

Bud Sinor KA30GG

A CHEAP 6 ELEMENT YAGI FOR 2 METERS

WHY A YAGI

- ❖ Forward Gain better than most base station vertical co-linear antennas.
- ❖ Ability to cancel interference on the back side.
- ❖ Horizontal (SSB/DIGITAL) or Vertical (FM/Repeaters) polarization based on mounting
- ❖ Easy to build (and can be cheap).

PERFORMANCE OF THIS DESIGN

- ❖ Gain generally better than 12 dB – depends on number and placement of director elements
- ❖ Front to back ration about 22 dB (back of antenna is 10 dB lower than $\frac{1}{4}$ antenna.
- ❖ Beam width about 25 ° to -3 dB points.
- ❖ Quick and dirty match -> 1.5 to 1.7 SWR over 144 to 150 MHz
- ❖ Delta Match 1.0 to 1.5 over 145 to 147MHz

DRAWBACKS

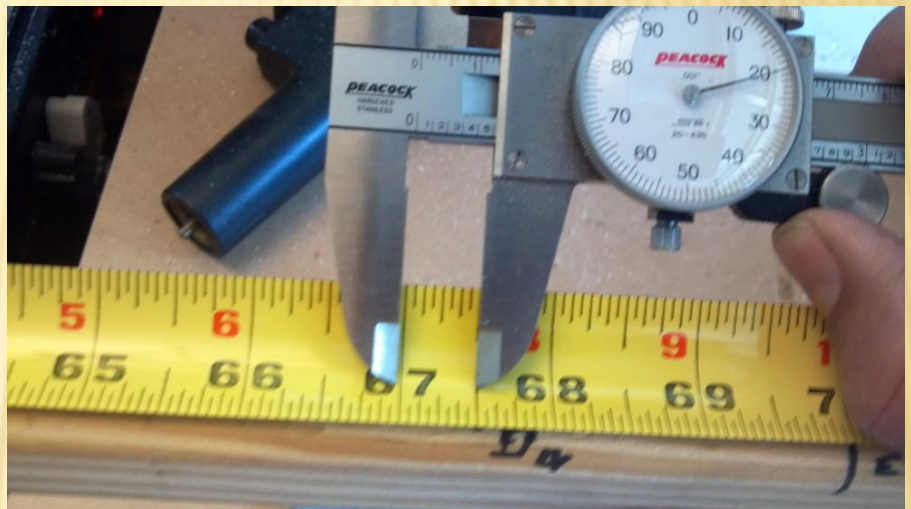
- ❖ Bigger (length) – about 5 feet
- ❖ Beam width means you need some kind of rotator (tv antenna rotator is fine) or you can only set up for a couple of stations.
- ❖ Must paint the wood if it is outside...will change SWR if it gets wet and warps.

MATERIALS AND TOOLS

- ❖ 2 – ten foot pieces of ½” copper pipe
- ❖ 1 – 8 foot piece of clear 2x2 lumber
- ❖ 3 foot piece of copper wire (10 – 12 gauge)
- ❖ ½” wood dowel x 3 feet (if using split radiating element.
- ❖ Drill motor and 5/8 inch bit (Fosner perf.)
- ❖ Gorilla Glue
- ❖ Solder and heavy soldering gun (200+ watts)
- ❖ Coax
- ❖ PL259, S0239, and wire ties, pipe cutter
- ❖ Tape measure (and a caliper if available)

BUILD THE BOOM

- ❖ Mark a point 2 inches in from one end of the boom. - Reflector
- ❖ Measure and mark the other 5 Positions from the chart.
- ❖ Drill a 5/8" hole at each mark.



CUT AND MARK THE ELEMENTS

- ❖ Measure and mark pipe for elements making sure all fit into the two pipe lengths.
- ❖ Mark the center and then $\pm 3/4$ " for extents of the 2x2 when you glue the elements.



