

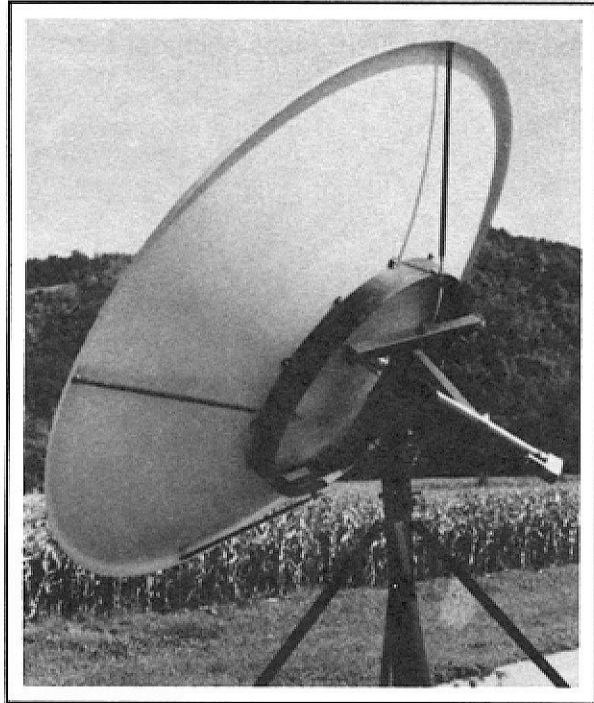


Motorized dual-axis satellite antenna polar mount with motorized declination with 8-piece aluminum reflector

Installation Instructions for the **Heavy Duty Polar Mount**

Congratulations, you have now purchased the finest Polar Mount available. This unit has been designed to give you the most stable system to work on a single pole application.

The Polar Mount is designed to go with the 3.0m, 3.3m, 3.7m, 3.9m, 4.2m, 4.5m and the 5.0 meter antenna. As all are identical in theory, we will cover the basic installation first and address each individually as the installation requires. **PLEASE READ COMPLETE INSTRUCTIONS BEFORE BEGINNING INSTALLATION!!**



PARTS LIST

- 1 - Antenna
- 1 - Polar Mount
 - 48" or 60" Back Ring
- 1 - 5 1/2" I.D. Base Can
- 4 - Back Braces for 3.3m - 3.7m
(8 for 3.9m - 5m)
- 4 - Feed Struts
- 1 - Feed Collar
- 1 - Locking Bar
- 1 - Bolt Bag to include all Hardware
- 1 - Feed Cover
- ***Options: Four Leg Base Stand, Base Post,
Non-Penetrating Roof Mount, Hot Dip
Galvanization, 36" Actuator, Electronics

*** Optional: Power Declination Instructions

CAUTION! - All 3.0m - 5.0m, 2 pc. antennas must be handled with extreme care.

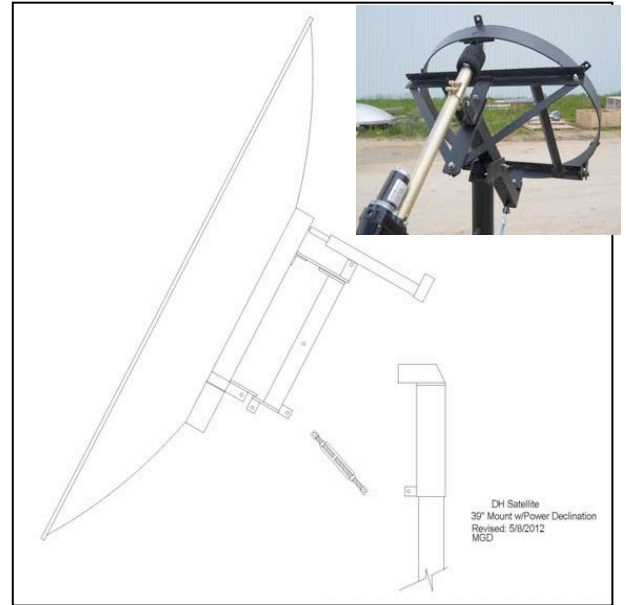
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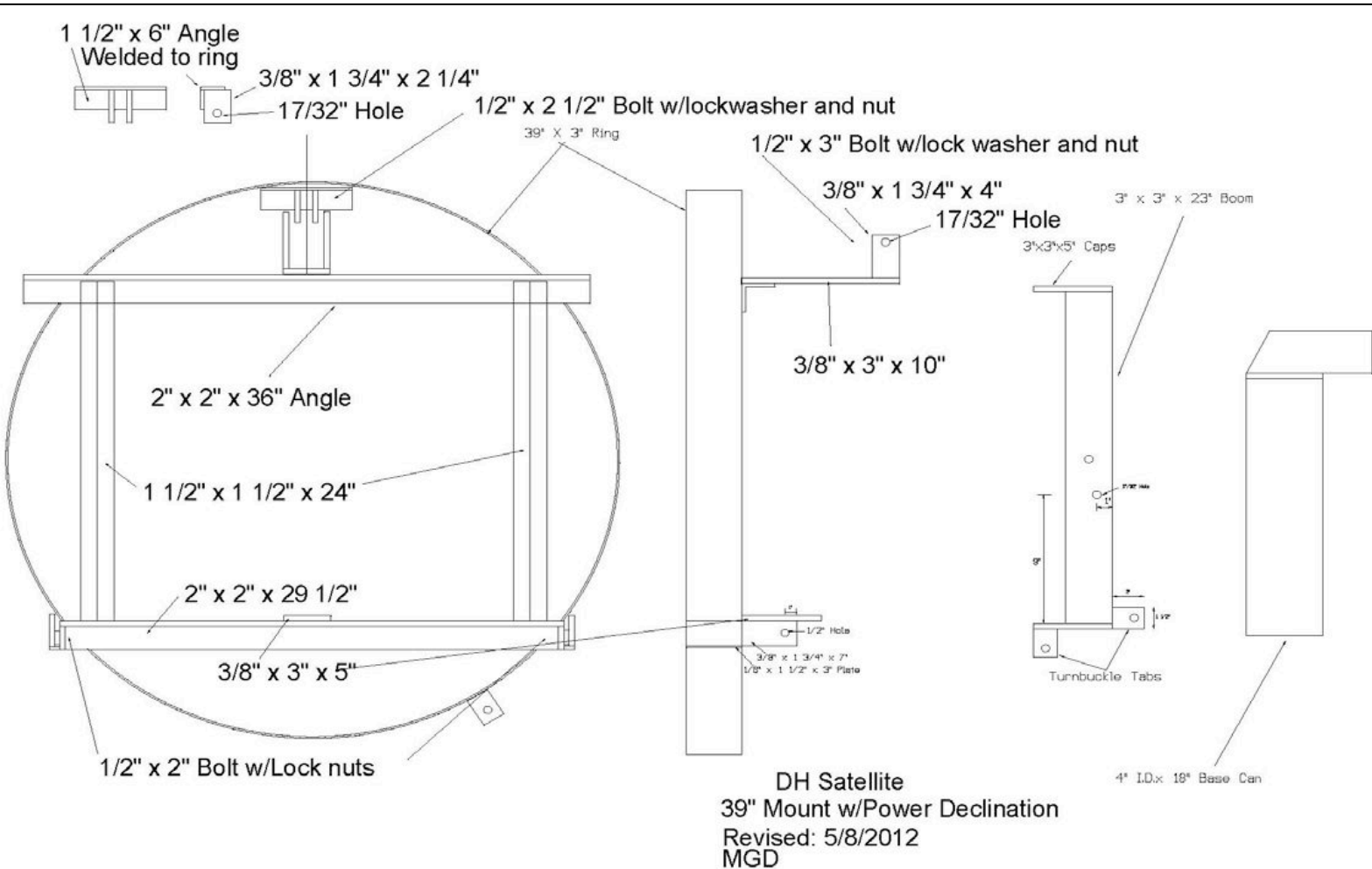
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DH Satellite
39" Mount w/Power Declination
Revised: 5/8/2012
MGD

Look at the drawing above. This may not be exactly your system but the working is the same. With the polar mount you will have one actuator for the Azimuth movement and the other for the Elevation movement. Unless otherwise ordered, both actuators will come with reed sensor motors. Typically this system is assembled but if yours, for shipping purposes, is in parts, you can assemble according to the photos below. The 1/2" Bolts are supplied with the washers and nuts for assembly. The following pictures show the assembly of the 39" ring with the power declination and the bolts are labeled. To set the system up, set the boom to your latitude and move the power declination to the offset angle for your location. This should be your start position for tracking.





