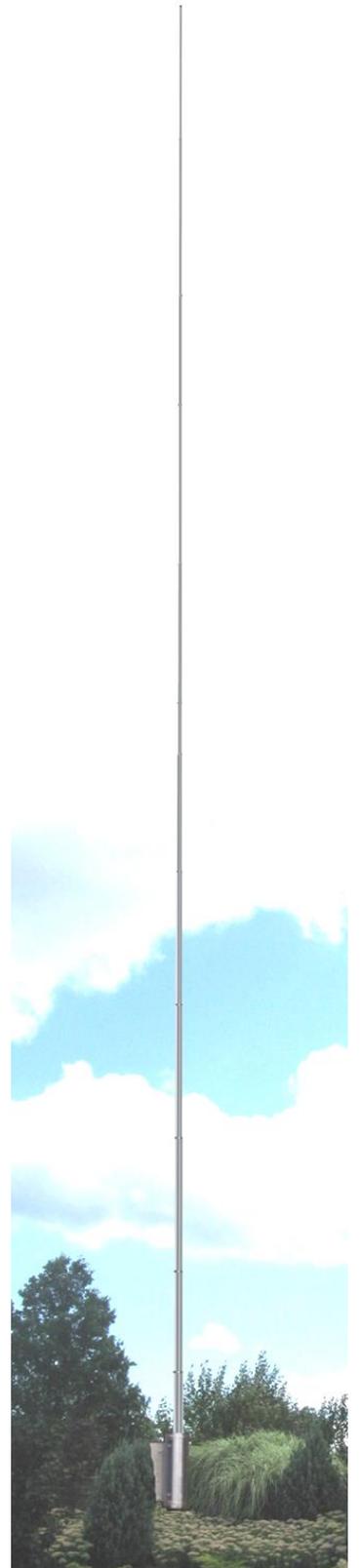


# 75/80 Meter Full Size Quarter-Wave Vertical Antenna

**DXE-7580FS-VA-1**

DXE-7580FS-VA-1-INS Revision 4

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1200 Southeast Ave. - Tallmadge, OH 44278 USA  
Phone: (800) 777-0703 · Tech Support and International: (330) 572-3200  
E-mail: [DXEngineering@DXEngineering.com](mailto:DXEngineering@DXEngineering.com)



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## Introduction

The DX Engineering **DXE-7580FS-VA-1** is a high performance 68 foot full size quarter-wave 75/80 meter vertical antenna that is tunable to operate over segments of the entire band with an SWR of 1.5:1 or less. Designed with 6063 corrosion-resistant aluminum tubing and stainless steel hardware, this antenna is very durable and attractive.

A breakthrough in a FULL SIZE quarter-wave high-performance antenna. The slim lines of this antenna can hide in even a small stand of tall trees. Some have painted the antenna a color to match the bark of the surrounding trees.

Guying is usually at 2 or 3 levels. With an outstanding 456 to 528 kHz 2:1 bandwidth, depending on your radial field, your internal tuner can get SWR down to 1:1 on any DXing frequency for maximum power transfer.

The key to performance is a good ground radial system. 32 radials, 65 feet long are recommended. Fewer radials will work, but with diminished results.

## Features

- Ultra-WIDE SWR Bandwidth and Unbeaten Gain
- Highest Wind Ratings - High Strength 6063/6061 Tubing Manufactured to DX Engineering Specifications
- Easy Tilt Up and Down - Specially Manufactured *Patented* Stainless Steel Tilt Base
- High Power Handling Capacity - High Strength, UV Protected Extren<sup>®</sup> Insulator
- No Rust - 100% Stainless Steel Tubing Clamps and Hardware
- Reliability Second to None - Specially Manufactured Stainless and Aluminum Saddle Clamps, Stainless Bolts and Precision Machining on each antenna
- Full 1,500 watt legal limit power rating

## Supplied Installation Item:

- **Tilt Base** - (*US patent 7,432,875*), Precision cut from 3/16 inch thick 304 Stainless Steel, this mounting plate is virtually indestructible. Mounts to the same mast that you use for the radial plate. Allows for easy installation, tuning or severe weather lay-down.

## Manual Updates

Every effort is made to supply the latest manual revision with each product. Occasionally a manual will be updated between the time your DX Engineering product is shipped and when you receive it. Please check the DX Engineering web site ([www.dxengineering.com](http://www.dxengineering.com)) for the latest revision manual.

## **Additional Material Needed but not Supplied:**

- **Antenna Mounting** - Steel mounting pipe, up to 2.0" OD, 0.25" wall thickness. A standard 1-1/2" galvanized water pipe (with its 1.9" OD) will work for this application and can usually be found at your local home building supply store. DX Engineering also has the **DXE-VGMT-2CG** Steel tubing for ground mount antennas made from high strength Chromoly: 2 inch OD x .25 wall thickness x 5 foot 4 inch length.
- **Quik-Set Concrete** - Mounting pipe installation
- **JTL-12555 Jet-Lube™ SS-30 Anti-Seize** - To ensure good connection on aluminum and on the threads of the Stainless Steel Hardware to prevent galling and aid in proper tightening torque.
- **DXE-RADP-3 - Radial Plate (US Patents 6,927,740 & D533,167)**: The most effective way to connect those essential radial wires and the feedline coax to your vertical antenna for the maximum efficiency and strongest signals. All stainless construction and includes 20 sets of radial connection hardware. Additional radial components available.
- **DXE-RADW** - Radial Wire Kits and Components. To achieve optimal performance with a ground-mounted vertical, install as many radials as possible. These bulk radial wire kits use 14 gage stranded copper wire with a relaxed black PVC insulation that is UV resistant, hard to see and lays down easily, unlike the wire that is commonly available at the big box stores. It will last much longer in contact with soil than bare wire.
- **DXE-SSVC-2P V-Clamp**. One is required for the optional **DXE-RADP-3** Radial Plate.
- **DXE-UHF-FDFB-KIT** - The DX Engineering Silver Plated Female Bulkhead Connector for a clean and quality feedline connection.
- **Guy Rope and Anchors** – **DXE-GUY400-KIT** contains 4 screw-in earth anchors and four 100 foot rolls of Dacron/polyester rope to guy the **DXE-7580FS-VA-1** at two or three levels in four directions. Additional guy rope is available from DX Engineering in several diameters and lengths.

The use of an antenna analyzer such as the Rig Expert analyzers will facilitate the fine tuning of the vertical.

Ground conductivity as well as the number of radials and their length can affect tuning parameters. The radial system used in the DX Engineering test vertical contained 32 radials, 65 ft long, symmetrically placed around the vertical using a DX engineering Radial Plate. A minimum of 16 radials 65 ft long should be used for reasonable performance.

## Parts List for the DXE-7580FS-VA-1

Description	Qty
Tilt Base, 3/16" Laser Cut Stainless Steel	1
DXE-SSVC-2P V-Clamp	2
Tilt Base, Mast Mount Extren® Channel	1
Tilt Base Mount Plate	1
1/4-20 x 2" HH Bolt, full thread	4
1/4" Flat Washer	4
1/4" Split Washer	4
1/4" Aluminum Spacer	4
1/4-20 Hex nut	4
1/4" Fender Washer, 1" OD	4
1/4-20 Flanged Nut	2
1/4-20 Nyloc nut	4
3/8" U-Bolt x 2" ID x 3.25" leg	2
2" Saddle for 3/8" U-Bolt	2
3/8-16 Hex Nut	4
3/8" Split Washer	4
3/8" Flat Washer	4

Description	Qty
DXE-ECL-0500 Element Clamp	1
DXE-ECL-0625 Element Clamp	1
DXE-ECL-0875 Element Clamp	2
DXE-ECL-1000 Element Clamp	1
DXE-ECL-1250 Element Clamp	2
DXE-ECL-1500 Element Clamp	2
DXE-ECL-1750 Element Clamp	2
DXE-ECL-2000 Element Clamp	2
DXE-ECL-2250 Element Clamp	2
Black Vinyl Cap	1
<b>Feedpoint Connection Hardware</b>	
Studded Band Clamp	1
#10 Star Washer	2
#10 Flat Washer	2
#10 Hex nut	2
#10 Split Lock Washer	2

