

**.90M/1.0M/1.2M Offset Antenna**  
**Receive only and**  
**Transmit-Receive**  
**INSTALLATION &**  
**ASSEMBLY INSTRUCTIONS**

# PATRIOT.

## LIMITED TWELVE (12) MONTH WARRANTY

This PATRIOT ANTENNA equipment is warranted to be free from defects in material and workmanship under normal use and service. PATRIOT ANTENNA shall repair or replace defective equipment, at no charge, or at its option, refund the purchase price, if the equipment is returned to PATRIOT ANTENNA not more than twelve (12) months after shipment. Removal or reinstallation of equipment and its transportation shall not be at cost of PATRIOT ANTENNA except PATRIOT ANTENNA shall return repaired or replaced equipment freight prepaid.

This Warranty shall not apply to equipment which has been repaired or altered in any way so as to affect its stability or durability, or which has been subject to misuse, negligence or accident. This Warranty does not cover equipment which has been impaired by severe weather conditions such as excessive wind, ice, storms, lightning, or other natural occurrences over which PATRIOT ANTENNA has no control, and this Warranty shall not apply to equipment which has been operated or installed other than in accordance with the instructions furnished by PATRIOT ANTENNA.

Claimants under this Warranty shall present their claims along with the defective equipment to PATRIOT ANTENNA immediately upon failure. Noncompliance with any part of this claim procedure may invalidate this warranty in whole or in part.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER AGREEMENTS AND WARRANTIES, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. PATRIOT ANTENNA DOES NOT AUTHORIZE ANY PERSON TO ASSUME FOR IT THE OBLIGATIONS CONTAINED IN THIS WARRANTY AND PATRIOT ANTENNA NEITHER ASSUMES NOR AUTHORIZES ANY REPRESENTATIVE OR OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE EQUIPMENT DELIVERED OR PROVIDED.

IN NO EVENT SHALL PATRIOT ANTENNA BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, INTERRUPTION OF BUSINESS, OR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND.

In no event shall PATRIOT ANTENNA be liable for damages in an amount greater than the purchase price of the equipment.

Some states do not allow limitations on how long an implied warranty lasts, or allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

PATRIOT ANTENNA has the right to void the warranty when the antenna is installed by someone other than a certified installer.

*Product Serial Number-* \_\_\_\_\_

*Date Purchased-* \_\_\_\_\_

### ***Patriot Antenna Systems***

704 North Clark Street

Albion, MI 49224 USA

Tel: (517)629-5990

Fax: (517)629-6690

E-mail: [info@sepatriot.com](mailto:info@sepatriot.com)

## **IMPORTANT!!!**

INSTALLATION OF THIS PRODUCT SHOULD BE PERFORMED ONLY BY A PROFESSIONAL INSTALLER AND IS NOT RECOMMENDED FOR CONSUMER D.I.Y. (DO-IT-YOURSELF) INSTALLATIONS.

## **DANGER!!!**

**WATCH FOR WIRES! Installation of this product near power lines is dangerous. For your own safety, follow these important safety rules.**

1. Perform as many functions as possible on the ground.
2. Watch out for overhead power lines. Check the distance to the power lines before starting installation. We recommend you stay a minimum of 6 meters (20 feet) from all power lines.
3. Do not use metal ladders.
4. Do not install antenna or mast assembly on a windy day.
5. If you start to drop antenna or mast assembly, get away from it and let it fall.
6. If any part of the antenna or mast assembly comes in contact with a power line, call your local power company. **DO NOT TRY TO REMOVE IT YOURSELF!** They will remove it safely.
7. Make sure that the mast assembly is properly grounded.

## **WARNING!!!**

**Assembling dish antennas on windy days can be dangerous. Because of the antenna surface, even slight winds create strong forces. For example, a 1.0m antenna facing a wind of 32 km/h (20 mph) can undergo forces of 269 N (60 lbs.). Be prepared to safely handle these forces at unexpected moments. Do not attempt to assemble, move or mount dish on windy days or serious, even fatal accidents may occur. PATRIOT ANTENNA SYSTEMS is not responsible or liable for damage or injury resulting from antenna installations.**

## **WARNING!!!**

**Antennas improperly installed or installed to an inadequate structure are very susceptible to wind damage. This damage can be very serious or even life threatening. The owner and installer assumes full responsibility that the installation is structurally sound to support all loads (weight, wind & ice) and properly sealed against leaks. PATRIOT ANTENNA SYSTEMS will not accept liability for any damage caused by a satellite system due to the many unknown variable applications.**

## **INTRODUCTION**

Thank you for purchasing your Patriot Commercial Antenna. We trust that you will find this to be a well designed product that will provide many years of reliable service. This manual covers the assembly and installation of the .90m/1.0m/1.2m Antenna System. Read this manual thoroughly before beginning assembly. For best results in the assembly process. Perform each step in the same sequence as listed in this manual. Record the serial number of the unit on to page 2 for future reference and read the warranty information. The serial number can be found on the antenna back structure.

## **UNPACKING AND INSPECTION**

Shipping cartons should be unpacked and contents checked for damaged or missing parts. Should there be any parts that are damaged or missing, please contact technical support for replacement.