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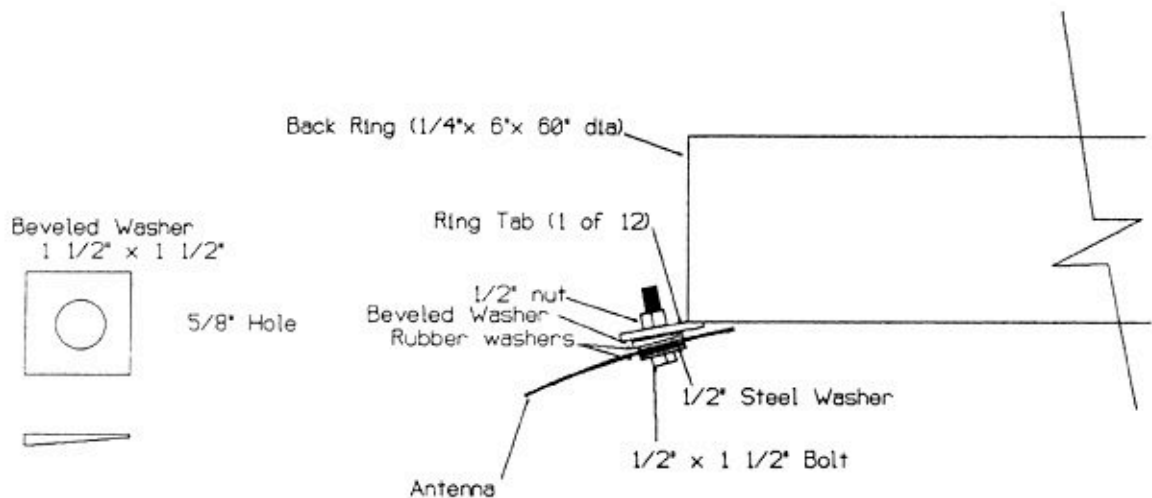
Important!!!

**If you have purchased a 36" F/L Antenna
(3.0m, 3.3m or 3.6m T.I. Eliminator)
follow these directions.**

The following instructions pertain to the Installation of the 36" F/L Reflector only.
If you have purchased a 57.6" F/L Reflector please disregard these Instructions.

When you purchase the 36" F/L Reflector with the 60" Ring Mount the following procedure is necessary in order to conform the Reflector to the Mount.

When Assembling the reflector to the Mount, the 12 Beveled Washers must be installed between the reflector and the mount tab. When you put the Beveled Washer in place, **make sure that the thick part is oriented toward the reflector perimeter.** This is very important as failure to do this will distort the reflector causing loss of signal because the parabolic shape will be compromised.



Important: For 36" f/l Antennas only

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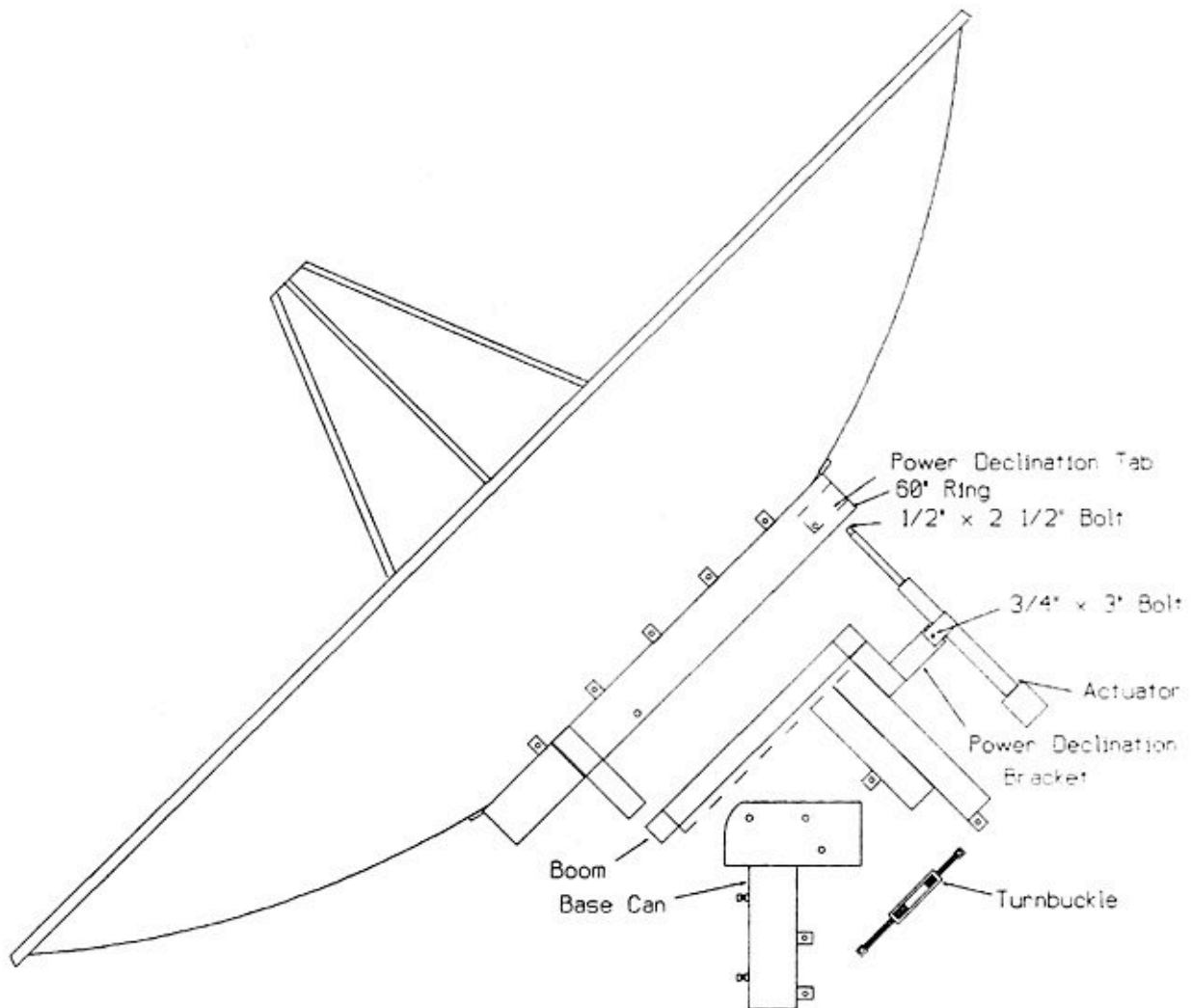
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Polar Mount with Power Declination



Power Declination Option

Look carefully at the drawing. This shows where the declination actuator is placed on the mount. The Polar Mount must be ordered from the factory with this option as it is not a retrofit kit. The end of the actuator bolts to the plate under the top of the 60° ring with a 1/2" x 2 1/2" bolt. The actuator clamp is attached to the actuator as per the manufacturers recommendation. Then using the 3/4" x 3" bolt, slide it through the declination bracket and through the clamp and fasten it using the 3/4" nut.

