1.50 " Wider spacing, the less capacitance thus higher frequency of the coil. 1 " gives UP TILT on 440 band no insulstion on #14 solid wire for 440 coils. 1 1/4" gives Down Tint on 440 band Enter Frequency in box below and hit ENTER 1/2 wave ele. 38.47 " Convert to metric 1/2 wavelength in air 41.11 inches 1/2 wavelength of element 38.47 inches Below only good for 2 meters only! e for coil wire -- 8.75 " lea #14 solid wire for coil wire -leave 63/4" of insulation on wire for 2 meters only Wound on cpvc tubing = no tilt or at the horizon for 2 meters Five -- turns of solid wire #14 solid electrical wire for coils ( 1 1/8" spacing ) 1.50 " With out insulation on coil wire! for 446 only! CPVC tubing from Home Depot 5/8 " O. D. hot / cold water tubing/pipe

Drawing below continued from above



Note that the antenna is one continious length from top to bottom and not as shown above in the drawings.

After you download the program below, set the program files to 146 and the measurements should work as a dual band antenna using the 2 meter design.

In the 440 design the gain will be higher and pattern will be like the 2 meter design.