Antenna Elements					
OD	(OD)	Wall Thickness	Length		Qty.
2"	(2.000")	0.120"	72"	Base Section	1
2-1/8"	(2.125")	0.058"	36"	Slit both ends	1
2"	(2.000")	0.058"	36"	Slit one end	1
1-7/8"	(1.875")	0.058"	36"	Slit one end	1
1-3/4"	(1.750")	0.058"	36"	Slit one end	1
1-5/8"	(1.625")	0.058"	72"	Slit one end	1
1-1/2"	(1.500")	0.058"	36"	Slit one end	1
1-3/8"	(1.375")	0.058"	36"	Slit one end	1
1-1/4"	(1.250")	0.058"	72"	Slit one end	1
1-1/8"	(1.125")	0.058"	72"	Slit one end	1
1"	(1.000")	0.058"	72"	Slit one end	1
7/8"	(0.875")	0.058"	72"	Slit one end	1
3/4"	(0.750")	0.058"	72"	Slit one end	1
5/8"	(0.625")	0.058"	72"	Slit one end	1
1/2"	(0.500")	0.058"	72"	Slit one end	1
3/8"	(0.375")	0.058"	36"	No slits	1

## Tools Required

Two 7/16" wrenches, (one of them should be open-end)  
 1/2" and 7/16" socket and drive  
 Medium size screwdriver or 5/16" & 1/4" nut drivers for the element clamps  
 Tape measure  
 Black Felt Tip Marker.

## WARNING!

### INSTALLATION OF ANY ANTENNA NEAR POWER LINES IS DANGEROUS



**Warning:** Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death.

### Overhead Power Line Safety

Before you begin working, check carefully for overhead power lines in the area you will be working. Don't assume that wires are telephone or cable lines: check with your electric utility for advice. Although overhead power lines may appear to be insulated, often these coverings are intended only to protect metal wires from weather conditions and may not protect you from electric shock

Keep your distance! Remember the 10-foot rule: When carrying and using ladders and other long tools, keep them at least 10 feet away from all overhead lines - including any lines from the power pole to your home.

## Installation

### Site Selection

Select a mounting location clear from power lines and structures by a minimum of 78 feet (68 plus 10 for the 10 foot safety rule). **Consider overhead power lines, utility cables and wires.** The vertical should be mounted away from local noise sources or other metallic objects which can re-radiate noise and affect the tuning, radiation pattern and SWR. Determine the direction you want the antenna to tilt down and make sure there is adequate clearance. There should also be a clear diameter of at least 70 feet from the antenna for the guying and radial systems that will extend away from the antenna.

### Radial System

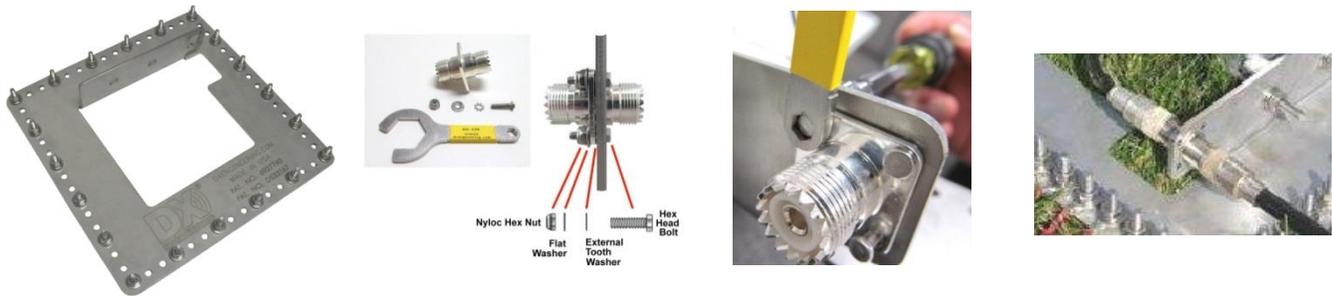
Using an optional patented **DXE-RADP-3** Radial Plate greatly simplifies mounting radial wires in a vertical installation. The **DXE-RADP-3** stainless steel Radial Plate contains enough stainless hardware sets to attach 20 radials. Additional 20 set radial connection hardware kits **DXE-RADP-HW1K** are available from DX Engineering.

**DXE-RADW** - Radial Wire Kits and Components contain everything you need to make your own radials, including steel or biodegradable lawn staples to hold the wire down, are also available.

The best way to connect the feedline to the radial plate and vertical feed point is to use a **DXE-UHF-FDFB-KIT** The DX Engineering Silver Plated Female Bulkhead Connector.

A **DXE-SSVC-2P** V-Clamp is needed to secure the radial plate to the vertical mounting pipe.

The radial plate should be mounted to the vertical mounting pipe before the tilt base and vertical base section. It should be as close to the ground as possible, while still allowing access to the radial wire hardware for tightening. A one inch ground clearance is adequate.



**Figure 1: Optional DXE-RADP-3 Radial Plate and DXE-UHF-FDFB-KIT Bulkhead Connector**

The DX Engineering Silver Plated Female Bulkhead Connector (**DXE-UHF-FDFB-KIT**) is a high-quality silver-plated connector that provides a positive, permanently secure connection for your coaxial cable. The two-sided SO-239 female connector has a superior silver-plated body with silver contacts to ensure the best performance for any application. The flange, which employs four mounting screws, means that the bulkhead connector won't work loose like those with concentric nuts and washers. Once mounted to any panel or bulkhead, the flanged bulkhead connector will provide the best possible connection and stay that way. Additionally, when using our Radial Plate, Tower Leg Brackets or SO-239 Mounting Brackets, the Bulkhead Connectors are the best way to bond your coax to ground this side of Cad-Welding! Unlike many common nickel-plated bulkhead connectors, our silver-plated bulkhead connectors have no air space within their midpoint. This area of solid and superior PTFE dielectric between the center conductor and body maintains constant impedance and ultimate performance. See **Figure 12** for details.

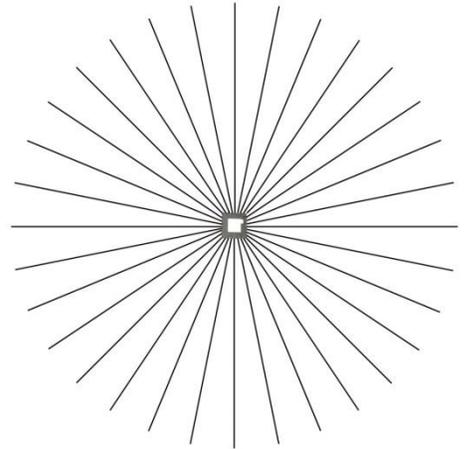
These connectors are not required if you order the optional **DXE-VFCC-H05-A** Vertical Feedline Current Choke for connection to the base of a vertical antenna.

The use of a radial system is a key requirement for a high performance quarter wave vertical antenna system. With a vertical antenna system, the radials are the second half of the antenna. The radials contribute to the radiation efficiency of the entire vertical antenna system.

At a minimum, 20 radials, each 65 feet long, should be used with this antenna. Using 32 radials at 65 feet long is preferred and highly recommended. If you have very rocky or mostly sandy soil, using more radials (60 to 90) and longer radials (for 80 meters  $1/3$ -wavelength = 87 feet,  $1/2$ -wavelength = 131 feet) may help the performance of your antenna. Extra radials help overcome unknown poor-soil conditions, improve efficiency, and ensure the best performance possible from

the vertical antenna. **DXE-RADW** Radial Wire, a stranded 14 gauge PVC insulated copper wire is suggested for the best results.