## **SITE SELECTION**

The main objective of conducting a site survey utilizing a compass and inclinometer is to choose a mounting location on the ground that will give you the greatest amount of swing for azimuth and elevation for present as well as future use. A thorough preinstallation site survey is strongly recommended because it can alert you to any “look angle”, soil, wind or other problems.

The first and most important consideration when choosing a prospective antenna site is whether or not the area can provide an acceptable “look angle” to the satellite. A site with a clear, unobstructed view facing south, southeast is required. Your antenna site must be selected in advance so that you will be able to receive the strongest signal available. Also consider obstructions that may occur in the future such as the growth of trees.

It is important to conduct an on-site survey with a portable antenna or with a compass and clinometer to avoid interference, obstructions, etc.

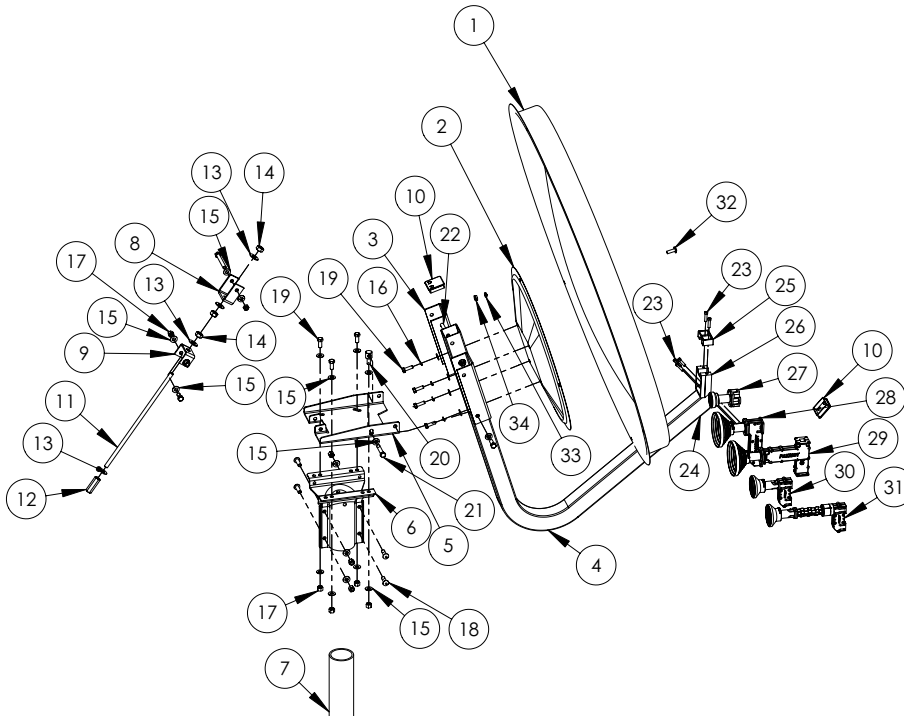
When selecting “look angle”, be sure to observe and take readings approximately 10 deg to the left and right, above and below your selected “look angle”.

Before Ground Pole Installation, the soil type should be checked because soil conditions vary widely in composition and load bearing capacity. A soil check will help you to determine the type and size of foundation required to provide a stable base for the antenna.

Before digging is done, information regarding the possibility of underground telephone lines, power lines, storm drains, etc., in the excavation area should be obtained from the appropriate agency.

As with any other type of construction, a local building permit may be required before installing an antenna. It is the property owner’s responsibility to obtain any and all permits. Ground mounts are certified for 125 mph wind survival.

# Parts and Hardware



ITEM	PART NO.	DESCRIPTION	QTY.
1	209(.90m)210(1.0M) 212(1.2M)001	Reflector, .90m, 1.0m, or 1.2m	1
2	1R2092810	Back Plate Tx Offset	1
3	20982	Bracket Elevation Adaptor	2
4	209(.90M)210(1.0M) 212(1.2M)003	Ku Feed Support, .90m, 1.0m, or 1.2m	1
5	210081	Bracket Azimuth	1
6	210080	Bracket, 3" Pipe	2
7	1RSP02740(2.7/8")1RSP03040(3")	Mast Pipe, 2.7/8" or 3" O.D. (not included)	1
8	210083	Upper Clevis, Elevation	1
9	210082	Lower Clevis, Elevation	1
10	HWD Prebag H1101	Plastic Plugs	2
11	HWD Prebag H1101	1/2-20 Thread Elevation Rod 13"	1
12	HWD Prebag H1101	Adjusting Nut 1/2" Thread 2" Long	1
13	HWD Prebag H1101	1/2" SAE Flat Washer	4
14	HWD Prebag H1101	1/2 - 20 Fin Hex Nut	3
15	HWD Prebag H1101	3/8" SAE Flat Washer	27
16	HWD Prebag H1101	5/16" Lock Washer	4
17	HWD Prebag H1101	3/8 - NYL INST L/N	15
18	HWD Prebag H1101	3/8 - 16 x 1 1/2 Carr. Bolt, G-2	4
19	HWD Prebag H1101	5/16-18 x 5/8" HCS G-2	8
20	HWD Prebag H1101	Fine Az Adjusting Bolt (Pre-Assembled)	1
21	HWD Prebag H1101	3/8 - 16 x 2 HCS, G-2 (Pre-assembled)	1
22	HWD Prebag H1101	3/8 - 16 x 3 HCS, G-2	3
23	HWD Prebag H1101	1/4 - 20 x 1 SOG Cap SC	5
24	HWD Prebag H1101	1/4 - 20 Fin Hex Nut	5
25	PEO400A	Feed Holder Top	1
26	PEO400B	Feed Holder Bottom	1
27	TXFD-KA/KUR	Ku Rx Only, Feed Assembly (Optional)	1
28	TX-FDOMTKUL	Ku Tx/Rx XPol, Feed Assembly (Optional)	1
29	TXFD-DPLCOPOL/TXFD-KUL	Ku Tx/Rx CoPol, Feed Assembly (Optional)	1
30	TXFD-OMTKAL	Ka Tx/Rx Linear Pol, Feed Assembly (Optional)	1
31	TXFD- OMTPLKA	Ka Tx/Rx Circular Pol, Feed Assembly (Optional)	1
32	5-16/18 Bolt	5-16/18 Bolt	4
33	5-16/18 Lockwasher	5-16/18 Lockwasher	4
34	5-16/18 Nut	5-16/18 Nut	4

