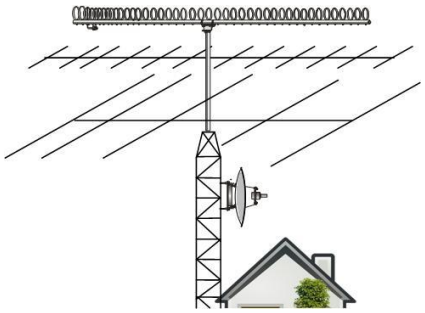

Directive Systems & Engineering

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K1JX DESIGNED 7-ELEMENT 50-MHZ YAGI, DSEJX7-50

INTRODUCTION

The Directive Systems **DSEJX7-50** is a 7 element Yagi-Uda antenna design by Clark Green, **K1JX.** The design provides optimum performance for a 1.44 λ boom-length antenna, while addressing construction details of importance to the first-time, as well as experienced, builder. Design issues, such as selecting the grade of aluminum used for boom and element material to assure harsh-environment survivability, use of stainless steel boom hardware and element assembly hardware, and use of commonly available hand tools to aid in ease of construction, have been considered in producing an antenna kit which is complete, satisfying to build, and gives the builder one of the finest 6-meter antennas available.

ELECTRICAL SPECIFICATIONS

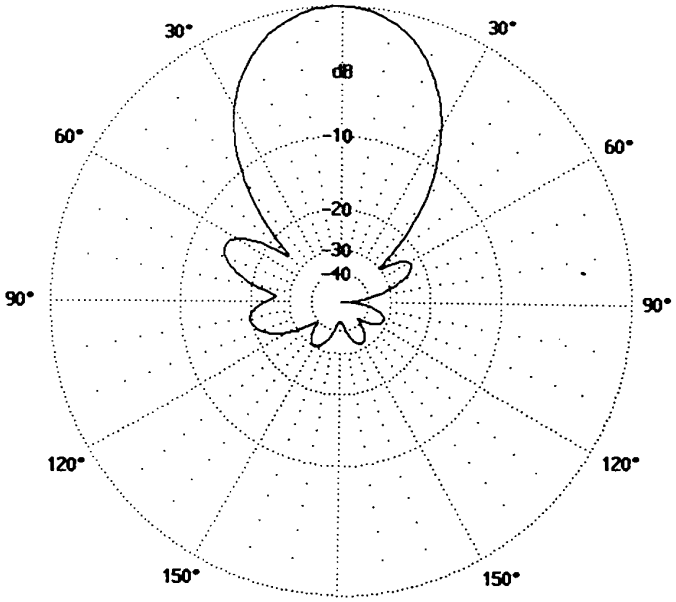
Calculated gain:	12.8dBi
E-plane 3 dB beam width:	42 degrees
H-plane 3 dB beam width:	45 degrees
SWR 1.5:1 Bandwidth:	700kHz
Side lobe attenuation	
1st E-plane:	-23 dB
1st H-plane:	-14 dB
SWR 50.1 MHz	1.07:1 typical
Stacking distance for optimum gain-to-noise ratio	
E-plane:	~24 ft
H-plane:	~29 ft
F/B ratio:	23 dB
Impedance:	50 ohms nominal
Maximum Power:	1500 Watts

MECHANICAL SPECIFICATIONS

Length:	28 ft 10 in
Turning radius:	15 ft
Boom material	6063-T832 aluminum
Front section:	1.75" x .058" wall
Rear/Front Intermediate section:	1.875" x .058" wall
Center sections:	2” X .058 wall
Elements:	.625" &.5" x .058" wall
T-match arms:	.375" x .058" wall
All stainless steel hardware	
Surface area:	~5.5 ft^2
Wind survival:	90 mph
Maximum mast size:	2.0" OD Std – larger on special orders
Coax connector:	Weatherproof type N
Assembled weight:	25 lbs
Boom sag:	Aluminum spars

Free Space
H-Plane

Free Space
E-Plane



0 dB = 12.8 dBi

50.150 MHz

DSEJX7-50 H-/E-plane Computer –
Generated Polar Plot

BEFORE INSTALLING YOUR NEW ANTENNA, PLEASE BE SURE TO READ THE ENCLOSED WARNING PAMPHLET.

