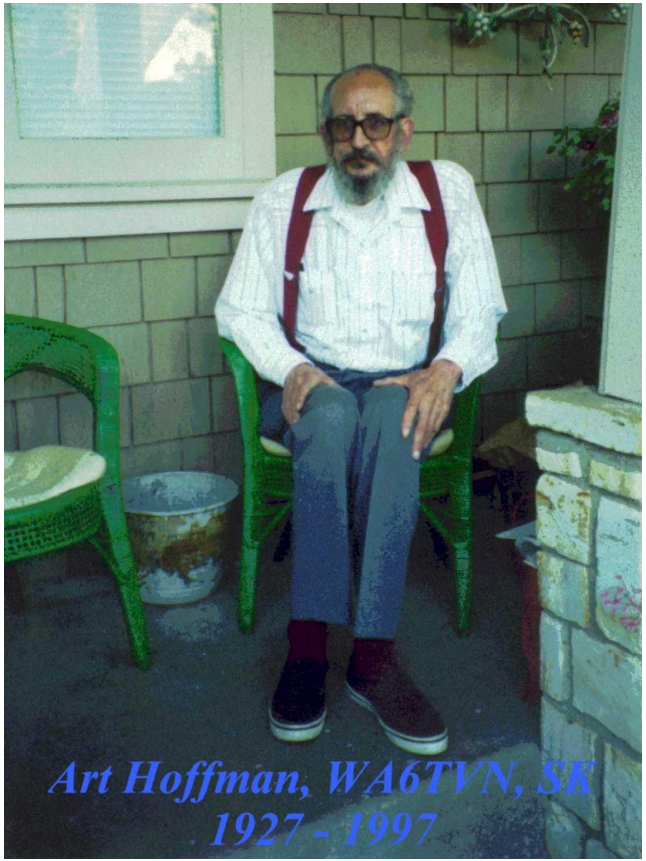
Constructing a WA6TVN Double-Skirted Ground Plane Antenna

Jey Yelland, KQ6DK
March 17, 2026

Art Hoffman, WA6TVN

In the mid-90's I met Art on a weekly Sunday evening net he called the Antenna Forum. I was a rotating host/moderator for this ham radio net.

Art was an antenna whiz. Anyone could ask anything about antennas and Art would answer directly or research and follow up as needed.

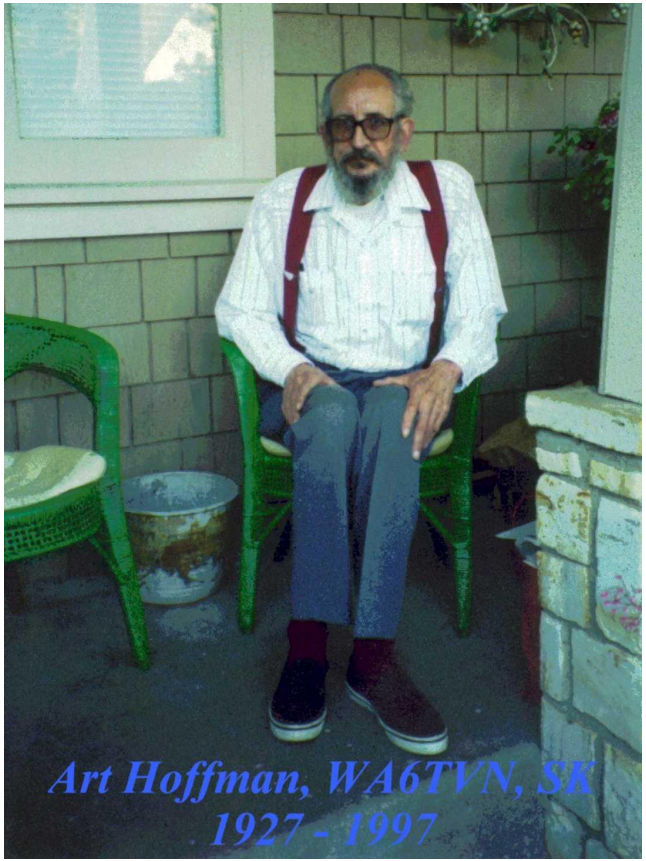


Art Hoffman, WA6TVN

Art encouraged me to become proficient using EZNEC antenna modeling software by W7EL. It's a free download for Windows (eznec.com)

I visited Art at his home in Carmel, CA. He showed me how to construct the WA6TVN Double Skirted Ground Plane antenna he designed. Tonight I'll show it to you.

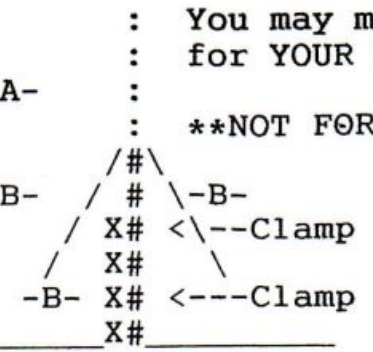
The following slides are snippets of the PDF that Art would email to interested builders.