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Installation of Base Post

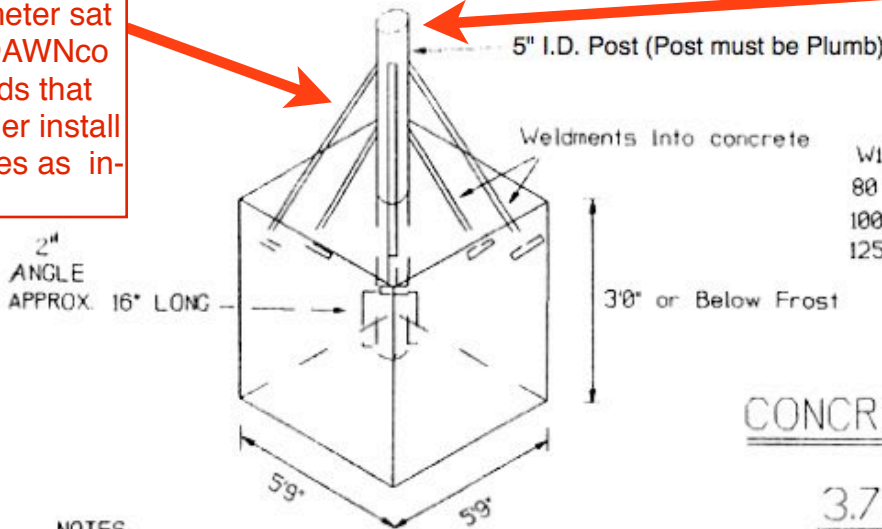
With this Polar mount you have a choice of using the factory base stand or using a base post. If you are using a post, please be sure to check with an engineer to determine the reinforcing required on this single post.

When placing your post in the concrete be sure it is plumb. The following chart shows how much of the post should be out of the ground for the different size antenna's.

3.0m antenna	5'-0" out of ground
3.3m - 3.7m antenna	5'-6" out of ground
3.9m - 4.2m antenna	6'-0" out of ground
4.5m - 5.0m antenna	7'-0" out of ground

OPTION FOR ANGLE BRACES:
When mounting the large 4.2 meter sat antenna, DAWNco recommends that the customer install angle braces as indicated

ALTERNATE 6.625" OD PIPE DIAMETER: When using the #D42F-6.6BaseCan satellite antenna, customer must provide 6.625 inch OD pipe



POST DESIGN CRITERIA:
Wind Speed
80 mph max. 5" schedule 40
100 mph max. 5" schedule 80
125 mph max. 5" schedule 120

CONCRETE PAD FOR
3.7M ANTENNA

NOTES:

- 5 #3 Rebar used in Footings
- Rebar distributed evenly in two directions
- Center of Rebar should be min. of 2" above bottom of pad
- Outside of bars should be 3" from edge of footings.

NOTES:

- PAD MUST EXTEND BELOW FROST DEPTH
- DIMENSIONS FOR CONC. MAY VARY DEPENDING ON SOIL TYPES AND WIND CONDITIONS CHECK WITH LOCAL ENGINEER
- POST MUST BE 5'6" MIN. OUT OF PAD
- POST MUST HAVE WELDMENTS ON SIDE TO PREVENT POST FROM TURNING IN WIND
- POST MUST BE CLEAR 20" FROM TOP
- IF POSSIBLE TRIANGULATE FROM POST TO CONCRETE WITH TUBE OR ANGLE AS IN SKETCH ABOVE
- NOT TO ANY SCALE



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Installation of Base Stand

Looking at the drawings on the following page, you will notice the two base stands we offer. The first is for the 3.7m - 4.2m size antenna and the second is for the 4.5m - 5.0m antennas. Before construction, please request the full size drawings of the unit that will fit your need. **WE RECOMMEND THAT YOU CHECK WITH A LOCAL ENGINEER TO DETERMINE SOIL TYPE AND BEARING TO VERIFY THAT THIS BASE WILL WORK FOR YOUR LOCALE.** In areas of frost, you must go below frost levels or make provisions for frost heave.

The Base Stand unit is designed to go above ground and /or installed on the concrete pad instead of in it. You can install this either of two ways, the first is you can request a template of the base stand and then install J-bolts in the concrete as you are pouring it. Or you can wait until you receive the base stand (having previously poured pad) and drill holes into the concrete using the stand as the template. You must use a type of Lead Head or Garonite, a Resin Mortar to secure the bolts.

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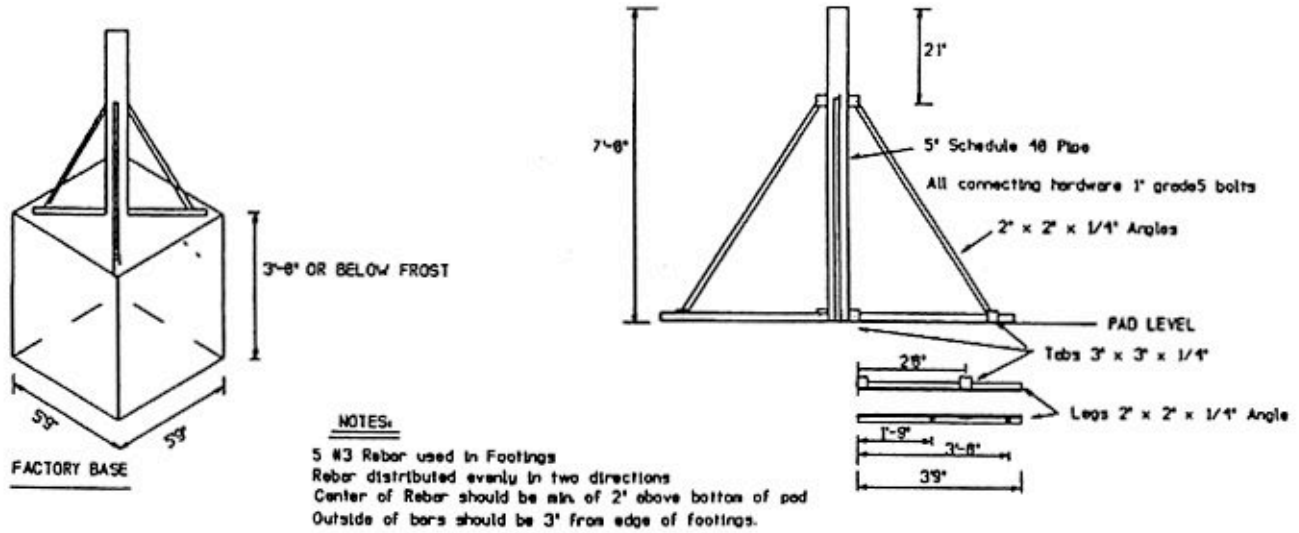