CAUTION: *While we strive to remove all burrs from all machined parts, there is always the possibility of sharp edges. We strongly suggest checking the edges and use a fine file, or 400 grit sandpaper, to remove any burrs that may have been left.*

ASSEMBLY TIPS AND NOTES

TOOLS

Assembly of your antenna kit requires the following tools:

25' or greater tape measure
#2 Phillips screwdriver
Flat blade screwdriver or 5/16" nut driver for hose clamps
11/32" nut driver for #8 nuts
1/2" wrench
Permanent marker (Sharpie)
Pliers
Two saw horses, chairs, or suitable supporting structures

ASSEMBLY TIPS

1. Read an entire section before performing each assembly operation.

2. This Manual contains assembly drawings and other assembly-related information such as element lengths. Drawings are referred to by **Figure** number; charts and lists are referred to by **Table** number. Continue using the same Table or Figure number until told to use a different one.

3. All of the information needed to successfully complete the construction of an antenna kit is contained in this Manual. Keep this Manual in a safe place so that it will be available should you require it for future reference.

4. When tightening hardware **FOLLOW INSTRUCTIONS – DO NOT OVER TIGHTEN!** Deformation of the boom may occur, causing misalignment of elements.

5. Orient all hardware as instructed in each assembly step and as may be shown in an associated figure.

Elements will be called out by their position on the boom, R = reflector, DE = driven element and D-element number = director. The director's number is relative to the DE element with D-1 nearest the DE. Director elements are identified by number on one end of an element.

PARTS LIST

Note: All hardware is Stainless Steel unless otherwise noted.

Unpack the antenna kit and check each part against the following list. Do not throw any packing material away until the antenna is completely assembled and ready for final installation. Some parts may be packed inside boom sections.

The box in which the antenna was shipped contains the following items:

2	72” x 2” Center boom sections (slotted on both ends)
1	36” x 1 7/8” Center boom splice
1	72” x 1 7/8” Rear boom section
1	72” x 1 7/8” Front intermediate section (slotted on one end)
1	72” x 1 3/4” Front boom section
2	72” x 5/8” Boom sag struts w/one end flattened
1	48” x 3/4” Boom sag struts w/one end flattened
1	36” x 3/4” Boom sag struts w/one end flattened
1	Boom to mast plate
1	Element pack with 14 element halves
7	¾” Element couplers
2	48” x 3/8” T-arms
1	Pre-assembled connector bracket
1	Balun
1	Anti Seize Compound

Parts Bag 1 – Element hardware

Qty	Item
7	2” Long Tangent U-bolts
7	Element saddles
14	5/16” Nuts
14	5/16” Split lock washers

Parts Bag 2 – Boom to Mast hardware

Qty	Item
4	2” U-bolts
4	Saddles
8	5/16” Nuts
8	5/16” Split lock washers

Parts Bag 3 – Misc.

Qty	Item
1	1 3/4” End cap
1	1 7/8” End cap
14	1/2” End caps
2	3/8” End caps
2	T-arm shorting bars
4	8-32 x 1 ¼” Screws
5	8-32 Nuts
3	#8 Internal tooth lock washers
4	#8 Split lock washers
2	6-32 x ½” Screws
4	#6 Internal tooth lock washers
5	2” Hose clamps
4	Cable ties

Parts Bag 4 – Boom Sag

Qty	Item
2	Boom sag support brackets
2	¼-20 x 1 1/4” Bolts
2	¼” Nylock Nuts
1	2” Long Tangent U-bolt
1	Saddle
2	5/16” Nuts
2	5/16” Split lock washers
6	5/16” Flat washers
2	5/16” Nylock nuts
2	¾” Hose clamps

Anti-Seize Compound - Apply a small amount of the supplied Anti-Seize Compound to the threads of the U-Bolts to prevent galling.