RADIATING ELEMENT (S)

- ❖ Decide on whether you are going to use a delta match and BALUN or go for the quick and dirty approach.
- ❖ A split element radiator (2 quarter wavelength radiators) should have an impedance of about 12-20 Ω
- ❖ A solid element ($1/2 \lambda$) should be around 10 Ω
- ❖ To my surprise MY YAGI had a 40 Ω impedance for the split radiators....so I went to a direct 50 coax solder joint

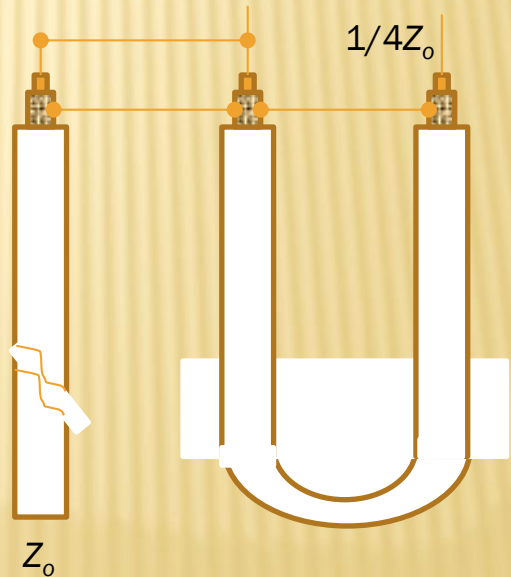
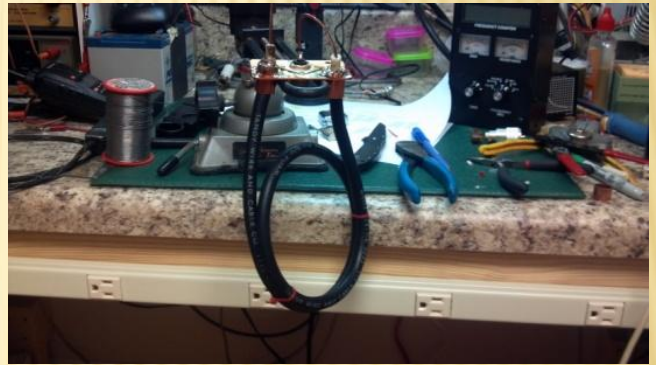
QUICK AND DIRTY



- ❖ Split the radiator to the required lengths or longer if you can tune it.
- ❖ Insert a $\frac{1}{2}$ dowel into the radiator position and glue and allow it to dry.
- ❖ Solder a short wire to the center of each radiating element or directly solder on the coax.
- ❖ This picture shows a BALUN in line with the coax....about the same match without it.

4:1 COAX BALUN

- ❖ Measure (and tune) a $\frac{1}{2}$ wavelength piece of coax
- ❖ Use same type coax as feedline
- ❖ Solder shields and center conductors as shown
- ❖ You can use a connector and piece copper plate for a neat unit or not.
- ❖ $In = 50 \Omega$ $Out = 12.5 \Omega$



4:1 Coaxial BALUN

FINISHING UP

- ❖ Tune the radiating element for best SWR
- ❖ If using a delta match adjust distance between the tap points and distance from BALUN and taps until you get a 1.0 SWR at 146 MHz.
- ❖ You will need an Antenna Analyzer or SWR meter and a lot of patience...takes an hour or so to cut and try.
- ❖ You could also try a hair pin match section with the split element.... Faster cut and try.

SUGGESTIONS

- ❖ Try the quick and dirty first and see how it works.
- ❖ You can add a BALUN and delta match or hair pin match after the fact for the cost of a 4 foot section of $\frac{1}{2}$ " pipe.
- ❖ You might get two pieces of repair pipe to use in tuning elements



FINALLY

- ❖ **HAVE FUN**
- ❖ Took me ½ day Saturday to pick up materials and build the YAGI,
- ❖ And another ½ day to install it in the attic on a rotator.
- ❖ Total cost is under \$30.00.