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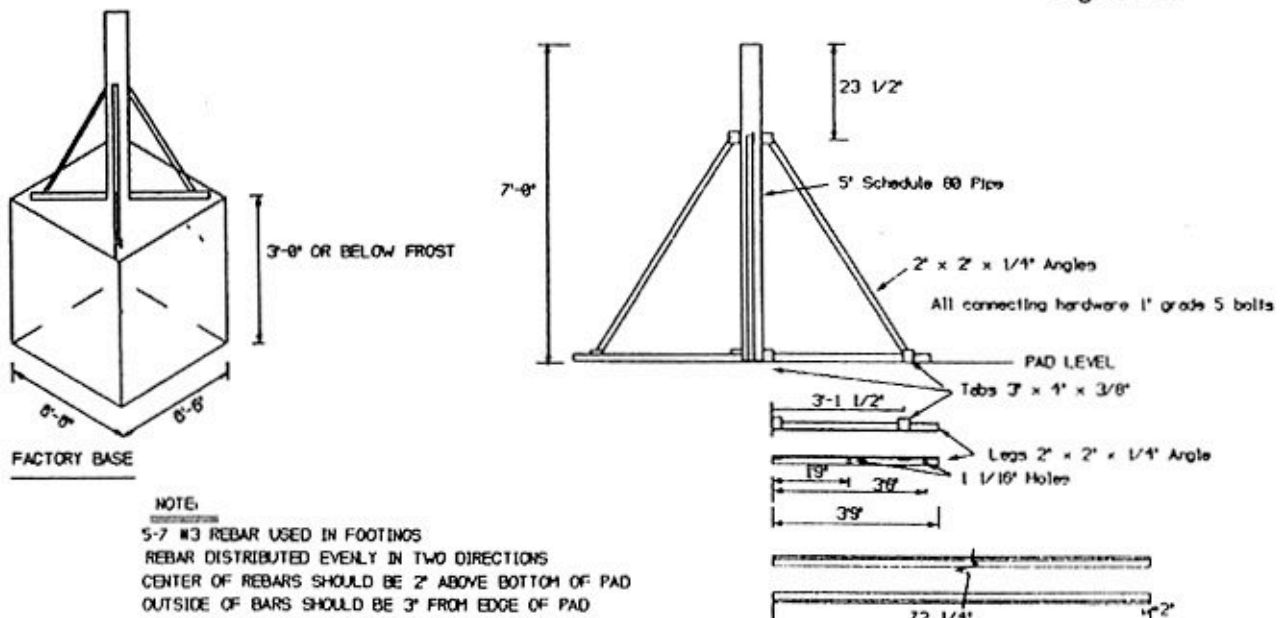
Installation of Base Stand (continued)

Concrete Pad for 3.7 - 4.2m Antennas



Concrete Pad for 4.5 - 5.0m Antennas

Figure #2





Assembly of the Antenna

The antenna will come in either one or two pieces. If you have requested your antenna to be shipped in one piece, please ignore this paragraph and go on to the next one. Those of you who had your antenna shipped in two pieces, you must take the two halves and place them on a flat surface. USE EXTREME CARE WHEN HANDLING A MULTIPLE PIECE ANTENNA. The antenna must always set on the lip when assembling and/or storing, (see figure #3). Before sliding the halves together, one person should get under the antenna with the 1/4" x 3/4" bolts supplied. Using the proper joiner strips, push the bolts from the inside out and secure with the 1/4" nuts. The joiner strips and the dish will have serial numbers that match, so when installing be sure the numbers match. These numbers are on the inside lip of the dish and the end of the joiner strip (see figure #4). Tighten these very tight so the dish holds the shape it had when it was manufactured.

Below is a listing of the additional number of 1/4" bolts that should be in your bolt bag when your antenna is in two pieces.

10' (3.0m)	28 1/4" x 3/4" bolts
11' (3.3m)	28 1/4" x 3/4" bolts
12' (3.7m)	28 1/4" x 3/4" bolts
12'9" (3.9m)	36 1/4" x 3/4" bolts
14' (4.2m)	36 1/4" x 3/4" bolts
14'9" (4.5m)	36 1/4" x 3/4" bolts
16' (5m)	36 1/4" x 3/4" bolts

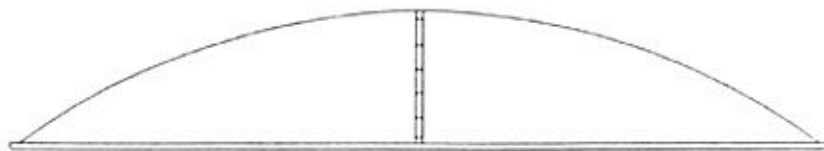


Figure #3

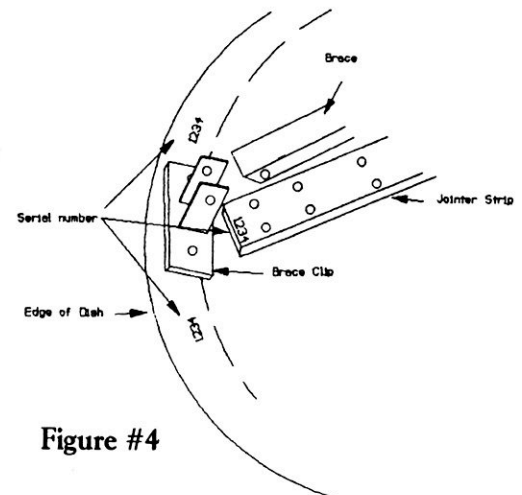


Figure #4



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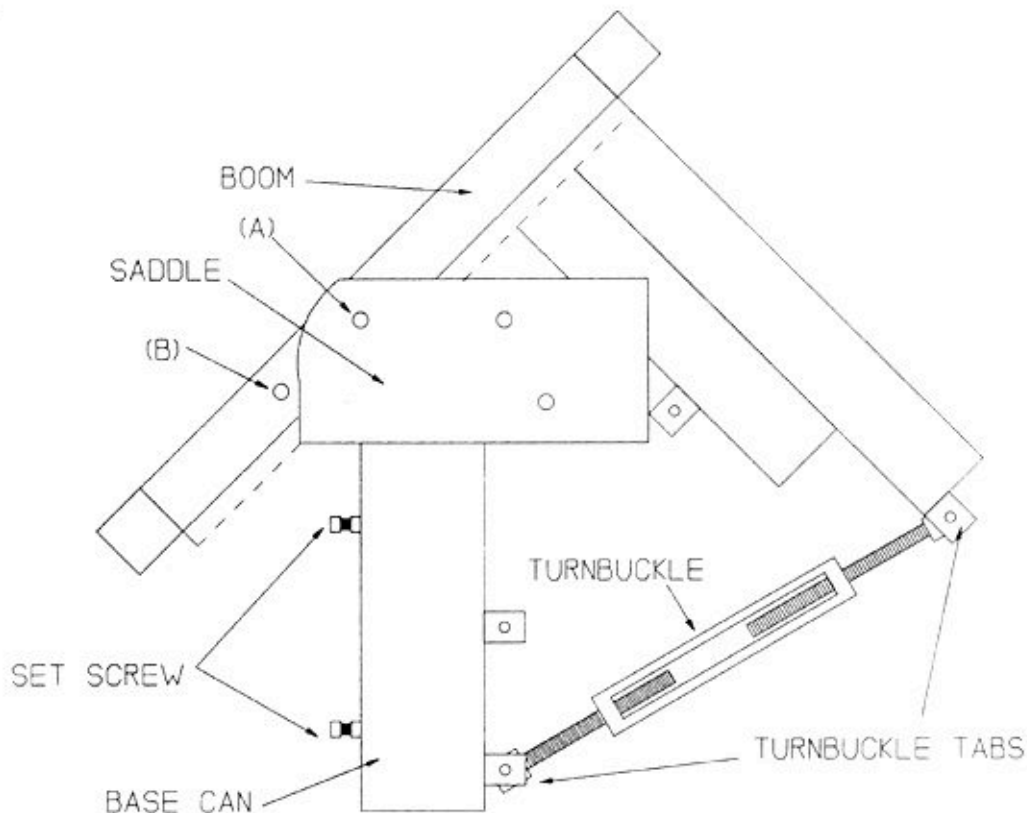
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Preparing the Base Post

Before setting the base can over the base post, please loosen the four set screws on the base can. Now get some help and lift this base can over the base post. Set it so the front ears of the saddle are pointing in a southerly direction. Now tighten down one or two of the set screws. If you are relying on man power to lift the antenna in place, you must now gather your manpower and take the 60" ring and lift it up and set it onto the top of the base can. This is referred to as the saddle, (See drawing below). While you align the hole in the boom to the holes in the ears of the base can, have one of your helpers slip the $\frac{3}{4}$ " x $5\frac{1}{2}$ " bolt through these holes. Yes, the bolt will fit, we actually overdrilled this hole. After you have cooled down, come back and finish reading these instructions!! You may want to use a hammer to get this bolt in place.