ANTENNA ASSEMBLY

In the following steps, apply a small amount of the supplied Anti-Seize Compound to the joints:

1. Locate the two 2” boom sections and the 36” x 1 7/8” boom splice. Insert the boom splice in one of the boom halves half way. Using a hose clamp from parts bag #3, slide it over the end of the boom and tighten it securely over the slits. Now, slide the second boom section over the exposed portion of the boom splice and use a second hose clamp to secure the connection.

2. Next, locate the 72” long x 1 7/8” boom section with NO slit and insert it 5” into one of the 2” boom sections and secure with a hose clamp. This becomes the rear boom. Similarly, insert the remaining 72” long x 1 7/8” boom section with a slit in one end, 5” into the other end of the 2” center boom section and install a hose clamp. Make sure the end you insert is the end without a slit in it.

3. Last, insert the 72” long x 1 ¾” boom section 5” into the slotted end of the 1 7/8” boom that was installed in step 2. Install a hose clamp and tighten securely.

4. Using a permanent marker, refer to Figure 3 and mark the boom where each element mounts. All measurements are referenced from the reflector (rear) end of the boom.

4. Starting with the reflector elements (REF), slide the two halves into the element joiner until you see the holes in the elements line up with the holes in the element joiner. Pass a U-bolt from parts bag #1 over the boom, through an element saddle and then through the holes in the element. Align this assembly on the rear of the boom so that the U-bolt covers the mark you made in step #4. Install two 5/16” nuts and lock washers and tighten.

5. Similarly, assemble the five directors, D1, D2, D3, D4 and D5 and attach them to the boom at the appropriate marks on the boom. Make sure all the elements are aligned in the same plane as the reflector element.

6. The driven element (DE) mounts the same way; however, the connector bracket sits between the element and the element to boom saddle (see Figure 1). Make sure the connector points towards the front of the antenna.

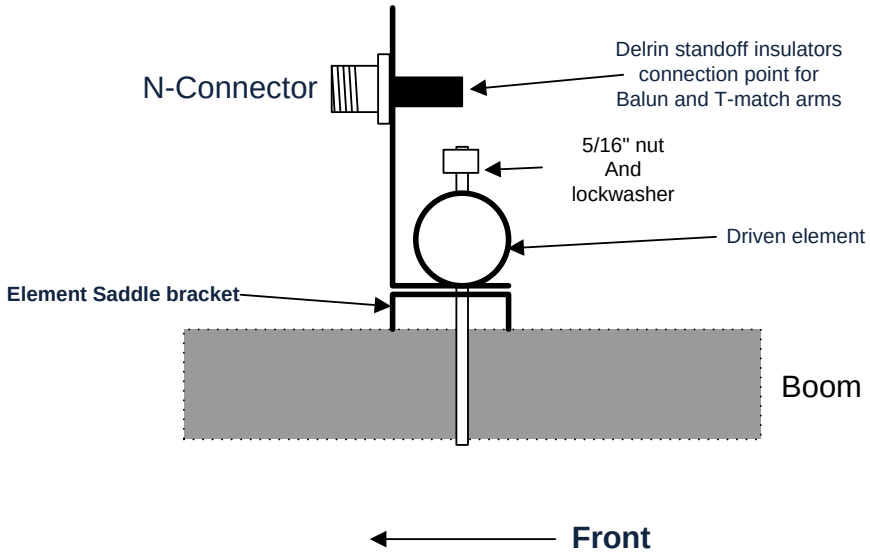


Figure 1

7. Locate the two 48” x 3/8” T-arms and the balun, and from bag #3 locate the T-arm shorting bars, the #8 hardware and the #6 hardware. The connector bracket came with the Delrin standoffs already installed. Using a 6-32 X ½” screw, place an internal tooth lock washer on the screw and put the screw through one of the balun lugs connected to the center conductor. Next, place the screw through the lug from the coax connector and then through one of the T-arms then another internal tooth lock washer and screw it in to the Delrin standoff insulator. Do not over tighten the screw as you can strip the threads in the standoff insulator.