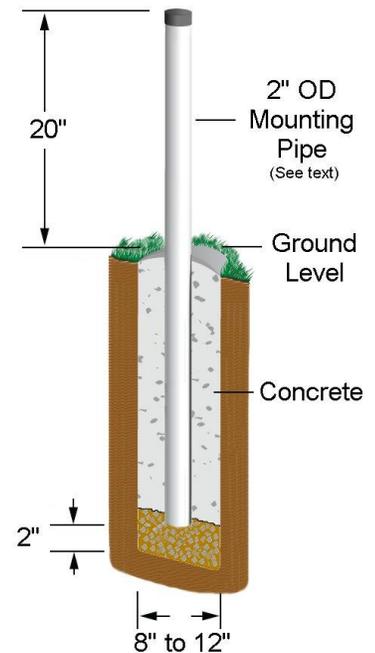
The wire radials should be placed as symmetrically as possible straight from the feedpoint around the vertical antenna and spaced evenly, regardless of how many radials are used. Do not cross or bunch any radial wires as this nullifies their effectiveness. If you have limited space, put in as many straight radials as you can. The radials must be connected to the shield of your feedline. The **DXE-RADP-3** Stainless Steel Radial Plate is an ideal optional item which provides an excellent system for attaching radial wires to your vertical antenna system feedpoint.



Radial wires can be laid on the roots of the grass using biodegradable **DXE-STPL** Radial Wire Anchor Pins to hold them down. Using enough staples will ensure the wires will not be snagged by mowers, people, or animals. Grass will quickly overgrow the radials and they will be virtually impossible to see or cause trouble. An article describing this process is available the DX Engineering website [www.dxengineering.com](http://www.dxengineering.com) in the **Tech Info** section. Radials can also be buried just under the surface by using a power edger to make a slit in the soil.

## Mounting Pipe

Use a customer supplied thick-walled galvanized steel mounting pipe *at least* 4 feet long. This will allow approximately 2 feet or more to be below ground and approximately 2 feet above ground. A thick-walled steel pipe 1-3/4" OD to 2" OD *maximum* is recommended with a minimum thickness of 1/8" (1/4" preferred) should be used. A standard 1-1/2" galvanized water pipe (with its 1.9" OD) will work for this application and can usually be found at your local home building supply store. DX Engineering also has the **DXE-VGMT-2CG** Steel tubing for ground mount antennas made from high strength Chromoly: 2 inch OD x .25 wall thickness x 5 foot 4 inch length. For permanent mounting, use a post-hole digger to make the hole deep enough to accommodate 2 feet of pipe and a couple inches of gravel at the bottom for drainage. Set the pipe on the gravel, use the pre-mix concrete to fill around the pipe, adding water and mixing as you fill or mix the concrete first, then pour in the hole. Fill the hole until the concrete is level with the ground around it. Use a level as you fill the hole to be sure the pipe is straight. Allow to set overnight. Your location, landscape and ground conditions may require different mounting solutions in order to have the steel mounting pipe and the vertical antenna in a secure position. Your ground/soil/rocky conditions may require additional mounting pipe length or method of securing.



*Note: Galvanized steel, rather than aluminum, is much more suitable for mounting in concrete. Aluminum will quickly corrode due to incompatibility with the materials used to make concrete.*

## Assembly

Your antenna is shipped in multiple boxes. The long box contains the vertical element sections, and an insulated U-channel. Some of the smaller tubes are inside larger ones. A smaller box contains the tilt base and all installation hardware.

Carefully unbox the antenna and separate the various element tubes. Using scissors rather than a knife, cut away the bubble wrap being careful not scratch the tubes. Unwrap the U-channel. Unpack the hardware box, separate the individually marked hardware bags and lay them out for easy identification.

*Note: JTL-12555 Jet-Lube™ SS-30 Anti-Oxidant should be used between all antenna element sections. Jet-Lube™ SS-30 is an electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. It ensures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.*

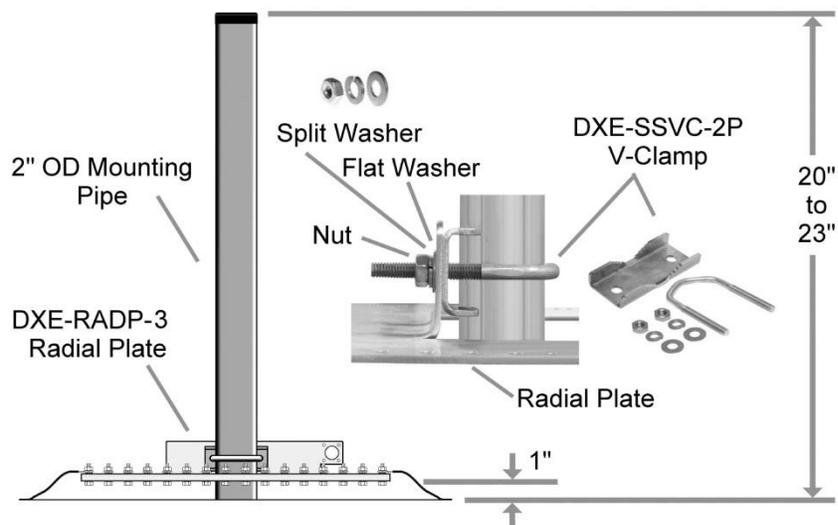
*Jet-Lube™ SS-30 should also be used on all element clamps and stainless steel threaded hardware to provide good electrical contact, prevent galling, allowing easier disassembly and to ensure proper tightening.*

*Note: The following assembly instructions are based on using a 2" OD Mounting Pipe, with the optional DXE-RADP-3 Radial Plate.*

### Radial Plate to Mounting Pipe

Install the optional **DXE-RADP-3** Radial Plate on the 2" OD mounting pipe using an optional **DXE-CAVS-2P** V-Bolt Saddle Clamp as shown in **Figure 1**. Mount the radial plate so you have approximately 1" of space between the bottom of the plate and the ground level. This will allow easy access to install the radial wire hardware. The **DXE-RADP-3** Radial Plate comes with 20 sets of stainless steel hardware for mounting the radial wires. Mount the plate as shown in relation to how the Tilt Base is mounted.

**Figure - 1 - Optional  
DXE-RADP-3  
Radial Plate Installation**



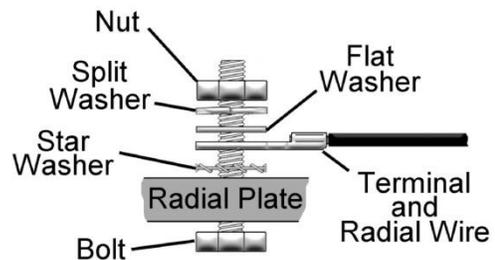
## Attaching Ground Radial Wires to the Radial Plate

Using the 20 sets of supplied 1/4" stainless steel hardware (Bolt, Flat Washer, Star Washer, Split Washer, Nut) connect the optional ground radial wires to the **DXE-RADP-3** Radial Plate as shown in **Figure 2**. Additional hardware kits are available (**DXE-RADP-1HWK**) that contain 20 sets of Radial Plate Hardware.

There are optional DX Engineering Radial Wire Kits available. **DXE-RADW-500K/BD** contains a 500 foot spool of 14 gauge copper stranded wire with black PVC insulation, 20 Terminal Lugs and 100 Steel or Biodegradable Lawn Staples. The **DXE-RADW-1000K/BD** Radial Wire Kit contains a 1,000 foot spool of 14 gauge copper stranded wire with black PVC insulation, 40 Terminal Lugs and 200 Steel or Biodegradable Lawn Staples. **RADW-20RT**, **-32RT** or **-65RT** contain 20 each radial wires with 1/4" terminal attached. These kits come in 20 Ft, 32 Ft, or 65Ft lengths.

