3 ELEMENT TAPE MEASURE YAGI ASSEMBLY INSTRUCTIONS

Caution:

- Tape measure is sharp; don't cut yourself.
- Tape measure is long; don't poke your eye out (or the eyes of those around you).
- Tape measure sanding is messy; don't sand on any surface you are not willing to stain or destroy.
- Unlike the 2022 UHF Yagi build, the 2023 VHF Yagi boom will be assembled last instead of first to hopefully avoid hitting anyone around you.

Tape Measure Preparation

1. Carefully (avoid cutting yourself) wrap the ends of the tape measure with electrical tape to cover sharp edges. Only wrap one end of each driven element; the other end of each driven element will be sanded in the next step. • Tip: Now is a good time to determine and plan if you want all your tape measure markings facing the same direction. This is just aesthetics; of course, it does not affect performance. 😊	

Driven Element Assembly

2. Using sandpaper, remove ~1/2" of the paint down to bare metal from the non-taped, convex (side without numbers) end of each driven element. Paint does not need to be removed from the concave side (the side with numbers).	
3. Using the tape measure hole alignment tool (not included with every kit; hole alignment tool will need to be shared during Elmer night) mark with a Sharpie then pierce a hole into the sanded end of the driven element using hammer, nail, and wood block. The hole alignment tool helps ensure pierce is 0.21" from end, which is ½ the width of the head of the truss screw that will be used in step 10.	
4. Using scissors, snip the corners off the sanded end of the driven element to prevent installation obstruction when the driven element is attached to the 4-way cross in step 10. Lay driven element on 4-way cross and align holes to get a sense of how much material to remove so that tape measure lays flat.	
5. Remove the pre-cut jacket from the RG-58 coax cable. Unwind the braid shielding (take your time) from the center insulator/conductor then refashion the braid shield strands together by twisting them into a single strand. 6. Remove all exposed foil around the coax center insulator then strip off ~1/4" of the insulation material surrounding the end of the coax center conductor. Take care not to cut the center conductor.	

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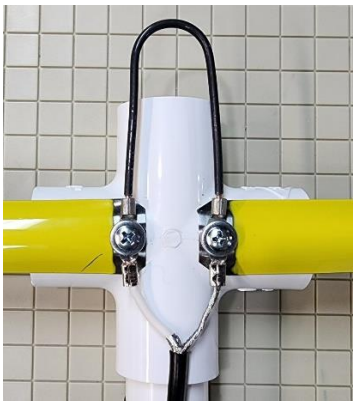
7. Strip ~1/4" of the insulation from each end of the solid copper wire (i.e. the hairpin match).
8. Crimp (1) ring terminal onto the coax center conductor, (1) ring terminal on the coax braid and (1) ring terminal on each end of the solid copper wire (the hairpin match).
    - TIP: DO NOT insert wires past the end of the ring terminal barrel. Doing so may 1) interfere with the truss head screw during later assembly and 2) change the capacitive effect of the hairpin thus changing the frequency characteristics (albeit very slightly; practically negligible) of the antenna.
9. Bend the solid copper wire (the hairpin match) in half, creating a U shape about 1" wide.
10. Affix the ring terminals for the coax and hairpin match to the driven elements using a truss head piercing screw and star washer. Layering from bottom-to-top: 1) pre-drilled 4-way cross, 2) driven element (sanded side facing up), 3) star washer, 4) hairpin ring terminal, 5) coax ring terminal, 6) truss head screw.



11. Attach (1) of the (2) 6-11/16” sections of ¾” PVC pipe into the cross where the coax is now connected.
12. Wind the coax six times around the center section of PVC pipe to create a choke.
    - Tip: An initial wrap of electrical tape before starting the wind will help hold the coax in place. After completing six wraps of coax a final wrap of electrical tape will continue to help hold the coax in place. Lastly taping around all the wraps of coax will help keep the coax wrap tight and in place.
    - ATTENTION: After completing six wraps of coax the remaining coax tail should be routed underneath the PVC pipe. During final assembly we DO NOT want the coax running on top of the reflector element.
    - Tip: Fold the driven elements back through the cross to reduce the overall size and chance of poking an eye out while working on the wrap.