8. Install an 8-32 X 1 ¼” screw, split lock washer and nut in each of the holes in the T-arm shorting bars. Slide a T-arm shorting bar over the end of the driven element and the T-arm. The shorting bar should be about 17” from the outer end of the driven element. Attach the other T-arm in a similar fashion, but without the wire coming from the connector, and locate the shorting bar about 17” from the end of the other driven element half.

9. Connect both ground wires from both ends of the balun to the grounding screw just below the connector. Place an internal tooth lock washer on the stud first, then a lug, then another internal tooth lock washer, then the other lug, another internal tooth lock washer and then the nut and tighten. Refer to Figure 2 for details.

10. Dress the balun along the boom or coil it as pictured. Securely tape the balun to the boom or use cable ties as pictured.

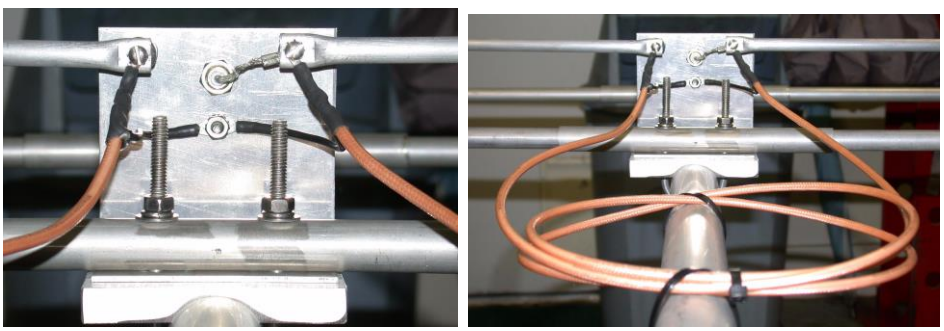


Figure 2

11. Install supplied plastic caps on ends of tubing.

12. Assemble the boom to mast plate next using two 2” U-bolts, saddles, 5/16” lock washers and nuts from parts bag #2. Position it on the boom at the boom splice of the two 2” boom sections. The hose clamps sit in between the two U-bolts. Attach a piece of feedline that is similar to what you plan to use to determine the final balance point. Once the balance point is determined, tighten the U-bolts securely.

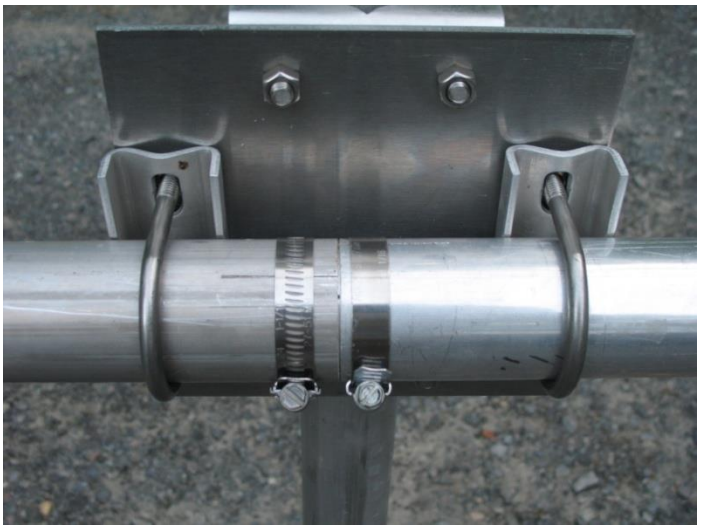


Photo 1: Boom to Mast Bracket showing how two boom halves come together

NOTE: Antenna elements are on the bottom of the boom for the following steps. Also note that the antenna truss boom support can be located above, or below, the boom. It is best to test fit and pre-adjust the boom sags before installing the antenna on your tower!

- Place a boom sag clamp directly behind D1. Place the other boom-sag clamp 21" behind D4.