## Assembly tools required

- 1- 1/4" allen wrench (supplied)
- 1- 5/32" allen wrench
- 2- Combination wrench -3/4"
- 2- Combination wrenches - 9/16"
- 2- Combination wrenches - 1/2"
- 2- Combination wrenches - 7/16"
- 1- 9/16 ratcheting wrench for Fine Az-El Adjustment
- 1- Inclinator (for sighting in)
- 1- Compass (for sighting in)

## Preinstallation materials checklist

Grounding Rod Clamp & Grounding Block - As required by National Electric Code or local codes.

Ground Wire - #10 solid copper or as required by National Electric Code or local codes.

Coaxial Cable (Size & Length required).

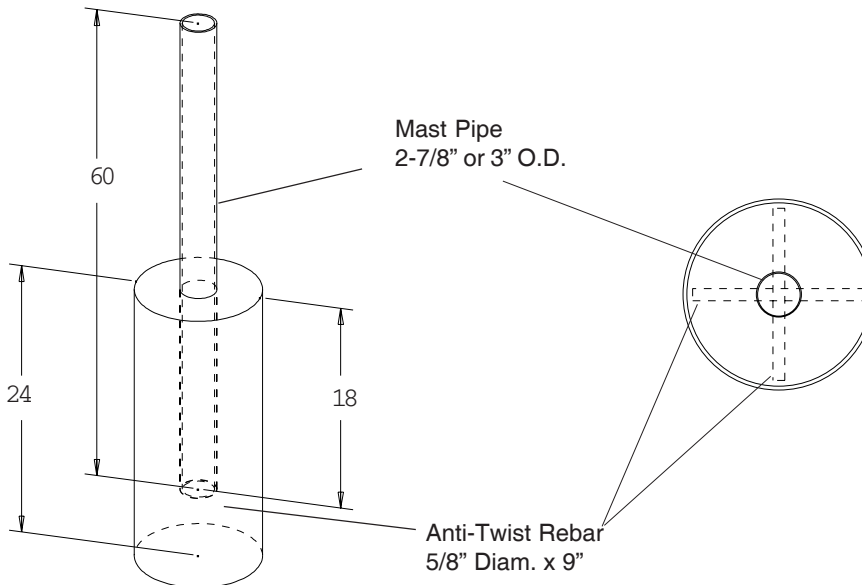
Concrete - (See Ground Pole section below).

#3 Rebar - (See Ground Pole section below). Deformed steel per ASTM A615, grade 40 or 60.

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## In-Ground Mast Foundation

- Steel Mast: L=72"; **2-7/8" (73mm) or 3" (76mm) O.D. Tubing** Plumb within 1 deg.
- Concrete: 3000 psi at 28 days, poured against undisturbed soil (Allow concrete 24 hour set time before installation of antenna)
- Soil Bearing Capacity > 2000 psf.
- Ground the Antenna to meet applicable local Codes.



-Universal mount/wall mount #CHA-WR300 not shown.

## Non-Penetrating Mount (optional)

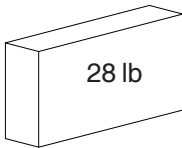
1. Assemble the Non-Penetrating mount per the supplied instructions to provide the mast for the mount installation.
2. Refer to the ballast chart for the required ballast to be placed in the Non-Pen Ballast Trays.

NOTE: Higher elevation angles can use less ballast. If there are any possible future elevation adjustments that could result in a lower elevation angle **use the 22 deg elevation angle from the chart for the ballast requirement!**

