

# NTMS 12' (45 Element) And 6' (25 Element) 1296 MHz Loop Yagi Club Project

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This is modified from a design by G3JVL/W1JR. This Yagi has six new directors with the diameter of loop elements modified according to an article by G3JVL to compensate for a 3/4" diameter boom, 1/4" by 0.032" thick directors and reflectors; and a brass driven element 1/4" wide by 0.020".

## Specifications:

Boom diameter:	3/4"
Boom Length:	either 12' or 6'
Gain 6':	17 dBi
Gain 12':	20 dBi

Pattern: The 3 dB beamwidth is approximately 13 degrees with first side lobes down 12 and 14 dB

Notes: **1** - Use a boom brace on 12' boom

**2** - Height of the driven element will be about 1/2" less than the width for the best VSWR. VSWR is less than 1.2:1 at 1296.0 MHz.

## NTMS Antenna Kit:

Parts included: # 4 stainless steel screws, nuts, and lock washers for each element  
1 ea. 1/4" brass strip for driven element  
1/4" aluminum strips about 10 1/2" in length  
hollow bolt for driven element support

User provides: 3/4" 6' or 12' boom  
N coax connector to 141  
10" or so of 141 for driven element (threaded through hollow bolt)  
bracket for N coax connector to antenna boom  
mast to boom bracket  
extra boom support for 12'

## Preparing the 1/4" Al strips:

**Figure 1. Loop Strip Measurements**



The parts provided by NTMS include 1/4" .032 aluminum strips for the loops. The strips are about 10.5" long and have one of the holes for mounting the loops punched in one end. Figure 1 shows the completed strip ready for mounting. The strips are sharp and can be smoothed by hand sanding or a Dremmel tool at slow speed with a rough drum sander tool (use eye protection). You should first check the measurements of the punched hole in one end to insure it is 1/4" center to edge of the strip and also make sure that the strip has not been mangled by the shear. Table 1 gives the proper lengths of the strips. A 6 ft version will only use 22 directors

<i>Elements</i>	<i>Length</i>
R1-R2	10.23"
DE (brass)	9.59"
D1-D11	8.81"
D12-D17	8.55"
D18-D25	8.25"
D26-D42	8.25"

**Table 1. Strip Lengths for 12 ft boom**

### **Boom Element Positions:**

Table 2 gives the boom element positions for both 6' and 12' antennas. You may measure and drill your own boom using a #32 clearance drill bit for the #4 stainless steel screws or use a templet made for the purpose of 3/4" EMT conduit. The 3/4" boom will slip inside the conduit. See Ross Pounders (K5ZSJ) for use of the templet. W5LUA has a similar boom drilling fixture using 1" square aluminum angle. N5AC also has a suitable boom jig.

<i>Element Number (6' &amp; 12')</i>	<i>Position in inches</i>	<i>Elements Common to 6' and 12' booms</i>	<i>Element Number (12' only)</i>	<i>Position in inches</i>	<i>Elements for 12' boom only</i>
1	0.00	R1	26	73.64	D23
2	2.68	R2	27	77.20	D24
3	4.05	DE	28	80.76	D25
4	5.17	D1	29	84.32	D26
5	6.00	D2	30	87.88	D27
6	7.78	D3	31	91.44	D28
7	9.56	D4	32	95.00	D29
8	11.34	D5	33	98.56	D30
9	13.12	D6	34	102.12	D31
10	16.68	D7	35	105.68	D32
11	20.24	D8	36	109.24	D33
12	23.80	D9	37	112.80	D34
13	27.36	D10	38	116.36	D35
14	30.92	D11	39	119.92	D36
15	34.48	D12	40	123.48	D37
16	38.04	D13	41	127.04	D38
17	41.60	D14	42	130.60	D39
18	45.16	D15	43	134.16	D40
19	48.72	D16	44	137.72	D41
20	52.28	D17	45	141.28	D42
21	55.84	D18			
22	59.40	D19			
23	62.96	D20			
24	66.52	D21			
25	70.08	D22			

**Table 2. Boom Element Spacings**

Driven Element

Total length is 9.59"

After a 0.141" diameter hole is drilled or punched at the end of the driven element, cut off the last 1/4" of the driven element so that what is left is a 0.07" radius half circle which can be soldered to the outer conductor of the .141" semirigid cable. Mount the driven element approximately 1/8" above the boom with a spacer. The driven element slides over the semirigid cable and is bent into a circle where the center conductor of the cable will be soldered to the end of the element with the .070" diameter hole and the half circle is soldered to the semirigid outer jack just below where the center conductor is soldered. See picture below of my early prototype unit that has been on many grid expeditions!

Good luck and happy building!