DOUBLE-SKIRTED GROUND PLANE ANTENNA
Revised Aug 10,1992 (Design by WA6TVN)
This Design is Patent Pending !

Freq	-A-	-B-
146	19"	20"
223	12 3/4"	13 1/4"
445	6 3/8"	6 5/8"

-A- Radiator final length.
-B- ALL other final lengths.



X =Insulated Support

Materials List:
1 - SO-239
2 - SS Hose Clamps, 3/4 - 1 1/4" dia.
2 _ SS Hose Clamps to hold Copper Pipe to Insulated Support.
1 - Copper Pipe 3/4 (Length = Dimension B)
8 - Radials - 3/32" Brazing Rod (Dim B + 3")
1 - Radiator - 3/32 Brazing Rod (Dim B + 1")
1 - 52 Ohm Feed Line with PL-259 at antenna end
1 - Support fixture: non-metallic for 1/4 wavelength below pipe (Dim B)

You may make this for for YOUR OWN USE ONLY!

NOT FOR PROFIT

NOT for BBS Use ! Personal construction ***ONLY****

Art Hoffman PO Box 413
Carmel Ca. 93921
408-624-4374

50 Ohm Coax to Radio

Construction (146 MHz model) - (Works well on BOTH 2 and 440 !)

* Cut copper water pipe to 20". With hacksaw, slit top of pipe down 1 1/2 inch - producing 6 "fingers" on top of pipe.
* Bend one end of 8 rods into tight "J", short leg length of 3/4 inch.
* Take 4 J rods. Bend the 3/4" U-section of each "J" to 90 degrees - these will be the bottom radials. Both legs of the "U" will seat against the copper pipe and will help stabilize the radials.
* Solder 3/32" rod to into the SO-239. Measure and trim to 19".

Assembly: (2 MTR)

* Pass 52 ohm coax terminated in a PL-259 thru the copper pipe, exiting thru the slotted end. Attach to the SO-239. Settle SO-239 onto top of pipe. Pass the long leg of a "J" rod up thru each of the SO-239 screw holes. Place a hose clamp over the ends of the J rods - tighten to secure the upper radials AND squeeze the slotted pipe section against the PL-259.
* Bend these upper radials to 90 degrees relative to the pipe. Measure from the pipe centerline, out the radials, and cut at 20 inches. Then bend the upper radials down, until they form a 30 degree angle with the pipe. Check the droop angle - The tip of each upper radial will be 10" from the centerline of the pipe (dim. B/2) when the droop angle is 30 degrees.
* The Bottom radials are mounted at the very bottom of the pipe. The hose clamp is placed above the radials and holds the 90 degree U-sections to the pipe. Cut radials at 20" measured from the centerline of the pipe.

* About the "j" bends: All they really are for is to make a "Wide" surface against the Copper Pipe, so the CLAMPS can hold the Radials in a steady direction. A single "L" bend in the radials lets them swing in ANY DIRECTION.
* SWR as measured and accepted - (146 MHz design used as a dual-band antenna)

Freq	144	145	146	147	148	430	435	440	445	450
SWR	1.1	1.1	1.12	1.15	1.2	1.4	1.6	1.3	1.2	1.4

* Design elements have proven critical for performance duplication.
* Most SO-239s have an excess depth on the PL-259 side, and a very Shallow Hole for the wire. If you use a 3/32 drill and drill all the way thru, and use a "DEPTH GAUGE" to position the RADIATOR DEEPER before soldering, the antenna becomes MUCH Stronger.
*** It is VERY IMPORTANT that the antenna NOT be Supported with a METAL MAST! Dimension B, inches of INSULATING MAST SHOULD BE USED! The "Hose Clamps" that hold the COPPER PIPE to the INSULATOR MAST MUST be Electrically INSULATED from the COPPER PIPE.
******THAT IS VERY IMPORTANT******** SO AS NOT TO CHANGE THE ELECTRICAL LENGTH OF THE COPPER PIPE.
***DO NOT PAINT ELEMENTS, as that will CHANGE ELECTRICAL LENGTH ! Use "Car Wax" to prevent CORROSION.

Materials Sourcing

Bare bronze brazing rod at Airgas, find a tube of LFBB, 13 sticks in a tube, ~$30

Copper pipe at Lowes, a pre-cut piece ¾” x 24”, ~$16

Hose clamps at Lowes, (2) ¾” - 1 ½” and (2) 2” - 3+”, ~$15

SO-239 panel-mount socket, ~$5 at HRO or mail order

Cable with PL-259/UHF connector, and adapter to your radio as needed.

Non-conductive mast (old broom handle, wood dowel, PVC pipe, or similar), allow at least “radial length” separation between base of antenna and any metal lower support mast. Isolate contact between antenna copper pipe and hose clamps, suggest using 2 x 1” long pieces of ¾” Sch 40 PVC, slit lengthwise.

Thanks for watching!

Look for Art’s legacy PDF on the WPARC Resources webpage.