Now take the turnbuckle and the two $\frac{1}{2}$ " x $1\frac{1}{2}$ " bolts and place them as in the drawing below. The turnbuckle is used to set your elevation and then never adjusted again. The boom will be set to your latitude. This will be covered again in the section under declination.

In most locations you will use the top hole in the boom. (A) The lower hole is for areas below 20 degrees latitude. (B) Use the second $\frac{3}{4}$ " x $5\frac{1}{2}$ " bolt in the back top of the saddle and tighten it until the sides of the saddle compress against the boom. (See below).





Declination Setting and Power Declination Option

Set the boom to the same degree as your latitude. You will find most road atlases will have this listed. Now adjust the four 3/4" nuts on the top tube moving it in or out to your off set angle. See the chart below. The farther North or South you go from the equator the larger your off set will be. The off set (declination) is the number in degrees between your axis (latitude) and the angle of the face of the antenna. Once this is set it should be left alone.

Units with power declination must have the actuator assembled to the ring and bracket prior to assembling the antenna to the mount. The power declination is a modification made to the mount in the factory and it requires the assembly of the actuator to the bracket on the ring and to the bracket on the back of the boom. Refer to page 15.

Site Latitude	Declination (Offset Angle)	Inclination	Zenith	Site Latitude	Declination (Offset Angle)	Inclination	Zenith
5°	0.75674°	5.13°	5.89°	39°	5.44034°	39.70°	45.15°
10°	1.50699°	10.26°	11.77°	40°	5.55596°	40.71°	46.27°
15°	2.24524°	15.37°	17.62°	41°	5.66969°	41.71°	47.38°
20°	2.96550°	20.47°	23.45°	42°	5.78151°	42.72°	48.50°
25°	3.66193°	25.57°	29.23°	43°	5.89173°	43.72°	49.61°
26°	3.79780°	26.58°	30.38°	44°	5.99987°	44.72°	50.72°
27°	3.93257°	27.59°	31.53°	45°	6.10625°	45.71°	51.82°
28°	4.06606°	28.61°	32.68°	46°	6.21808°	46.71°	52.92°
29°	4.19816°	29.62°	33.82°	47°	6.31344°	47.70°	54.02°
30°	4.32124°	30.63°	34.96°	48°	6.41412°	48.70°	55.12°
31°	4.45864°	31.64°	36.11°	49°	6.51227°	49.71°	56.21°
32°	4.58675°	32.66°	37.25°	50°	6.60936°	50.69°	57.31°
33°	4.71344°	33.67°	38.38°	55°	7.06154°	55.66°	62.72°
34°	4.83835°	34.67°	39.52°	60°	7.45937°	60.59°	68.06°
35°	4.96207°	35.68°	40.65°	65°	7.80106°	65.52°	73.32°
36°	5.08401°	36.69°	41.78°	70°	8.08352°	70.43°	78.52°
37°	5.20452°	37.69°	42.90°	75°	8.30517°	75.33°	83.64°
38°	5.32327°	38.70°	44.03°	80°	8.46446°	80.22°	88.69°



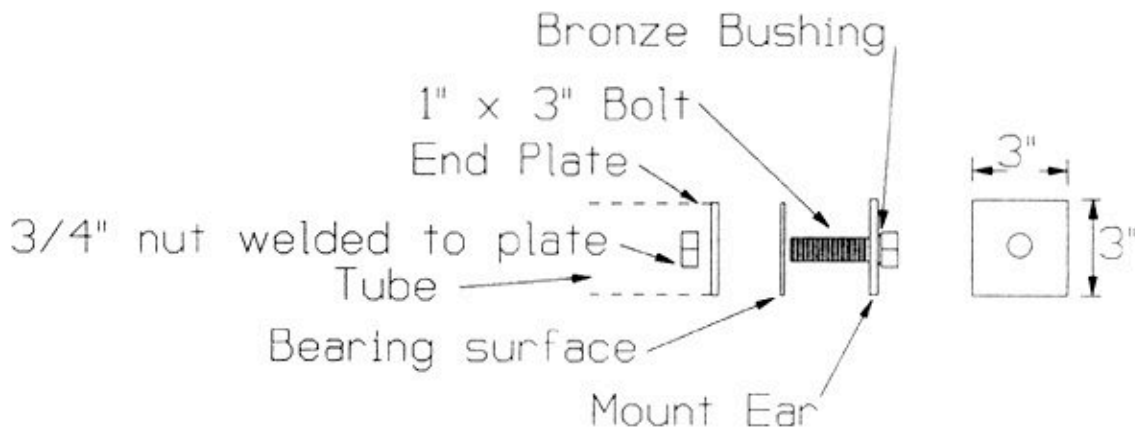
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Assembling Ring to Boom

In most cases the 60" ring is already attached to the boom. If you have requested your shipment as the knocked down version then you will have to assemble these pieces. The easiest way to assemble the ring and the boom is before you set the boom in place on the base can. First attach the top and bottom tubes to the ring. Take the bottom tube and lay it between the ears of the ring. Put the bronze bushing in the ear and insert the 1" x 3" bolt through the bushing. Be sure to put the special wear plate washer between the ear and the end of the tube. Now thread the bolt into the tube. Do the same for the other end. See section A-A.

Now thread one 3/4" nut on each of the two 3/4" declination bolts. Run the nuts most of the way down. Insert the bushing into the top and bottom tubes, two bushings per tube. Now swivel the bottom tube slightly and set the base bolt of the boom in place and secure with 1" nut. Next you can swivel the unit into place so the top tube slides over the declination bolts. Secure by threading the remaining two 3/4" nuts to the declination bolts. Now is the ideal time to attach the Locking Bar if you are not going to motorize this unit. The locking bar can go on either side of the top tube and bolts in place with the 1/2" x 1 1/2" at the tab and 1/2" x 5 bolt at the back of the boom. Lift assembly onto base can and follow instructions from "Preparing the base post" section.



SECTION A-A

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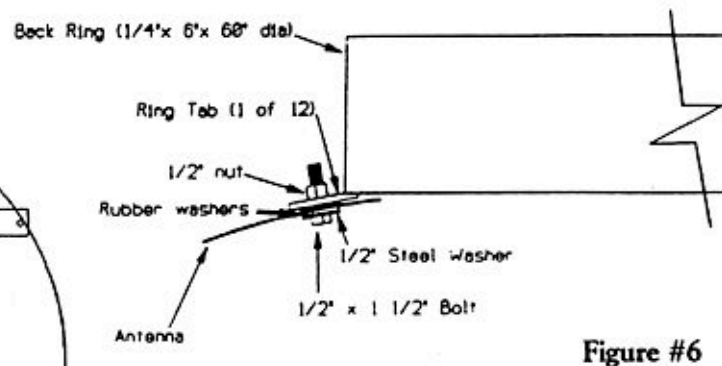
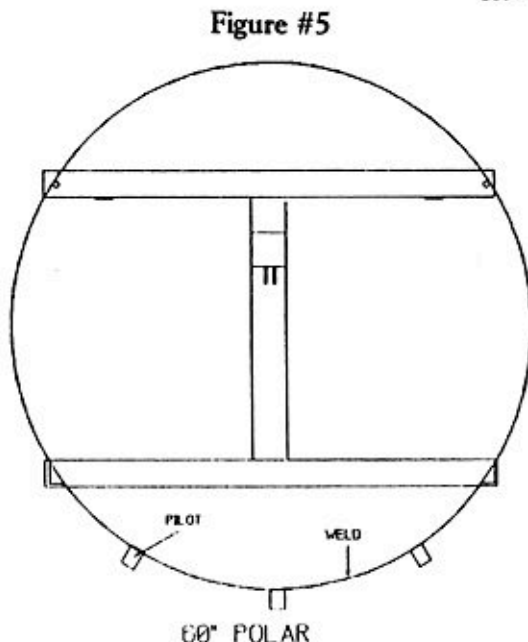
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Assembling the Antenna to the Ring

The mount should be assembled, and now it is time to install the antenna. We recommend two methods of lifting the antenna onto the post. The first is to take the ring and place it on the antenna on the ground and tighten the eight bolts to secure the ring to the antenna. You can now lift this antenna and ring by a crane, forklift or a boom truck. This insures that no pressure will be put on the antenna.