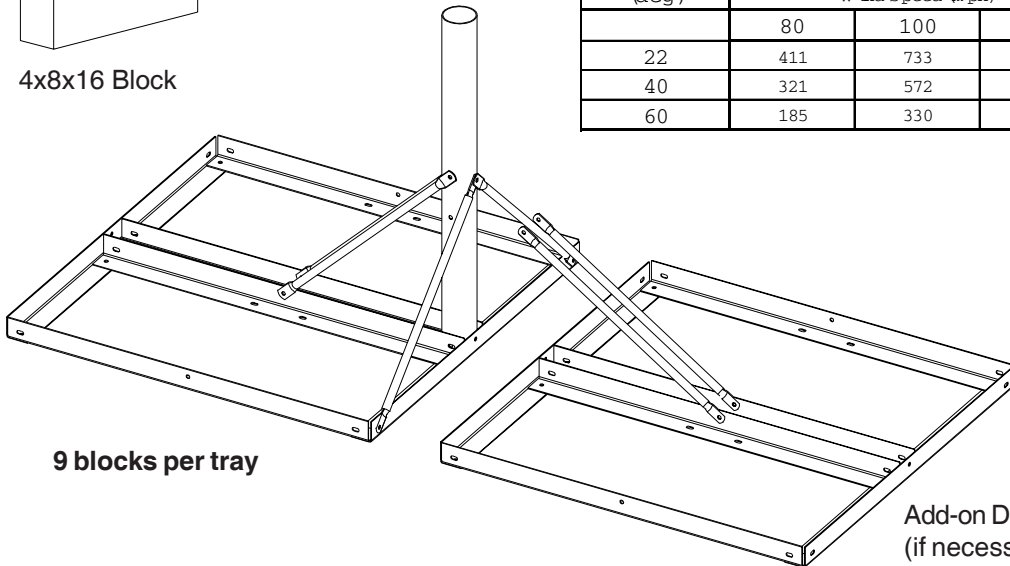
90cm Ballast Chart (use single tray PTX-NP300S)			
Elevation (deg)	Ballast Required (lbs)		
	Wind Speed (mph)		
	80	100	125
22	207	391	679
40	162	305	529
60	93	176	305

100cm Ballast Chart (use single tray PTX-NP 300S)			
Elevation (deg)	Ballast Required (lbs)		
	Wind Speed (mph)		
	80	100	125
22	259	480	826
40	202	374	644
60	116	216	372

120cm Ballast Chart (must use dual tray PTX-NP300D)			
Elevation (deg)	Ballast Required (lbs)		
	Wind Speed (mph)		
	80	100	125
22	411	733	1236
40	321	572	964
60	185	330	556



4x8x16 Block



9 blocks per tray

Add-on Dual Tray (if necessary)



**\* SPECIAL WIND REGIONS:**

Records or experience indicates that the wind speeds are higher in mountainous terrain, gorges, and ocean promontories and shall be examined for unusual wind conditions. Contact your local meteorological authority and a local civil or professional engineer if your installation is in one of these areas.