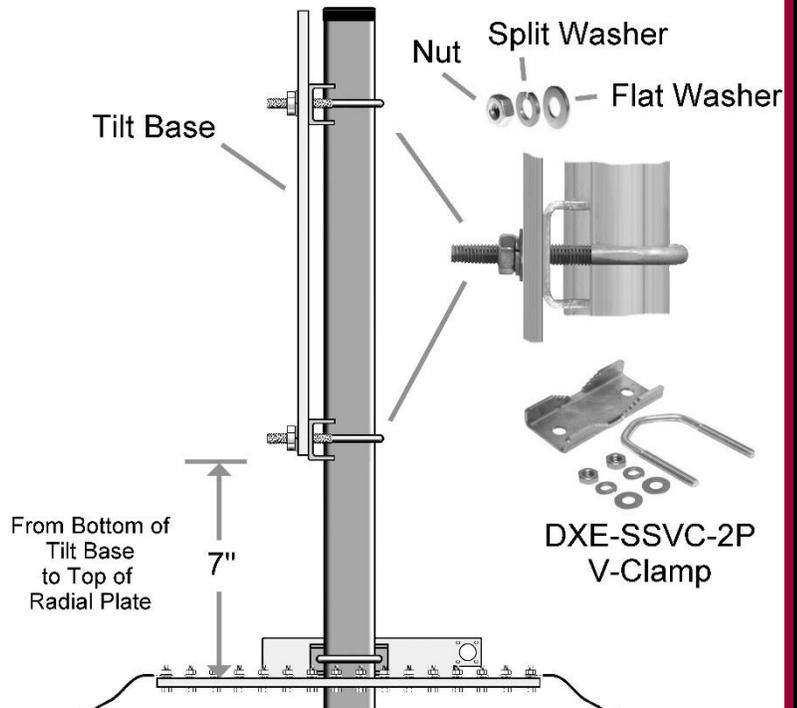
Depending on the number of radial wires used, space them out evenly around the Radial Plate. The Radial Plate will accommodate up to 60 radial wires (60 laser drilled holes), or up to 120 radials if doubled up.

**Figure - 2 - Radial Wire Hardware Installation**



## Tilt Base to Mounting Pipe

Install the Tilt Base to the 2" OD mounting pipe using two **DXE-SSVC-2P** V-Clamps allowing approximately 7" clearance between the bottom of the tilt base plate, to the top of the **DXE-RADP-3** Radial Plate as shown in **Figure 3**. A standard 1-1/2" galvanized water pipe (with its 1.9" OD) will work for this application and can usually be found at your local home building supply store. DX Engineering also has the **DXE-VGMT-2CG** Steel tubing for ground mount antennas made from high strength Chromoly: 2 inch OD x .25 wall thickness x 5 foot 4 inch length. Make sure the Tilt Base and optional **DXE-RADP-3** Radial Plate are oriented correctly for the direction you wish to tilt the antenna. Tighten the clamps evenly so the length of the exposed threads is approximately equal. Any clamp should be tightened evenly from side-to-side with an equal amount of thread above each nut.



**Figure - 3**

## Vertical Base Section

The base section is made up of an insulated mounting channel with hardware, a mounting plate, two U-Bolt assemblies and the base antenna section which is 2" OD and 36" long.

Using **Figure 4**, attach the aluminum backing plate to the back of the Extren<sup>®</sup> insulated channel. The base hardware kit contains four 2" hex bolts, four flat washers, four aluminum spacers, four split washers and four hex nuts. From the inside of the channel, insert a 2" bolt with a flat washer through each of the middle four holes, through the backing plate. Put on the aluminum spacer, a split washer and a plain hex nut. Tighten firmly, but not enough to crush the insulated channel.

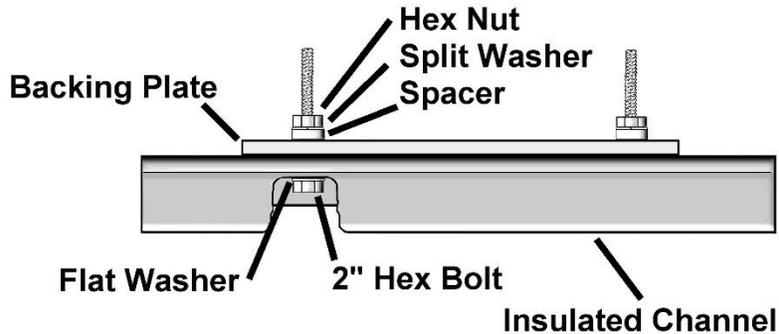


Figure - 4

Install the lower base section element (2" OD x 72" x .120" wall thickness) to the insulated channel using the two 3/8" x 2" U-Bolts, two saddle clamps, four flat washers, four split washers, and four nuts as shown in **Figure 5**.

The base section tube should extend 1-1/4" beyond the bottom of the U-bolt clamp. When tightening, observe the split washers. When they fully seat (flatten out), the clamp is tight enough. Any clamp should be tightened evenly from side-to-side with an equal amount of thread above each nut.

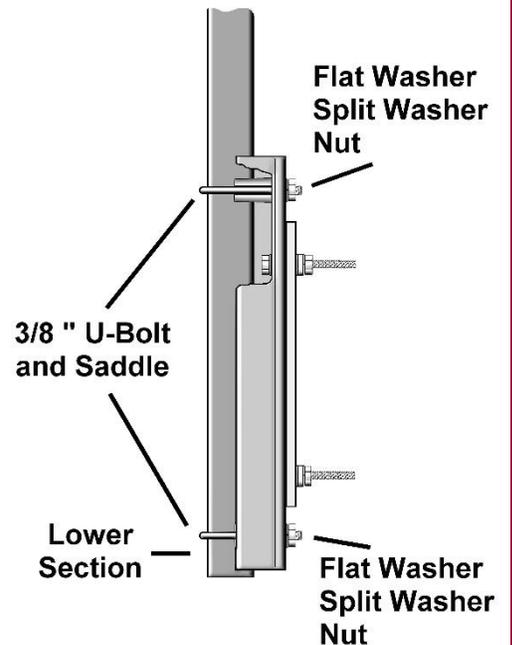
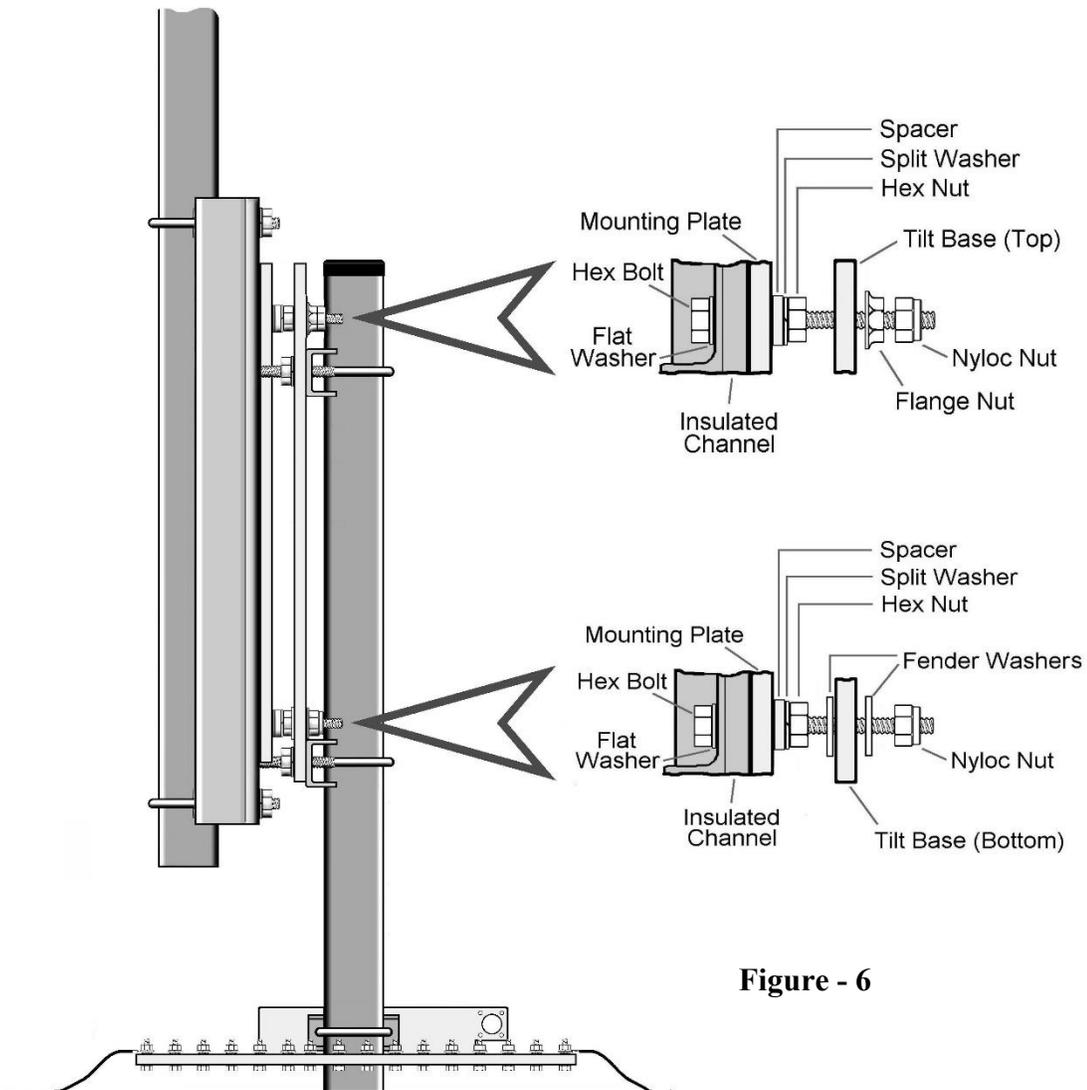