If you are going to use manpower, follow the ensuing instructions. First you must elevate the ring to about 60 degrees. Lock it in place. Now locate the 1/8" pilot holes; one is located next to one of the 12 - 1/2" holes in the dish and the other is found on one of the 12 tabs on the mount next to the 1/2" holes. See drawing #5. (These pilot holes are only to locate the two 1/2" holes they will not line up from the mount to the dish.) When you have located these two holes, use 4-5 people and pickup the dish and set it into the ring making sure the pilot holes lineup. **BE EXTREMELY CAREFUL IN HANDLING THE ANTENNA WHEN SETTING IT INTO THE MOUNT.** Now slip in the 1/2" x 1-1/2" bolts, (leave out every third bolt when using a C, Ku, C/Ku, or S-band feed.) Do not tighten these bolts more than just snug. Now put the dish in a very flat position (birdbath). Have the smallest worker (installer) get into the dish and install the feed and hold the bolts while they are tightened. Install the bolts as in drawing #6. **DO NOT OVER TIGHTEN.**



NOTE:

THE WELD OF THE ANTENNA IS ALWAYS
LINED UP WITH THE BOOM OF THE MOUNT

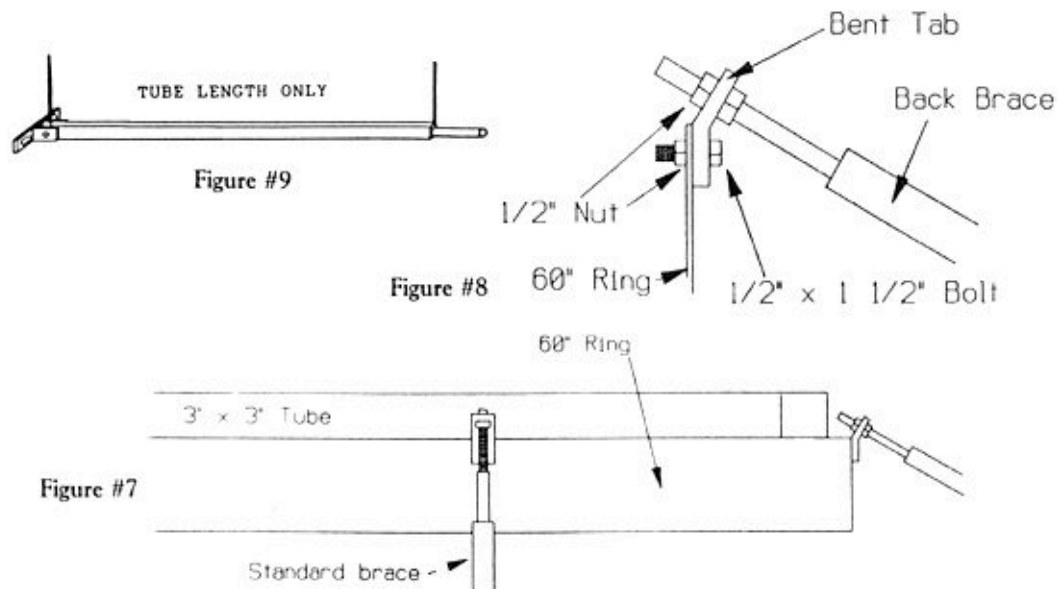


Assembling & Installing the Back Brace

There are eight holes around the rear of the 60' ring to accept the braces. First install the bent tabs. (See figures #7 & #8). The bent tabs are a piece of steel bent in the middle, approximately $1\frac{1}{2}$ " x 3" long with two $\frac{1}{2}$ " holes, you will find these in the bolt bag. Fasten the tabs with $\frac{1}{2}$ " x $1\frac{1}{2}$ " bolts to the 60" ring; now thread one $\frac{1}{2}$ " nut about $\frac{2}{3}$ of the way down on the $\frac{1}{2}$ " rod end of the brace. Slip the rod end through the tab and install another $\frac{1}{2}$ " nut. Only tighten these finger tight. Now go to the edge of the dish and place the two $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts thru the dish and into the end of the brace clip and tighten with $\frac{1}{4}$ " nuts. Repeat this on all four braces on the 3.3m thru 3.7m and eight braces on the 3.9m, 4.2m, 4.5m, & 5.0m antenna.

The following is a list of the different back braces for the different size antenna's. Check this chart to be sure you have the right length braces. Listed is tube length only and does not include the bracket or the bolt in this measurement. Refer to drawing #9.

Dish Size	Focal Length	Tube Length
10' (3.0m)	36" f/1	None
11' (3.3m)	36" f/1	40"
12' (3.6m)	36" f/1	45"
12' (3.7m)	57.6 f/1	45"
12'9" (3.9m)	57.6" f/1	50"
14' (4.2m)	57.6" f/1	55 $\frac{1}{2}$ "
14'9" (4.5m)	57.6" f/1	62 $\frac{1}{2}$ "
16" (5.0m)	57.6" f/1	68 $\frac{1}{2}$ "

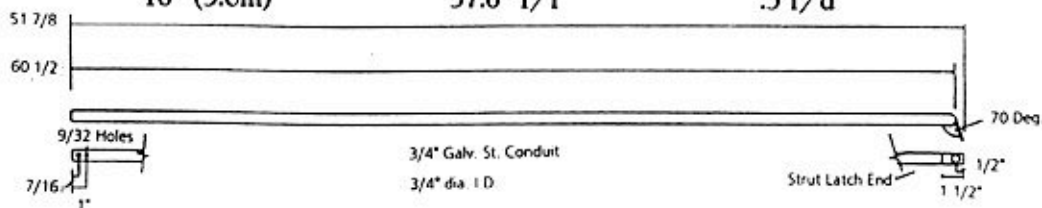




Preparing the C Band Feed Assembly

If the feedhorn you have selected has an adjustable scaler ring, move it to the proper wave guide setting as per the manufacturers instructions. Below, we have listed the focal lengths and focal length/diameter ratios for our commercial antennas, so just find your antenna size and you will have the information to set the scale properly.