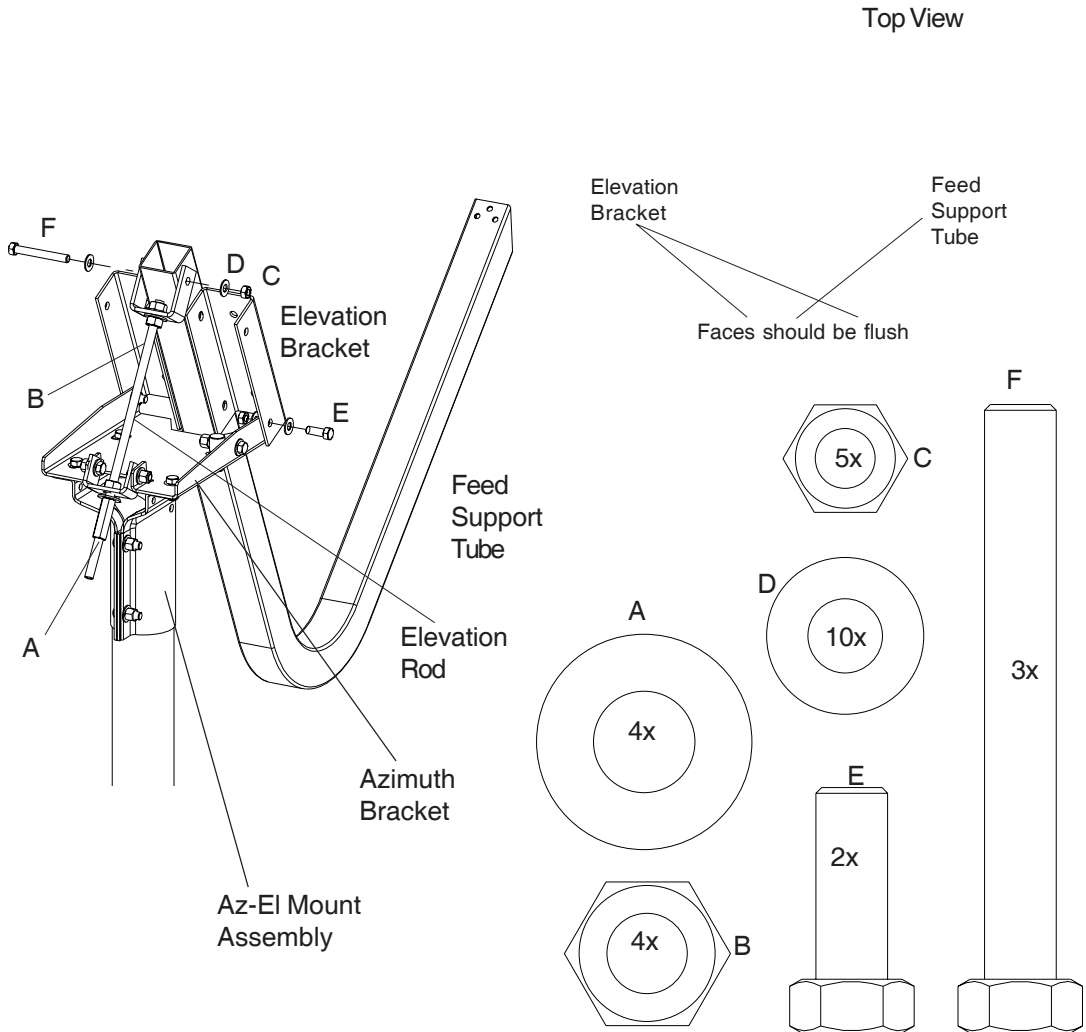


## Mount Assembly Continued

**NOTE: Ka band Antenna's ,Take extra care in assembly and handling - Do Not Stack!.**

2. Attach the Elevation Brackets (2) to the Feed Support Tube and the Azimuth Bracket as shown. Partially tighten all this hardware at this time.

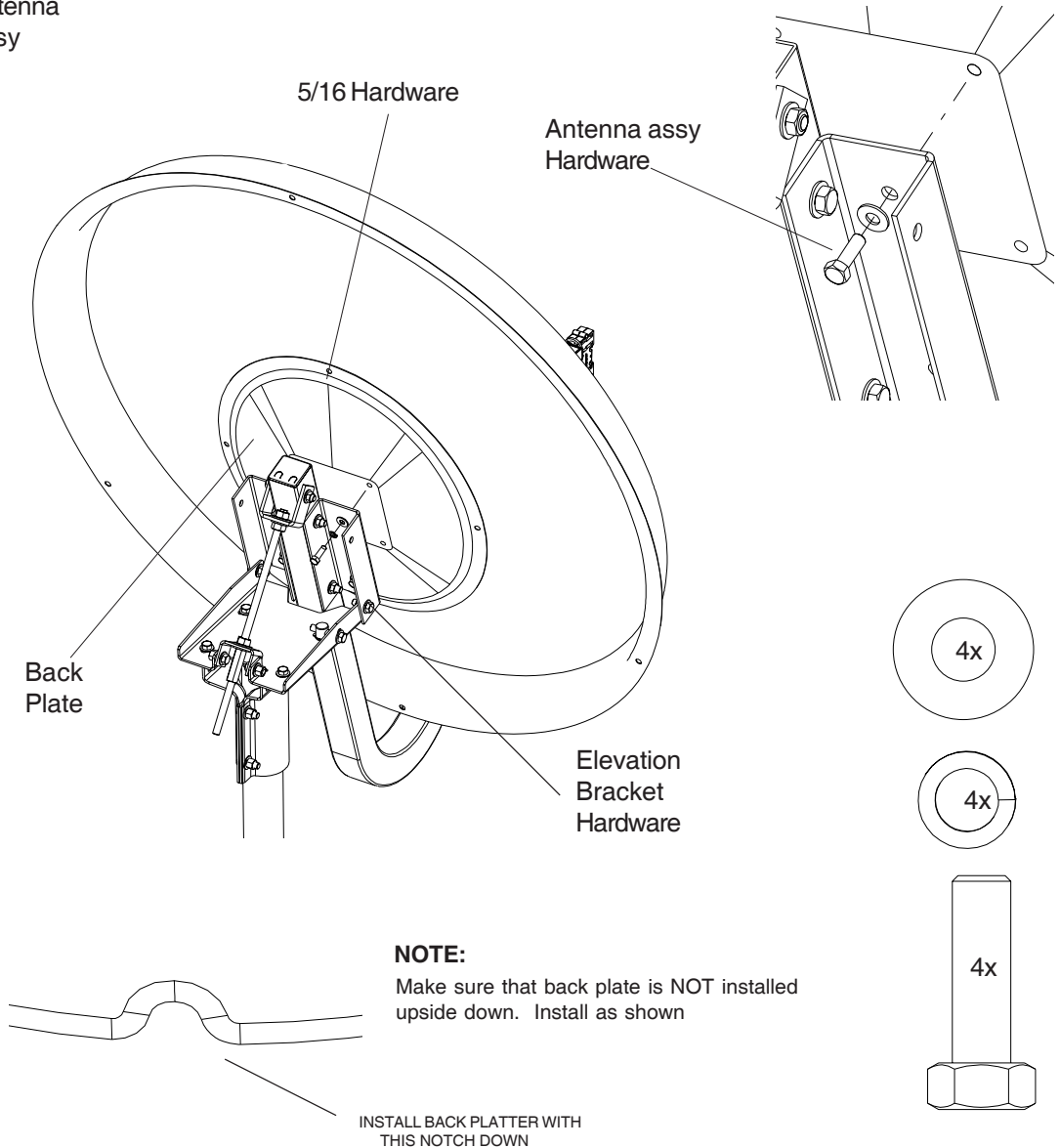
3. Assemble the Elevation rod with nuts and washers as shown.



## Reflector Assembly

1. Assemble Back Plate to Antenna using (4) 5/16x1 bolts, lockwashers, and nuts.
2. Attach the Antenna Assembly to the Elevation Brackets using the illustrated hardware.
3. Tighten the Antenna Assembly Hardware, then tighten the Elevation Bracket hardware.