Figure - 5

## Base Section to Tilt Base

Place the Lower Base Section into the holes of the Tilt Base and loosely install the Tilt Base mounting hardware shown in **Figure 6**.

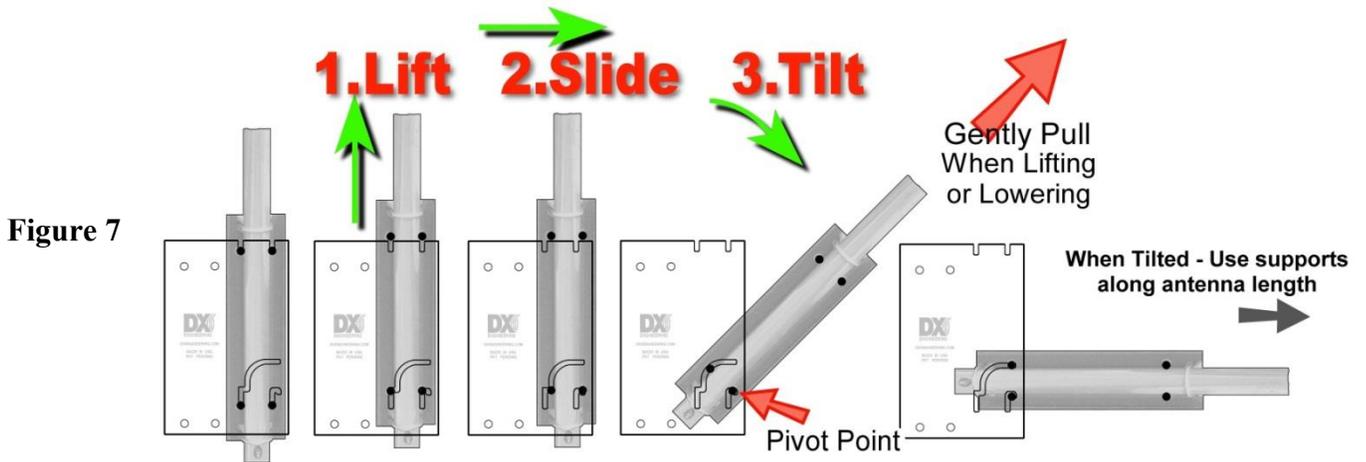


**Figure - 6**

Using a wrench or nut driver, securely tighten the two Nyloc Nuts at the bottom of the Tilt Base. Then loosen them one-half turn each. This will allow proper movement of the Tilt Base while raising or lowering the antenna. It is not necessary to tighten these nuts more securely unless further tilt operation is no longer required. They should not be loosened more than one-half turn at any time.

Test the tilt function to ensure proper clearances. Standing in front of the Tilt Base, lift the antenna base section, slide it to the right, and let it down slightly until the lower outside bolt is resting in the pivot point. Then slowly tilt as shown in **Figure 7**. Make sure when you are tilting the antenna to **lift, slide to the right**, and **then** tilt. Be careful to keep the pivot bolt resting in the pivot point. Reverse the process when raising the antenna.

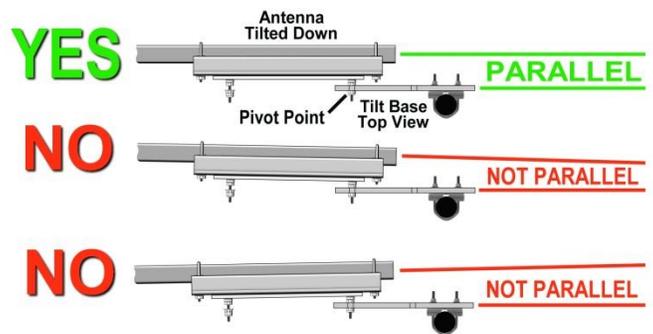
It is important to note that the lower, outside bolt becomes the pivot point while raising or lowering the antenna. This pivot bolt **MUST** be retained in the pivot point. It seems natural to *push* the antenna toward the Tilt Base while raising. **Push up** while raising, but not toward the base since this could cause the pivot bolt to lift out of the slot and allow the mechanism to bind up and bend the lower bolts. This is a large antenna and should be raised or lowered carefully.



Make sure the guy ropes are in the clear before you begin. It maybe helpful to tape over the element clamps to keep the ropes from getting hung on them as you raise the antenna. Starting from the top of the antenna, walk it up slowly using an overhead hand-over-hand motion, maintaining a slow and steady pace. It is recommended to have someone pulling on the back guy ropes for additional help in raising the antenna. A helper should use a push-up pole constructed of an 8 or 10 foot 2" x 4" board with small boards nailed to each side of one end in the form of a fork may be used to push up the antenna during the first stages of raising it.

The antenna mounting channel must be kept in alignment with the Tilt Base plate to prevent binding until it is positioned in the Tilt Base. Once the antenna is vertical, slide the antenna to the left, toward the Tilt Base mounting pipe to allow the two parts of the Tilt Base to line up and drop down into the slots. Lightly tighten the top flange nuts on the Tilt Base to hold the antenna.

**Note:** As you raise the antenna to the vertical position, it's important to maintain the alignment between the antenna mounting channel and the Tilt Base backing plate to minimize binding. Make sure the lower tilt-base bolts are not excessively loose before raising. They should be first tightened securely and then backed off no more than 1/2 turn.



The Tilt Base is not made to support the whole antenna by itself when tilted. When the antenna is tilted over, ensure you have some sort of table, stand, or saw horse to set the antenna on to aid in supporting the weight. When the antenna is in the upright position, ensure the mounting hardware (reference **Figure 6**) is tightened.

