



**4096-644**  
**Revision A**

**May 9, 2003**

**ASSEMBLY MANUAL**

# **.84M Ku-Band Rx/O Antenna System**

**PRODELIN CORPORATION**  
**1500 PRODELIN DRIVE**  
**NEWTON, NC 28658**

# .84M Ku-Band Rx/O Antenna System

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## SECTION I            INTRODUCTION

### 1.0    GENERAL INFORMATION

This manual describes the assembly and installation of Prodelin's 84 cm small aperture system. The Prodelin 84 cm small aperture system is a rugged and reliable antenna system which will operate in the Ku-band receive frequency band with high efficiency and at the same time successfully withstand the effects of the environment.

These instructions are listed with sections that cover all areas of assembly and installation. Additional sections are included in the manual to provide information on antenna alignment to satellite and maintenance.

### 1.1    UNPACKING AND INSPECTION

The antenna containers should be unpacked and inspected at the earliest date to insure that all material has been received and is in good condition. A complete packing list for each major component is supplied.

### 1.2    FREIGHT DAMAGE

Any damage to materials while in transit should be immediately directed to the freight carrier. He will instruct you on matters regarding any freight damage claims.

### 1.3    MATERIAL - MISSING OR DAMAGED

Any questions regarding missing or damaged materials that is not due to the freight carrier should be directed to Prodelin's Customer Service Department at:

**PRODELIN CORPORATION  
1500 PRODELIN DRIVE  
NEWTON, NORTH CAROLINA 28658  
USA  
(828) 464-4141**

#### 1.4 **MECHANICAL INSTALLATION TOOLS**

The following tools are suggested for the antenna installation.

1 Ratchet (3/8" drive)	1 Torque wrench
1 Socket 7/16" (3/8" drive)	1 Compass
1 Socket 1/2" (3/8"drive)	1 Inclinator
1 Wrench combination - 7/16"	1 Open end wrench 5/16"
1 Wrench combination - 1/2"	1 Philips / flat head screwdriver

#### 1.5 **MAXIMUM TORQUE VALUES**

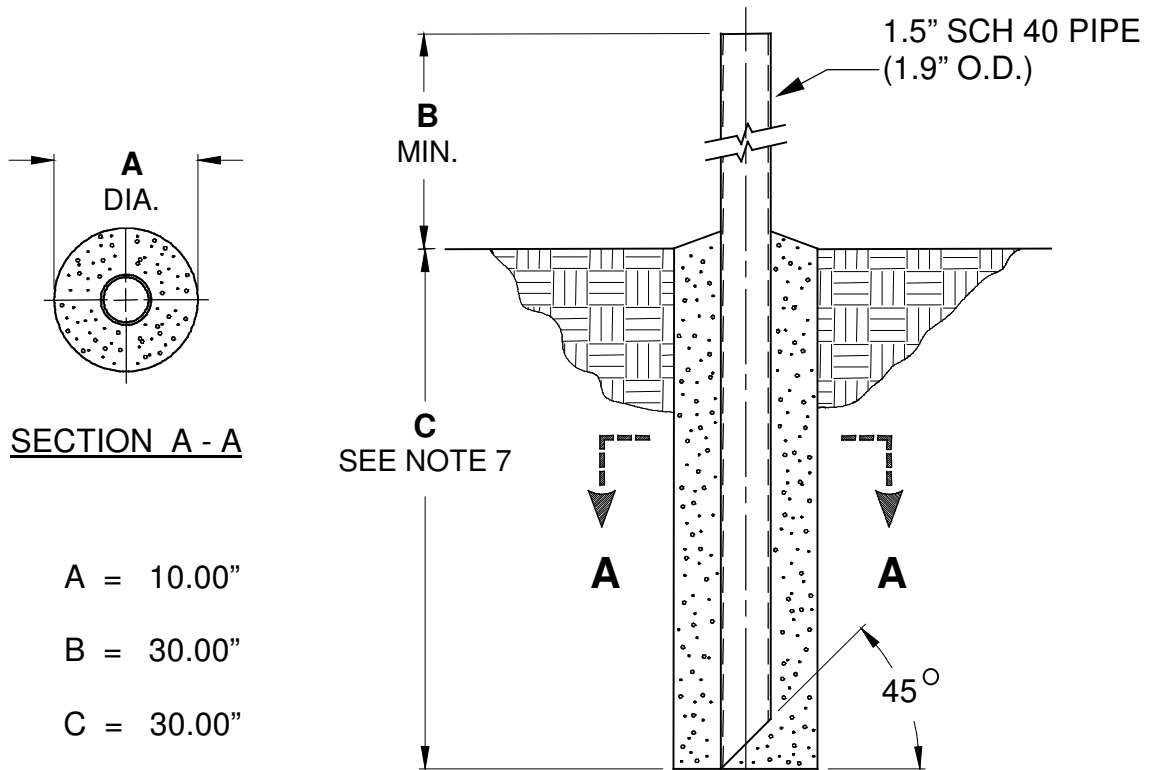
The following recommended torque values should be used during assembly.