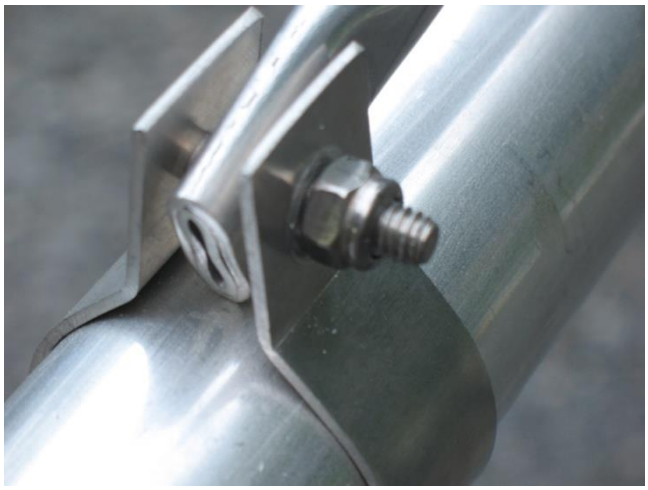


Photo 2: Boom Sag Strut attachment point

- Telescope the 5/8" and 3/4" truss arms and place the 3/4" cable clamp at the split section of the 3/4" tube.

- Using a 1/4” X 1 1/4" bolt and self-locking nut, attach the 5/8" end of the truss arm to the rear boom sag clamp.
- In a like manner, attach the front boom sag support to the forward boom sag clamp.
- Mount the mast truss clamp using the 5/16-18 X 2" long tangent U-bolt, 5/16-18 nut, 5/16" flat washer, 5/16" split lock washer. Attach the ends of the truss arms to the mast truss bracket by placing a flat washer on first, then the truss arm, another flat washer and a self-locking nut.

Be sure to mount the mast truss bracket so that the truss arms are on the boom side of the boom to mast bracket.

Photo 3: Mast Truss Support

- With the antenna supported between D1 and D2, and between D3 and D4, move the sag supports in and out at the hose clamps until the boom is straight and level, relative to the surface of the antenna and tighten the 3/4" hose clamps securely.

13. This completes the antenna assembly. Using the dimensions shown, the SWR below 50.4 MHz will be 1.5:1 or less. If you wish to improve the match, support the antenna at least one wavelength above the ground (about 20 feet). Check the match using a directional wattmeter or antenna analyzer. You can move the shorting bars in or out to change the match on the antenna. Always use coax in multiples of one half wavelength when testing to ensure you are seeing the real match of the antenna.

DO NOT, UNDER ANY CIRCUMSTANCES, APPLY ANY TYPE OF SEALANT OR COATING TO THE DRIVEN ELEMENT, T-ARMS OR CONNECTOR ASSEMBLY, OTHER THAN KRYLON® CLEAR COAT. ANY OTHER COATING WILL ADVERSELY AFFECT THE SWR AND VOID YOUR WARRANTY.