*A pair of sawhorses or ladders should be used to support the vertical sections during assembly with the tilt-base and whenever the vertical is tilted down. Do not allow the Tilt Base to support the entire weight of the vertical antenna when in the horizontal position.*

## Assembling the Vertical Element Sections

*Note: JTL-12555 Jet-Lube™ SS-30 Anti-Oxidant should be used between all antenna element sections. Jet-Lube™ SS-30 is an electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. It ensures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.*

*Jet-Lube™ SS-30 should also be used on all element clamps and stainless steel threaded hardware to provide good electrical contact, prevent galling, allowing easier disassembly and to ensure proper tightening.*

When assembling any telescoping aluminum tubing sections you should take the following steps:

1. Make sure the edges are smooth and not sharp. Deburring may be necessary, since burrs and shavings can occur on seams as well as edges. All surfaces need to be completely smooth to allow easy assembly of tubing sections.

### Caution

*Aluminum tubing edges can be very sharp.  
Take precautions to ensure you do not get accidentally cut.*

The raised particles and shavings that appear when the aluminum tubing is machined are referred to as burrs, and the process by which they are removed is known as deburring.

Deburring is a finishing method used in manufacturing. DX Engineering aluminum tubing is machine cut on both ends and machine slit on one end and you should further assure that there are no ragged edges or protrusions.

Use the **DXE-22166 Slim Grip Deburring Tool**, or the **DXE-22600 Deburring Tool with Extending Handle and Extra Blades** for this operation.

2. Clean the inside of the aluminum tubing to clear out any dirt or foreign material that would cause the aluminum tubing sections to bind during assembly. Do not use any type of oil or general lubricant between the aluminum tubing sections. Oils or general lubricants can cause poor electrical connections for radio frequencies.
3. Clean the outside of the aluminum tubing to clear any dirt or foreign material that would cause the clamps to malfunction during assembly.
4. The use of **JTL-12555 Jet-Lube™ SS-30** is highly recommended. Jet-Lube™ SS-30 is an electrical joint compound which effects a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. Using Jet-Lube™ SS-30 assures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.
5. When assembling the aluminum tubing sections, ensure the area is clear of grass, dirt or other foreign material that could cause problems during assembly of the closely fitted telescoping sections.

Assemble the vertical element sections in an area that is flat and has sufficient room for the length of the antenna (68 feet) during assembly. Lay the tubing out in descending OD sizes. Orient the slits in the tubes toward the top of the antenna.

Mark each section for the overlap as shown in **Figure 8**. A dark color felt-tip marker works well. Measure and mark from the end of each tube using the marker so it will be clearly visible.

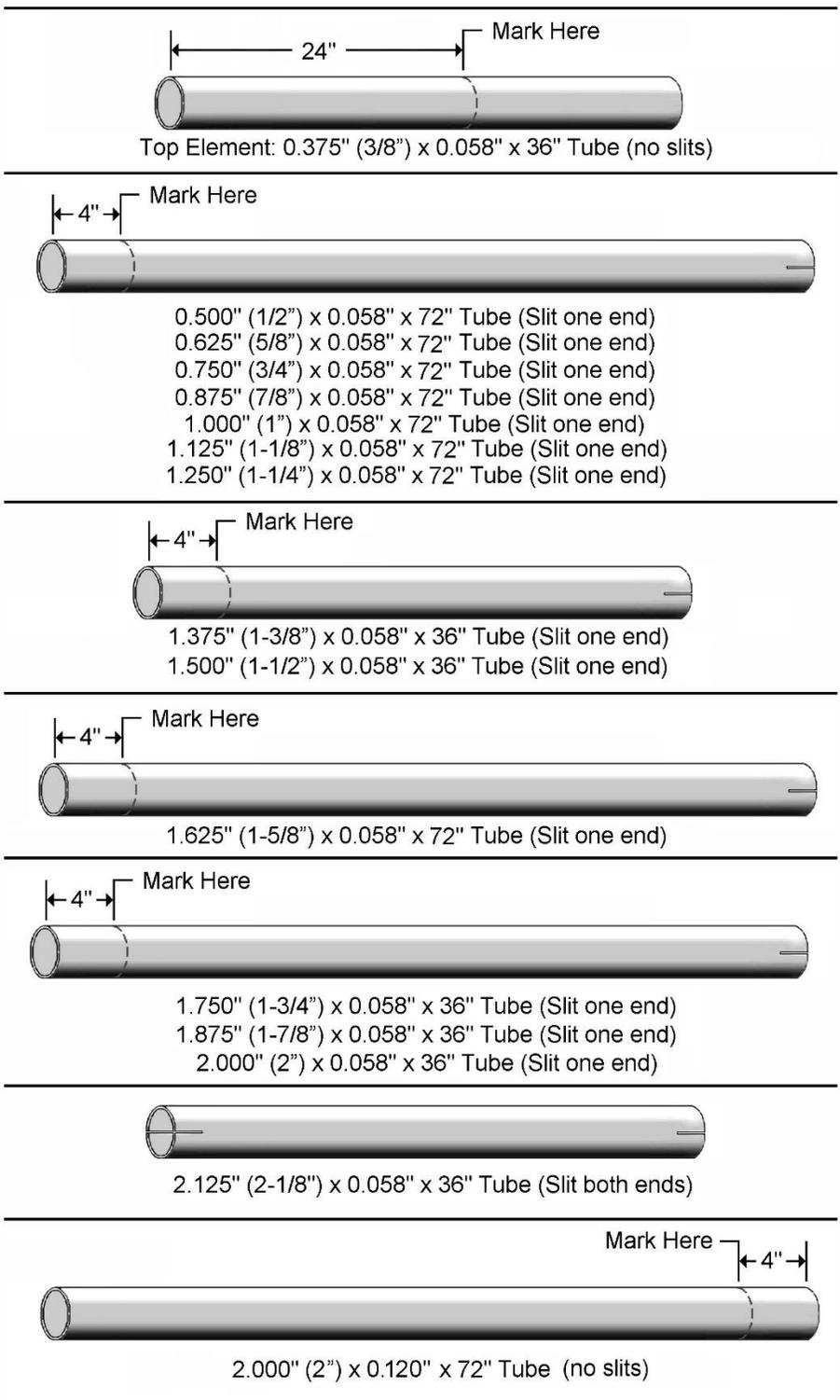
Locate the hardware pack containing element clamps. Refer to **Figure 10** for clamp sizes and placement. Slide all the clamps over each section before putting them together. You can lightly tighten the clamps in each section to hold them until needed. Align the element clamp screws on each element to face the same direction. At final assembly, body of the element clamp should be positioned between the slits in the tubes and 1/8" from the edge of each tube as shown in **Figure 9**.



**Figure - 9**

Using **Figure 10** on the next page for dimensions, assemble the element sections.

Making sure dirt or grass does not adhere to the elements to be joined. Position the element clamp approximately 1/4" to 1/2" from the end.



**Figure 8 - Vertical Elements**

Make sure the body of the element clamp is positioned between the slits and tighten securely. Repeat the procedure with remaining elements. Refer to **Figure 10** for clamp sizes and placement.

Continue mating the smaller elements inside the larger ones. Double-check the vertical element sections you have just assembled. Total overall length before tuning should measure 68 feet, 4 inches.

The black vinyl cap is installed on the top element section.