<u>HARDWARE SIZE</u>	<u>TORQUE.</u>
1/4" FEED SYSTEM HARDWARE	5 ft/lb
5/16" Az/EI CAP, REFLECTOR AND BOOM HARDWARE	11 ft/lb

## 1.6 ANTENNA MOUNTING ACCESSORIES

All local building codes should be adhered to, i.e. grounding, foundation requirements, zoning rules, setbacks, etc. The following sections outline some mounting options

### 1.6.1 IN-GROUND MAST MOUNT



A = 10.00"  
B = 30.00"  
C = 30.00"

#### Notes:

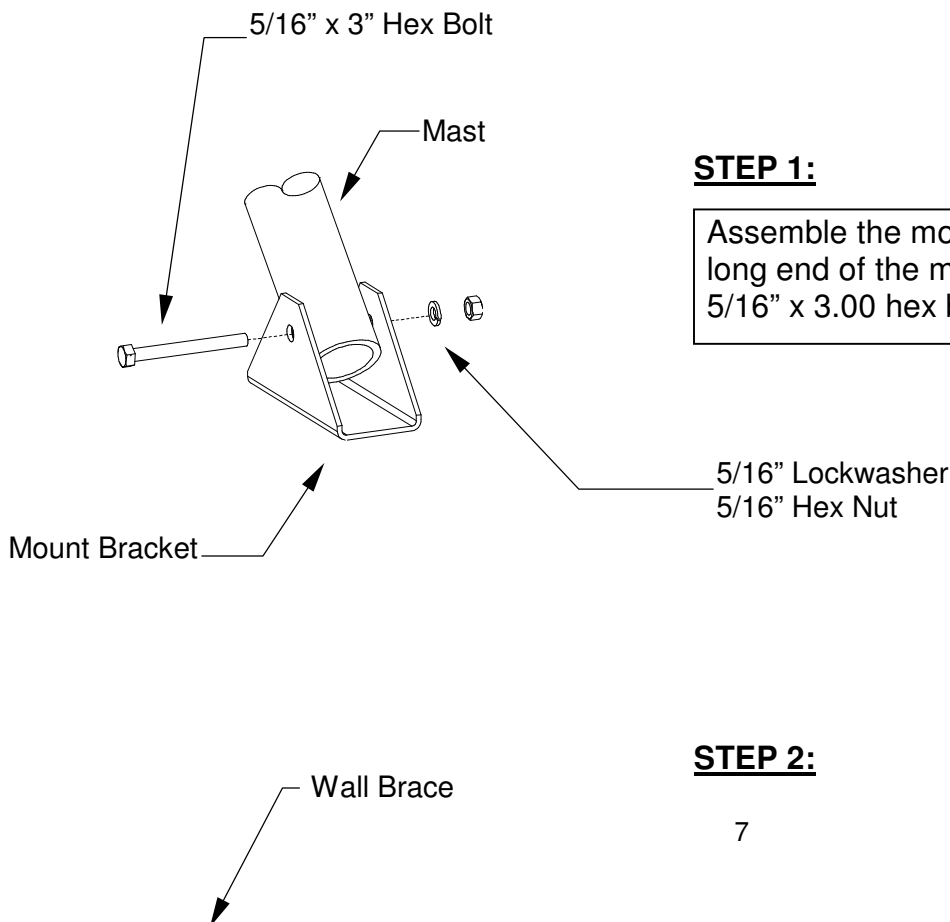
1. 1.50" SCHEDULE 40 PIPE SHOULD CONFORM WITH ASTM A36 STRUCTURAL STEEL.
2. ALL CONCRETE SHOULD CONFORM TO BUILDING CODE STANDARDS AND HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. (PER ACI-318-77)
3. SOIL BEARING CAPACITY SHOULD BE NO LESS THAN 200 PSF.
4. CONCRETE SHOULD BE POURED AGAINST UNDISTURBED SOIL.
5. ALLOW CONCRETE 24 HOUR SET TIME BEFORE INSTALLATION OF ANTENNA.
6. THE ANTENNA SHOULD BE PROPERLY GROUNDED TO MEET APPLICABLE LOCAL CODES.
7. MINIMUM DEPTH AS SHOWN OR EXTENDED TO LOCAL FROST LINE.