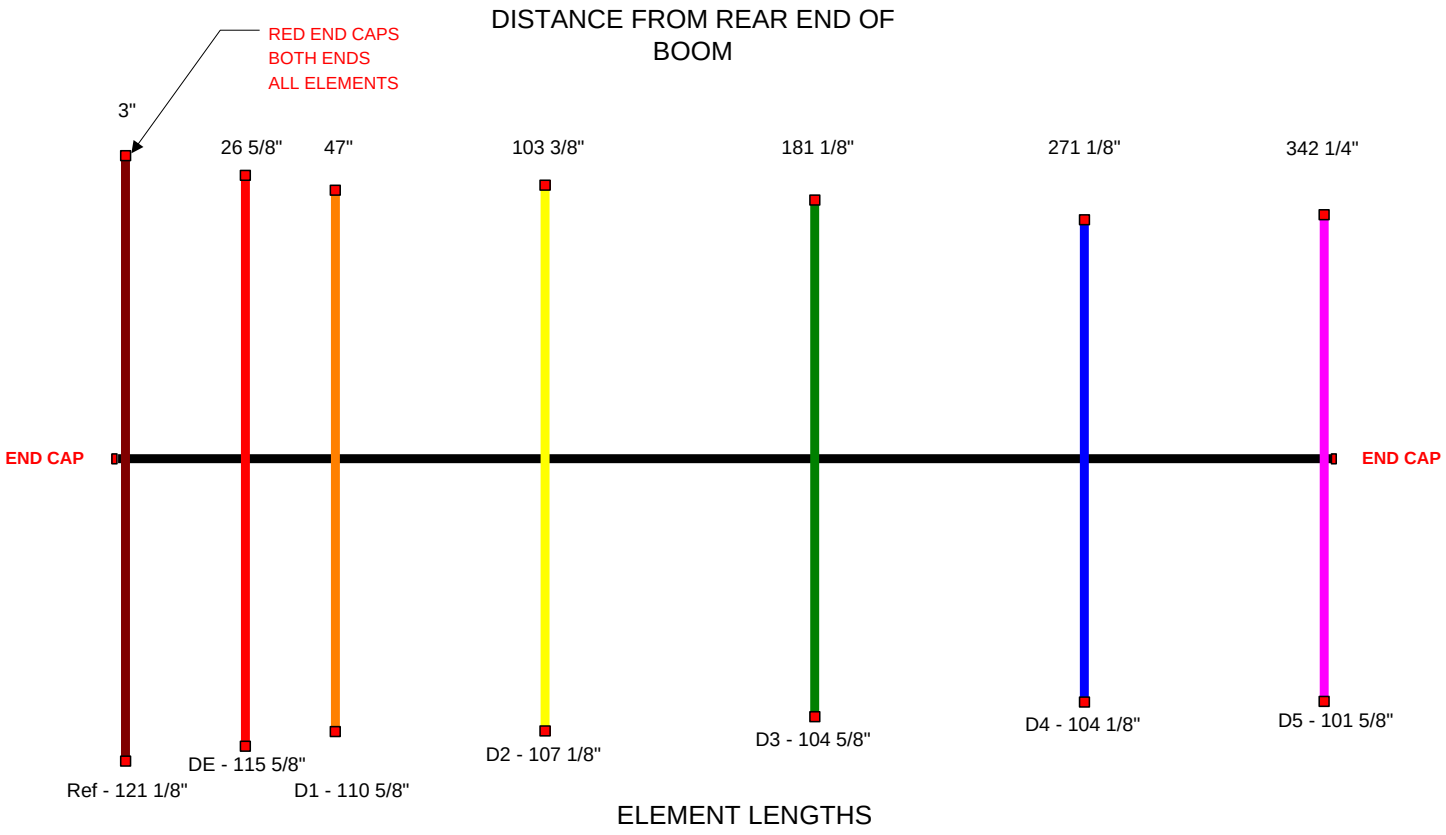


Figure 3

Note: All dimensions are +/- 1/8 inch.

Directive Systems Warranty Policy

All Directive Systems antennas are built with the finest materials available. We take great pride in building a quality product that will give years of good service and performance. If there is a defect in materials or workmanship within 90 days of purchase, Directive Systems will repair or replace the defective part, free of charge, to the original purchaser. **DO NOT RETURN ANYTHING WITHOUT PRIOR AUTHORIZATION FROM DIRECTIVE SYSTEMS**. Please contact us either by phone or email describing the problem and we will resolve your problem.

If, after examining a new antenna you received, you are not satisfied, contact us immediately for return authorization and refund. **ANY ANTENNA THAT HAS BEEN MODIFIED WILL BE SUBJECT TO A RESTOCKING CHARGE. IF AN ANTENNA IS SO MODIFIED AS TO MAKE IT UNUSABLE, DIRECTIVE SYSTEMS RESERVES THE RIGHT TO REFUSE TO ACCEPT THE ANTENNA FOR RETURN**.