Director Element Assembly

13. Attached (1) of the (2) wooden dowels to the 3-way tee using 2 full wraps of electrical tape on each end of the tee. The wooden dowel will provide additional support to keep the director element strait and level when attaching the director using nylon wire ties in the next step.

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14. Attach the shorter 35-1/8” director element to the 3-way tee with a nylon wire tie on each side of the tee. Pull tight and cut flush.
15. Center the director from side to side.
    - Tip: Center is 17-9/16” from the ends. Draw a line at 17-9/16” on the director to help visually center the director.
16. Attach the 11-3/16” section of ¾” PVC pipe into the 3-way tee.

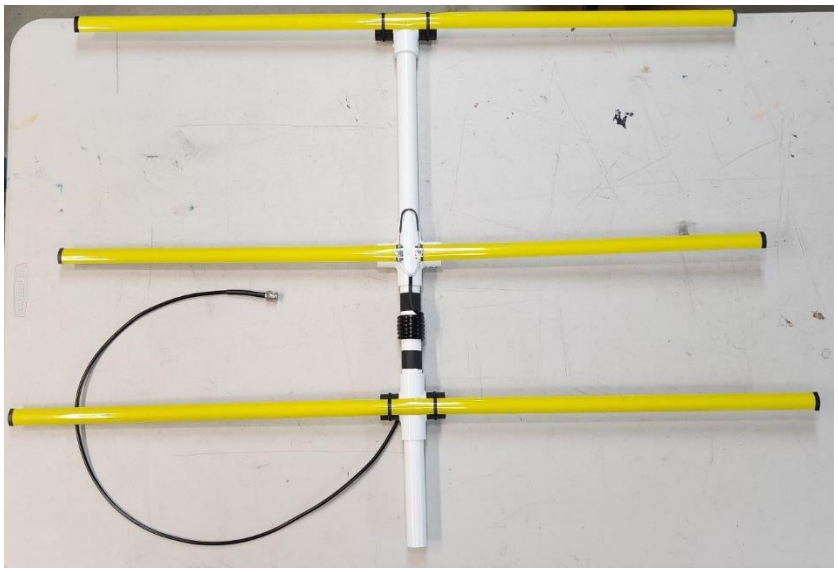
Reflector Element Assembly

17. Attached the wooden dowel to the 4-way cross using 2 full wraps of electrical tape on each end of the cross.
    - Tip: two of the 4-way cross inlets are very tight, and two of the 4-way cross inlets are less tight. For easy assembly and disassembly make sure you identify and reserve the less tight inlets for use with the PVC pipe.

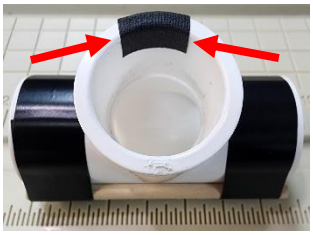
18. Attach the longer 41-3/8” reflector element to the 4-way cross with a nylon wire tie on each side of the cross. Pull tight and cut flush.
19. Center the reflector from side to side.
    - Tip: Center is 20-11/16” from the ends. Draw a line at 20-11/16” on the reflector to help visually center the reflector.
20. Attach the remaining 6-11/16” section of ¾” PVC pipe into the bottom of the cross; this will be the handle.

Final Assembly

21. Assemble the Yagi sections together according to the picture below. Make sure to line up the fittings and elements so they lay flat and are in alignment with each other.



Tip: Is your boom loose or wobbly because the PVC joints did not make a tight connection? Don’t want to use glue? Add a piece of tape from the outside to the inside of the fitting inlet to increase the friction.