### Optional CW Extension Kit for Four Square Systems

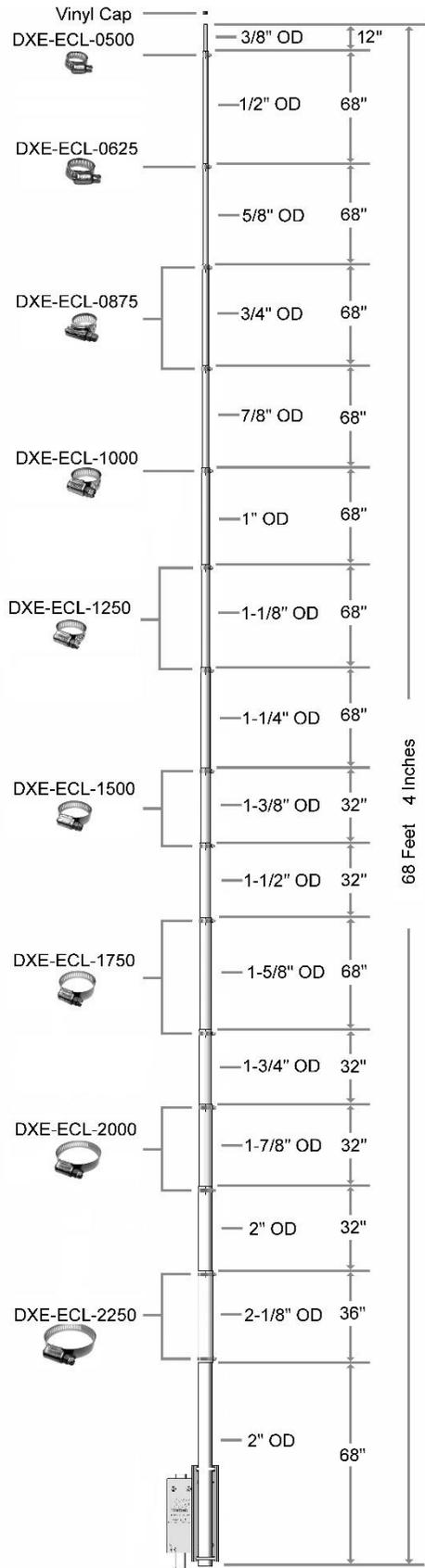
**DXE-VA1-80MCW-4P** is used for 80 meter 4 squares to extend the length of the verticals which extends the antenna length and allows tuning for the lower CW area of the band.

Kit includes: Four - **DXE-AT1189** - Aluminum Tubing, 6063-T832, 6 ft., 0.375 in. OD, 0.058 in. Wall, No Slit, Each One for each vertical.

This replaces the existing 3 foot 0.375 inch OD piece. It will make the antenna about 36 inches longer. Once installed, tune the antenna for the desired CW frequency by shortening the tube length inside the larger one a bit. Repeat the process for the other three antennas in your four-square system.

**Figure 10 - 7580FS-VA-1  
Element Dimensions**

Drawing is not to scale



## Mating the Vertical Element Sections to the Tilt Base

**CAUTION:** *Attempting final assembly without proper precaution can be dangerous.*

You should have someone help you steady the vertical antenna sections during mating with the base section.

**Note:** *A pair of sawhorses or ladders should be used to support the vertical sections during assembly with the tilt-base and whenever the vertical is tilted down. Do not allow the tilt-base to support the entire weight of the vertical antenna when in the horizontal position.*

Mate the vertical element sections to the base element tube section by sliding the bottom 2-1/8" element of the vertical over the 2" base section element tube to the 4" mark you previously made. See **Figures 8 and 10**. The two element sections will have a snug fit, so use a small amount of Penetrox A on the bottom element section to make the fit easier. Slide the element clamp down to the edge of the bottom section, between the slits, and tighten. For fine tuning, you can adjust this bottom section inward or the very top section inward or outward. See the **Tuning the Vertical** section in this manual.

## Guy Rope and Anchor Installation

Guying is required on this as well as any other vertical antenna, especially in areas where it is windy or susceptible to wind gusts. Four screw-in earth anchors and sufficient antenna rope are available as model **DXE-GUY1000-KIT** to allow guying of the antenna at three levels in four directions. Rule-of-thumb engineering suggests the distance of the anchors from the antenna base should be equal to the height of the highest guy level. This provides a 45-degree guy angle. The guy ropes should be fastened just above an element clamp using a non-slip knot as shown in **Figure 11**.

The set of four earth anchors may be augured into the ground approximately 35 to 50 feet from the antenna base to fasten the guy lines. When you install the earth anchors, make sure one of them is placed exactly opposite the direction toward which the antenna will tilt over. The others should then be evenly spaced. You may find it easier to first install and raise only the sections of tubing up to the lower set of guy ropes. This will allow you to establish the correct length and tie off the ropes. Then, you can disconnect the guy rope toward the rear and, leaving the others fastened, lower the partial sections for final assembly. The remaining ropes will provide stability as the antenna assembly is raised.

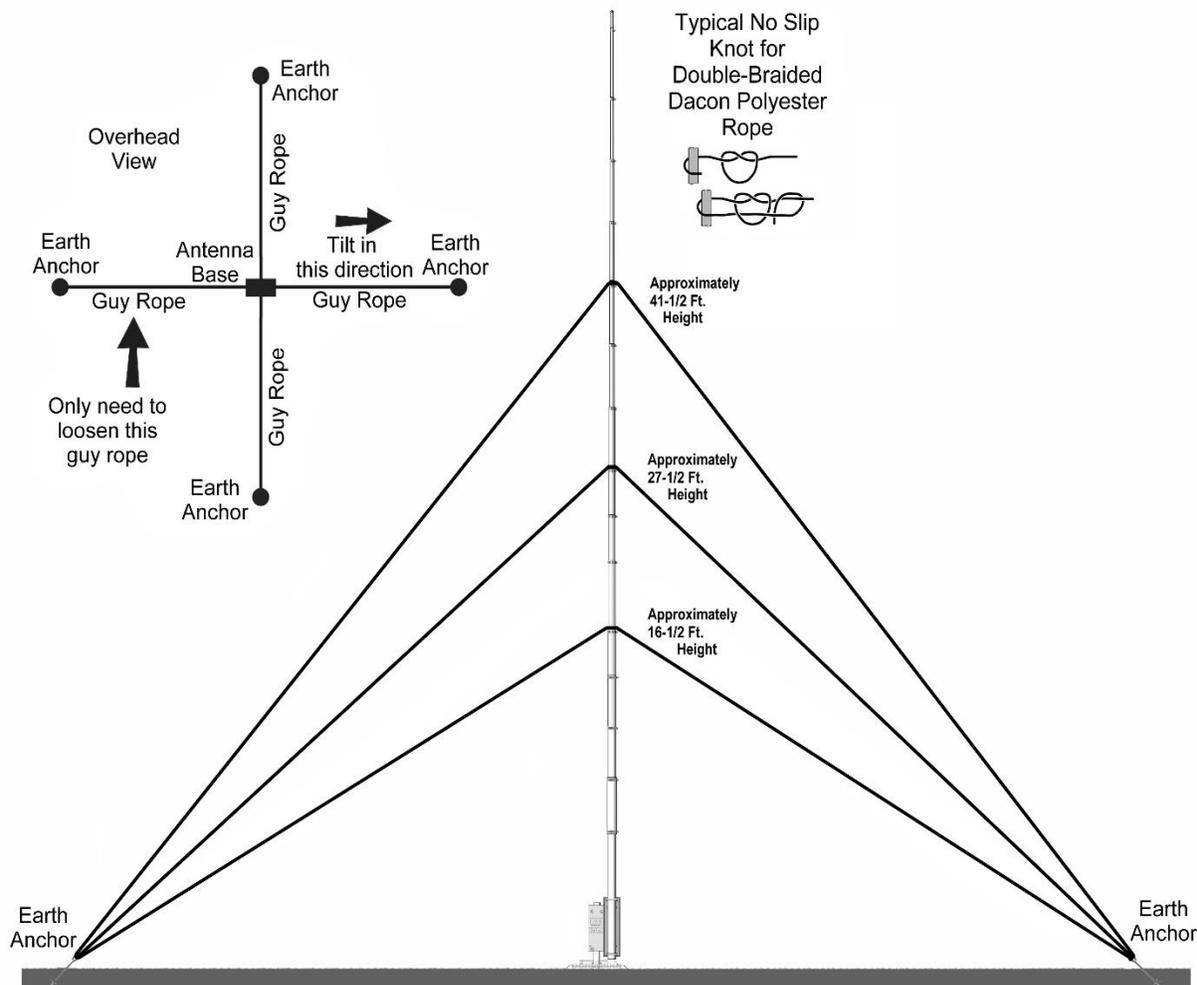
## Raising the Vertical

**It is strongly recommended that you have help when you raise this antenna.** The Tilt Base certainly makes it easier however, this antenna is 68 feet long and can be challenging to put up the first time or with gusty winds. If you have properly laid out your guy system in advance, they will help keep the vertical stable as you raise it – stop you from going beyond vertical at the apex of the lift and help keep the antenna parallel to the tilt base.