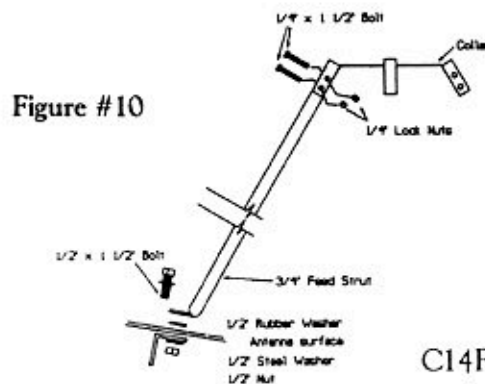
Antenna Size	Focal Length	Focal Distance
10' (3.0m)	36" f/1	.3 f/d
11' (3.3m)	36" f/1	.273 f/d
12' (3.6m)	36" f/1	.25 f/d
12' (3.6m)	57.6" f/1	.4 f/d
14' (4.2m)	57.6" f/1	.342 f/d
14' 9" (4.5m)	57.6" f/1	.33 f/d
16" (5.0m)	57.6" f/1	.3 f/d



Your representative should have asked you what type feed you will be using. We need this information to be assured we are sending the proper collar to attach your feed to our struts. Take the collar and set it on the back of the scaler ring of the feedhorn. Turn it until all three holes line up between the two and insert the 1/4" x 3/4" bolts through the scaler ring and then through the collar; fasten with the 1/4" nuts. Most C-band and dual feeds have a 3-bolt pattern on the scaler ring as described above.

For SEAVEY type feeds, please refer to figure 11.

For CHAPARRAL type feeds, refer to drawing #10. Slip the feed strut into a tab on the collar and line up the two holes. Insert the 2-1/4" x 1 1/2" bolts into the holes and tighten with the 1/4" nuts. Proceed with all four struts then check focal length and tighten down.



(For use of Chaparral (Universal) Feed)

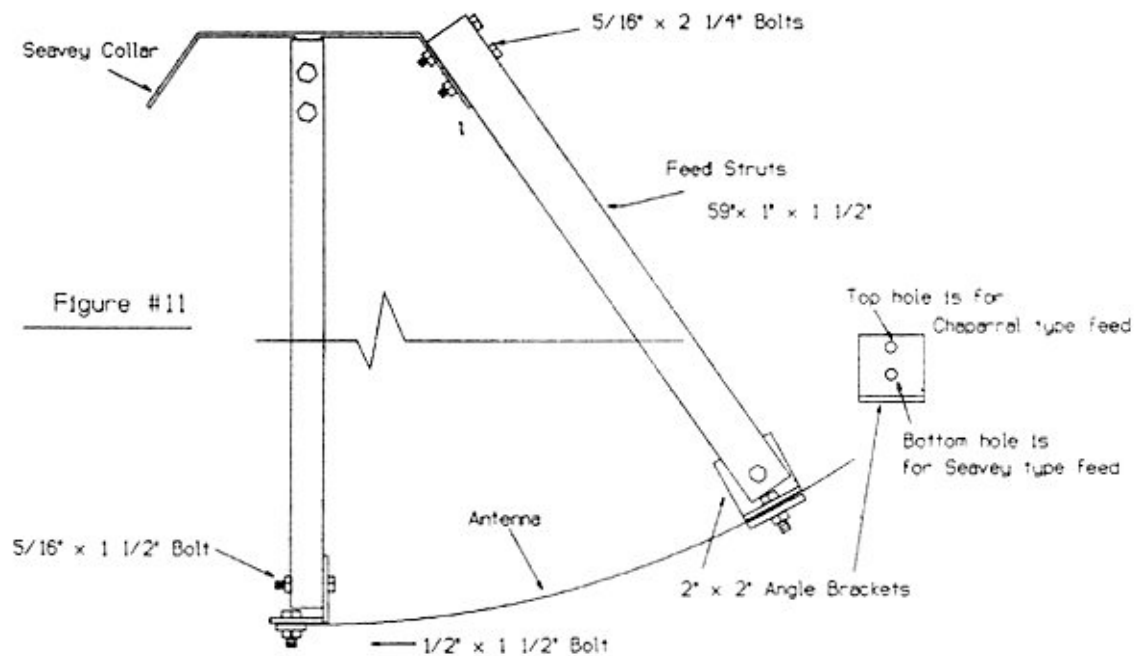


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Seavey Feed Strut

We have developed a new feed strut and collar for the heavier 4 Port Seavey feed assembly. This utilizes the rectangular aluminum tube for the feed strut. Below is the sketch of this feed assembly, it is very simple to install. Each strut has 2 - $\frac{5}{16}$ x $2\frac{1}{4}$ " bolts to attach to the feed collar. Now attach one of the angle brackets (2" x 2") to the antenna with the $\frac{1}{2}$ " x $1\frac{1}{2}$ " bolts. Notice that angle bracket has two holes. You will use the bottom hole. The top hole is for an optional heavy duty Chaparral type feed. Next attach the base of the strut to the angle brackets with the $\frac{5}{16}$ x $1\frac{1}{2}$ " bolts supplied. Align the feed to point directly at the center of the antenna. Now measure the focal length to the front of the scaler rings. (Seavey recommends $f/1$ is measured to front of scaler ring.)



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KU Band Feed Assembly

Several things will be different when using the Ku only feed horns. The collar will still be set up for four struts but the inside of the collar will have our tri-collar bolted to it. When attaching the collar to the throat of the feed horn, first assemble two pieces of the tri-collar and then slide it onto the feed horn, then add the last piece. The collar is assembled by using the included $3/32" \times 1"$ screws. One in each piece (see drawing # 12.) Now put the $5/16"$ end of the strut thru the feed collar as shown in figure #13, remember one $5/16"$ nut goes on either side of the collar. This is to allow you to adjust the focal length. If you find this doesn't give you enough adjustment, you can move the collar on the throat of the feedhorn to allow more adjustment.

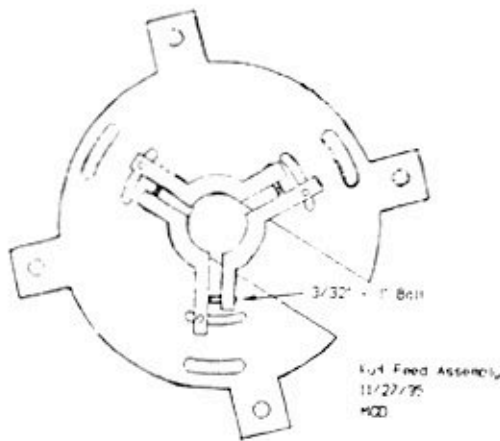


Figure #12

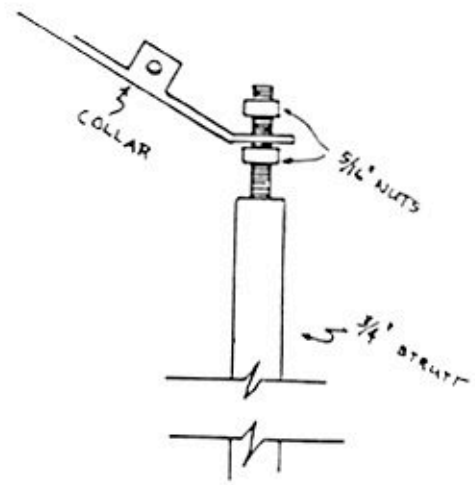


Figure #13

Fine Tuning the Feed

Set the feed at the exact focal length we recommend. It will either be 36" or 57.6". (This does not take into effect the allowance for the feed manufacturer's recommendation that the focal length be $1/4"$ inside the waveguide for C-band and $1/8"$ for KU band.)

Now you must set the feed so that you are looking directly at the center of the dish. Use a focal finder, or anything handy, but the feed must not be tilted in any way.



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Fine Tuning the Antenna

To receive the optimum from your antenna, you must take time to fine tune the antenna. What are the antenna adjustments? They are: make the front surface flat, be sure the feed looks at the center of the dish, and set the proper focal length. You must also be pointed at the satellite and have the feed skew properly adjusted.