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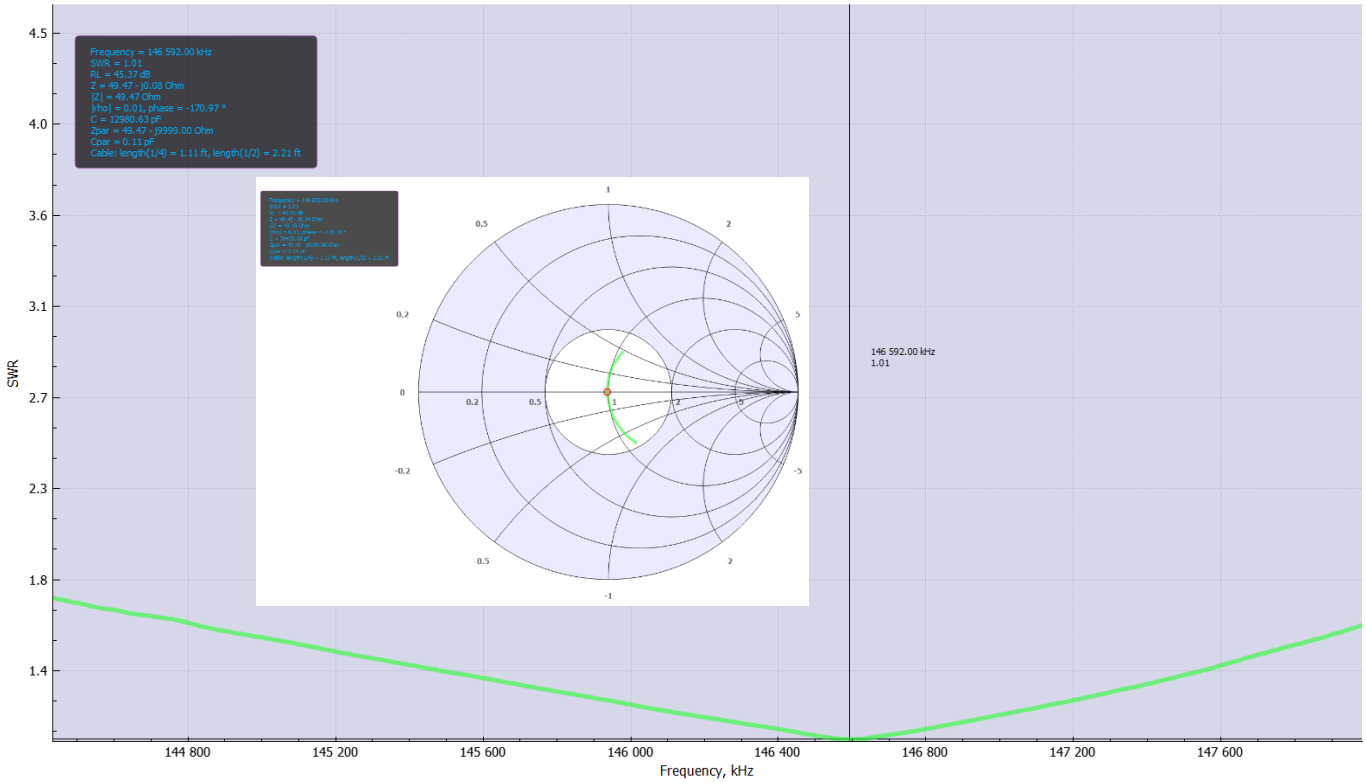
Prototype Yagi results captured on a RigExpert Stick 500 outdoors in an open area with no nearby obstructions:



Lowest SWR	Freq @ Lowest SWR (Mhz)	RL (dB) @ Lowest SWR	SWR @ 146.52 National Simplex Calling Frequency	SWR @ 146.58 Unofficial SOTA/POTA Calling Frequency	SWR @ 147.165 PRA Squaw Repeater Input	SWR @ 147.765 PRA Squaw Repeater Output
1.01	146.592	45.37	1.02	1.01	1.19	1.36

Fine tuning:

- Shortening the hairpin raises the center frequency.
- Shortening the driven element raises the center frequency.

Planned Parker Radio Association (PRA) VHF Foxhunt Freq:

- 146.565 simplex with no tone
- a third harmonic of 439.695 can be used for attenuation.

Credits:

- Jeffrey Bail, NT1K. Jeff's 3 element tape measure Yagi plans were the inspiration for this design.
    - https://nt1k.com/wp-content/uploads/2012/11/3L-Tape-Measure-Yagi-Assy.pdf