Antenna  
assy

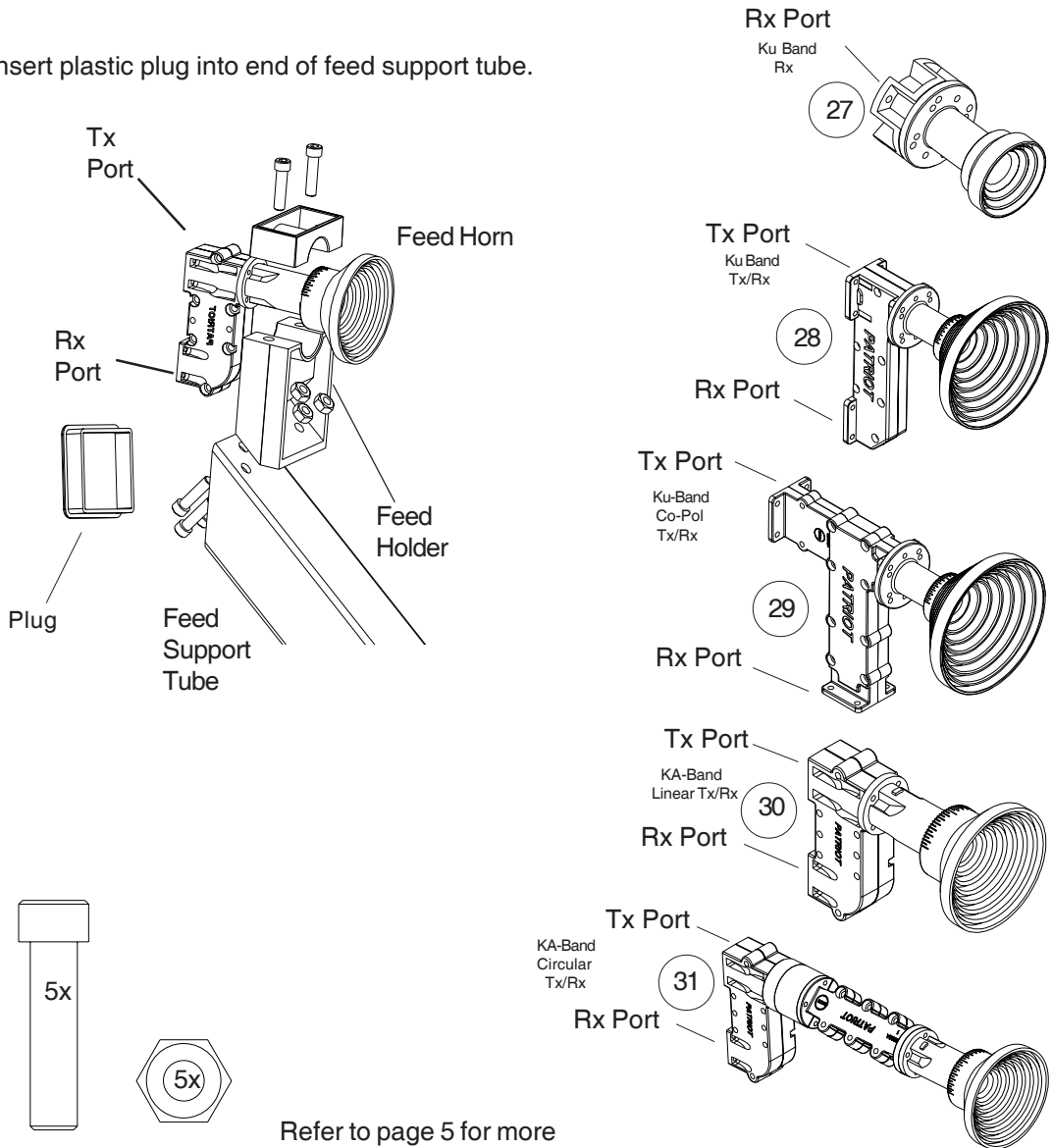


## Feed Assembly

1. Attach the relevant Feed Assembly.
2. Insert the Feed Assembly into the Feed holder and assemble to the Feed Support Tube using the hardware illustrated below.

NOTE: 2 nuts slide into the back of the Feed Holder.

3. Insert plastic plug into end of feed support tube.



Refer to page 5 for more information of Feed Assemblies.

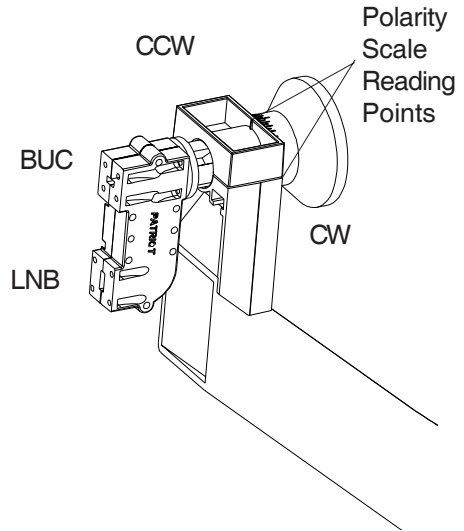
### Feed Adjustment (Polarity tuning)

NOTE: Linear Polarity systems only

1. Adjust the Feed to the appropriate skew angle using the provided scale reference.

NOTE: Refer to the chart below for polarization angle. Elevation and polarity are both dependent on site azimuth and the difference between satellite and site longitude.