Make sure the guy ropes are in the clear before you begin. It maybe helpful to tape over the element clamps to keep the ropes from getting hung on them as you raise the antenna. Starting from the top of the antenna, walk it up slowly using an overhead hand-over-hand motion, maintaining a slow and steady pace. It is recommended to have someone pulling on the back guy ropes for additional help in raising the antenna. A helper may also use a push-up pole constructed of an 8 or 10 foot 2" x 4" board with small boards nailed to each side of one end in the form of a fork may be used to push up the antenna during the first stages of raising it.

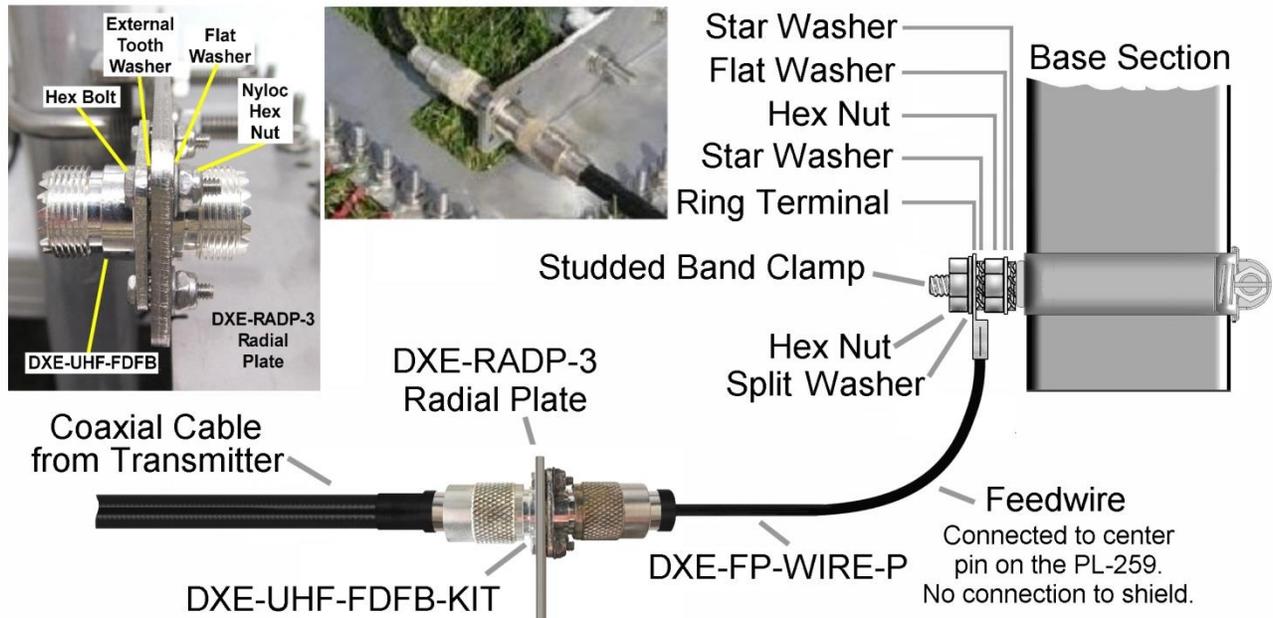
The antenna mounting channel **must** be kept in alignment with the Tilt Base plate to prevent binding until it is positioned in the Tilt Base (see page 12). Once the antenna is vertical slide the antenna to the left toward the Tilt Base mounting pipe to allow the two parts of the Tilt Base to line up and drop down into the slots. Tighten the four nuts on the Tilt Base when done raising the antenna..

**Note:** As you raise the antenna to the vertical position, it's important to maintain the alignment between the antenna mounting channel and the Tilt Base backing plate to minimize binding. Make sure the lower tilt-base bolts are not excessively loose before raising. The bolts should be first tightened securely and then backed off no more than 1/2 turn.



**Figure 11 - Guying example - your installation may vary.**

## Feedline Connection



**Figure 12 - Feedline Connection using the optional Bulkhead Connector**

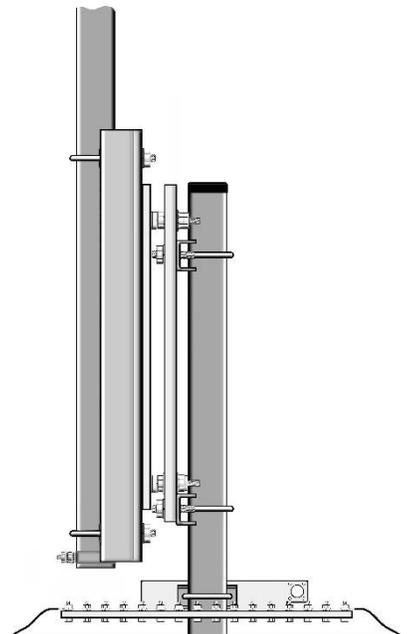
Install the Studded Band Clamp on the lower Base Section as shown in **Figure 12**. The Studded Band Clamp is the feedpoint connection for the vertical elements. Use a small amount of Penetrox between the clamp and the lower base section to insure a good electrical connection. As shown above, use the optional **DXE-UHF-FDFB-KIT** the Double SO-239 Bulkhead Connector and the **DXE-FP-WIRE-P** Feed wire with PL-259 and wire with ring terminal installed on the optional Radial Plate for the most efficient means of feeding the antenna and tying in the radial field.

Make sure all connections are tight.

If an optional **DXE-MC20-1-1BM** Vertical Feedline Current Choke is used, the bulkhead connector is not used. The coaxial feedline connects directly to the input of the Vertical Feedline Current Choke. Reference the manual for the **DXE-MC20-1-1BM** Vertical Feedline Current Choke for more details.

## Tuning the Vertical

It's best to use an antenna analyzer such as the Rig Expert analyzers for determining antenna resonance. Use the  $X=0$  and  $\pm j0$  readings to determine the resonant frequency. The SWR will be adjusted by the impedance matching assembly mounted at the feed point once the vertical is resonant at the desired frequency.



The **DXE-7580FS-VA-1** should resonate at approximately 3.6 MHz with the recommended ground radial system installed and the vertical dimensions as shown in **Figure 10**. Resonance is adjusted by the length of the vertical element sections.

If you are having trouble achieving resonance, make sure the element section lengths are correct. Make sure you have at least 16 radials (32 are better), 65 feet long, symmetrically placed around the vertical. Our test vertical employed 32 radials, 65 feet long. The difference in resonance from 16 to 32 radials is about 30 kHz.

The antenna resonant frequency may be centered at any point by merely adjusting the overall length. To raise the base resonant frequency, shorten the element tubing stack. Adjusting the vertical base measurement in **Figure 10** will move the resonant frequency 20 to 30 kHz.

Measurements are taken from the bottom of the base element tube to the first vertical element section. To ensure sufficient nesting of the base tube, do not go less than 4" of separation. The more of the base element tube that is nested, the stronger the bottom section will be. For maximum strength, the base section can be nested until it is slightly above the top clamp on the tilt-base. If a larger excursion is desired, the antenna should be lowered and the length adjustment made to the highest element section.

As a rule of thumb, one foot of length should be approximately 50 kHz in frequency. A shorter antenna length = higher frequency and a longer antenna length = lower frequency.

## Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at:

[DXEngineering@DXEngineering.com](mailto:DXEngineering@DXEngineering.com)

For best service, please take a few minutes to review this manual before you call.

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DXE-7580FS-VA-1-INS