We feel that you must use strings to assure the front of the dish is flat. The strings must be taut and run from brace to the opposite brace at 180 degrees. A larger dish with 8 braces needs four strings. Do all adjustments with the braces loose. The strings must touch at the center, if they do not, sight the dish from the side to see which braces should be slightly adjusted to make the front surface of the antenna perfectly flat. CAUTION: Do not overtighten the 12 bolts that hold the dish to the ring as they can distort the dish.

The easy way to assure yourself that the feed is looking at the center is to make a tool. This can be a 1" x 4" board cut to the focal length of the dish. Held vertical against the feed it should point at the center of the antenna, this will be true at the horizontal plane also.

We no longer suggest using a spectrum analyzer to fine tune the antenna. Many of the adjustments are done without any measurement of the signal, and in fact require no signal at all. The adjustment of making the front surface flat, adjusting the focal length, and aligning the feed will be done without signal.

Use a portable TV and a receiver to adjust skew, azimuth and elevation. When you are on a satellite, the skew can be adjusted from bad to bad and the center found. The same should be done for azimuth and elevation, going from bad to bad and then returning to center. We have found over the years this is the easiest and best way to make sure your antenna is fine tuned. If you have a test pattern or color bars you may use a spectrum analyzer to make some minor adjustments, but we have found if looking at active video it is almost impossible to ascertain proper levels in adjustments.

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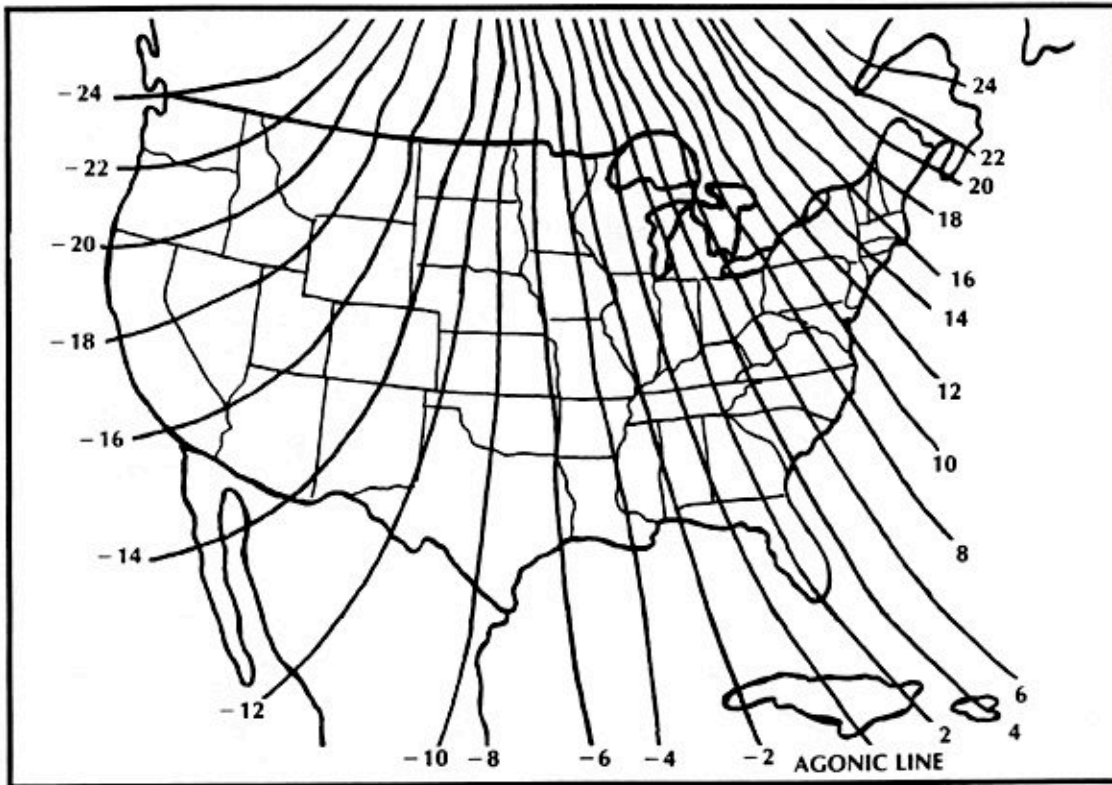
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Magnetic Variation Chart



Magnetic Variation

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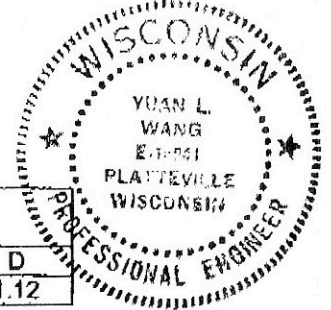


WIND LOAD SPECS

Table 1 - Velocity Pressures, q, and Wind Load F
10'(3.0M) antenna Af = 73.80
Cf = 1.20 I = 1.00

Kz Exposure			
A	B	C	D
0.19	0.50	0.98	1.37

Gz Exposure			
A	B	C	D
2.01	1.51	1.26	1.12



Velocity	q(psf) Exposure				F(Pounds) = q*Gz*Cf*Af Exposure			
	A	B	C	D	A	B	C	D
70.00	2.38	6.27	12.29	17.19	424	839	1372	1706
80.00	3.11	8.19	16.06	22.45	554	1095	1792	2226
90.00	3.94	10.37	20.32	28.41	701	1386	2268	2618
100.00	4.86	12.80	25.09	35.07	866	1712	2799	3479
125.00	7.60	20.00	39.20	54.80	1353	2675	4374	5435

Wind Load Sample Calculation

WIND LOAD

According to request, the design wind load is for antennas to be mounted on top of buildings 20 feet or less in height. Diameters for antennas are: 3 M (10'), 3.3 M (11'), 3.7 M (12'), and 4.2 M (14'). The design wind speed are for 70, 80, 90, 100, and 125 mph.

WIND LOAD DESIGN

From Table 4 of 6.4.2, ASCE 7-93

$$F = q_z G_z C_f A_f$$

where

F = design wind force, in pounds given in Table 4, ASCE 7 - 93

q_z = velocity pressure evaluated at height Z above ground, in pounds per square foot given by Eq. 3 of 6.4.2, ASCE 7 - 93

G_z = gust response factor evaluated at height Z above ground given in Table 8 of 6.6, ASCE 7 - 93

C_f = force coefficient to be used in determination of wind load for other structures given in Table 13, ASCE 7 - 93

A_f = area of other structures or components and cladding thereof projected on a plane normal to wind direction, in square feet

For a 11' antenna, with the receiving dish at 70° from the horizontal and the building is in exposure C category, the wind load F, at 70 mph, is:

$$F = 12.29 * 1.26 * 1.2 * 89 = 1654 \text{ lbs.}$$



Note:

1. See attached sheets for computation of q_z .
2. The computed wind load is for exposure C. See 7-93 for exposure categories.

COMPUTATION OF q_z

$$q_z = 0.00256 * K_z * (IV)^2 \quad \text{Eq. 3, ASCE 7-93}$$

where

K_z = velocity pressure exposure coefficient evaluated at height Z
 I = Importance factor
 V = wind speed in miles per hour

For a 11' antenna mounted on top of a 20' building, the velocity pressure, q , is:

70 mph	$q_z = 0.00256 * 0.98 * (1 * 70)^2 = 12.29$ pounds/sq. feet
80 mph	$q_z = 0.00256 * 0.98 * (1 * 80)^2 = 16.06$ pounds/sq. feet
90 mph	$q_z = 0.00256 * 0.98 * (1 * 90)^2 = 20.32$ pounds/sq. feet
100 mph	$q_z = 0.00256 * 0.98 * (1 * 100)^2 = 25.09$ pounds/sq. feet
125 mph	$q_z = 0.00256 * 0.98 * (1 * 125)^2 = 39.20$ pounds/sq. feet