NOTE: Some satellites have a slant angle with respect to the satellite belt angle. Contact the satellite operator for details.

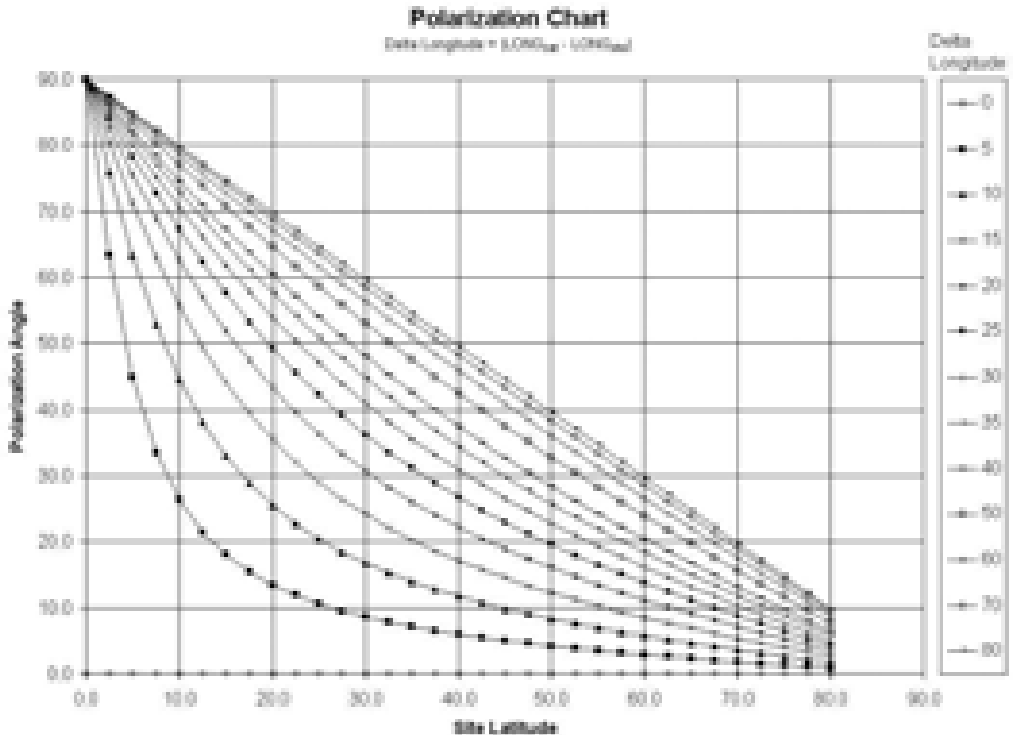


### Feed Rotation Chart

Install site west  
of satellite  
CW  
CCW

Install site East  
of satellite  
CCW  
CW

Northern Hemisphere  
Southern Hemisphere



## Antenna Pointing

NOTE: The Reflector contains a 22 degree offset look angle for the 1.0/1.2 and 21 degree angle for the .90m. Therefore, when the reflector aperture is perpendicular to the ground, the antenna is actually looking 22 degrees, or 21 degrees for the .90, in elevation. All mount hardware should be firm, but not tight.

1. Adjust the reflector up or down in elevation by turning the two 1/2" hex nuts at the Clevis until the desired elevation is measured (taking reading from the face of the reflector).

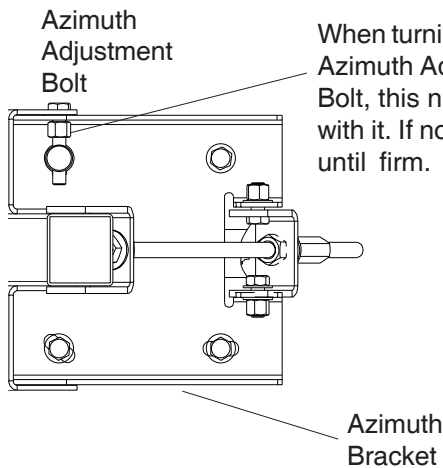
Elevation of Satellite above horizon = Measured angle from face of reflector minus 22 or 21 respectfully.

2. Azimuth Adjustment: With the electronics set to acquire the satellite, rotate the antenna in azimuth until the satellite is found. Roughly obtain the strongest signal and tighten the hardware on the Pipe Brackets.

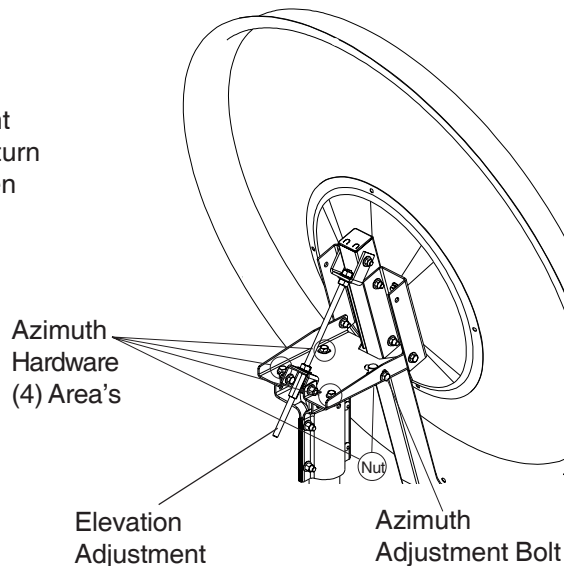
NOTE: If signal is not found on first pass of Azimuth, adjust elevation up or down in 2 deg increments until signal is found.

3. Peak the satellite signal by fine adjustments made in both azimuth and elevation until the optimum signal is achieved.

Note: With Azimuth hardware snug (loose enough to allow adjustment), turning the Azimuth bolt allows  $\pm 3$  deg fine adjustment.



When turning the Azimuth Adjustment Bolt, this nut must turn with it. If not, Tighten until firm.



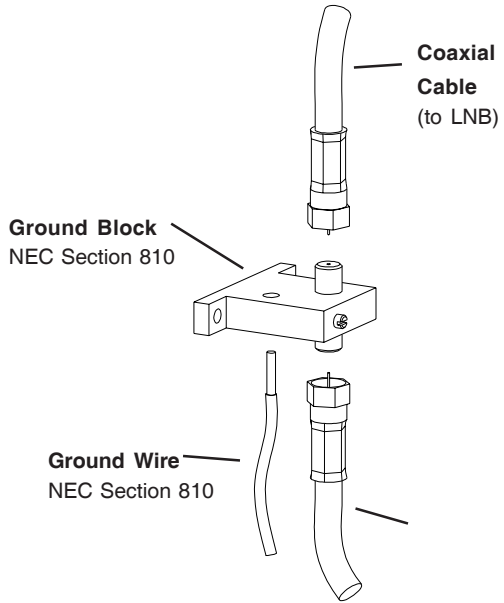
4. Tighten all mount hardware

5. Patriot recommends the use of cross pol nulling using a spectrum analyzer during TX/RX installations. After tightening the azimuth and elevation hardware, peak the co-pol signal using the spectrum analyzer. Then rotate the feed assembly roughly 90 degrees to obtain a cross pol null. Fine tune the null. The scale on the feed horn can be used with the tick mark on feed holder top or the seam between feed holder top and bottom. The tick mark and seam are 90 deg. apart. Note that changes may be necessary to the resolution and video bandwidth to bring the signal above the noise floor. Note the angle of optimum cross pol null. Rotate the feed back exactly 90 degrees and tighten the feed clamp.

# Grounding

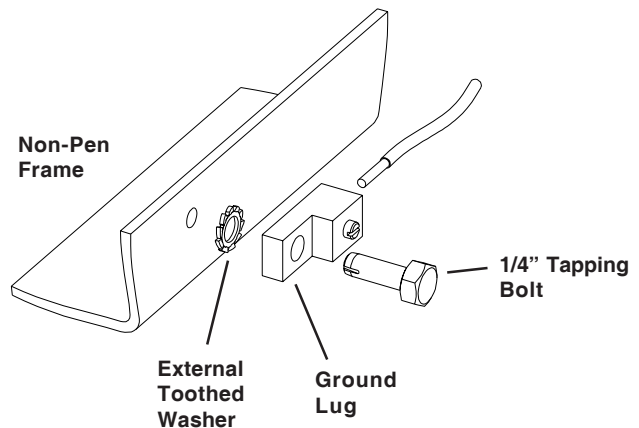
## Grounding Antenna Feed Cables

1. Ground antenna feed cables in accordance with current National Electric code and local electric codes. The illustration shows a typical grounding method. Clamps that provide a solid connection between ground wire and a ground source should be used.



## Grounding Non-Penetrating Mount Frame (if applicable)

1. Ground the Non-Penetrating mount frame. The illustration shows a typical grounding method. Refer to the NEC Section 810 and local electric codes for specific instructions on grounding the remaining end of the ground wire.



<b>Specifications</b>	<b>Ku Band .90M</b>	<b>Ka Band .90M</b>	<b>Ku Band 1.0m - 1.2m</b>	<b>Ka Band 1.0m - 1.2m</b>
<b>Electrical</b>				
Tx Band(GHz)	13.75 - 14.50	29.50 - 30.00	13.75 - 14.50	29.50 - 30.00
Rx Band(GHz)	10.70 - 12.75	19.70 - 20.20	10.70 - 12.75	19.70 - 20.20
Tx Gain dBi (Midband)	40.9	47.1	41.90   43.50	48.10   49.70
Rx Gain dBi (Midband)	39.3	43.6	40.30   41.80	44.60   46.00
Efficiency	70%	65%	70%	65%
Side Lobes	ITU-580-5		ITU-580-5	ITU-580-5
Cross Polarization (on axis)	35dB		35dB	35dB

***Mechanical***

Antenna Size	90cm (35.4")	1.0m (39.4") 1.2m (47.3")
Offset Angle	21 degrees	22 degrees
F/D	0.65	0.635
Operational Wind	50mph	50mph
Survival Wind	125mph	125mph
Operational Temp	-40 to 140 F	-40 to 140 F
Survival Temp	-60 to 180 F	-60 to 180 F
Rain	Operational = 1/2in./hr Survival = 3in./hr	Operational = 1/2in./hr Survival = 3in./hr
Ice	1 in. Radial -or- 1/2 in. + 60mph wind	1 in. Radial -or- 1/2 in. + 60mph wind
Pole Size	2-7/8" or 3" OD	2-7/8" or 3" OD



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