(PRODELIN CORPORATION DOES NOT REPRESENT OR WARRANT THAT ANY PARTICULAR DESIGN OR SIZE OF FOUNDATION IS APPROPRIATE FOR ANY LOCALITY OR EARTH STATION INSTALLATION)

### 1.6.2 WALL MAST MOUNT

Due to the wide variety of possible wall constructions requiring different types of connections, anchor bolts are not provided with the mount. The mount is sized for 1/2" anchor bolts. The user should first assure that the wall section chosen could withstand 400 pounds of both shear and axial force at the anchor bolt locations. **Note: Due to the wide variety of wall designs and types, Prodelin Corporation does not warrant that this mount is suitable for any particular installation. It is the responsibility of the installer/user to choose the appropriate method of connecting this mount to a wall, and determine if it meets the guidelines above.**

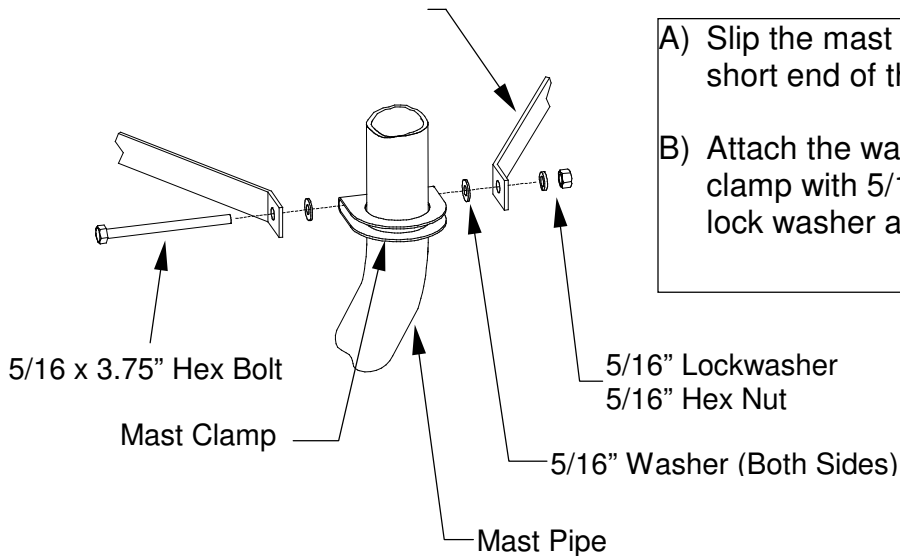
WALL MOUNT PARTS LIST			
ITEM	PART NO.	DESCRIPTION	QTY
1	0184-208	MAST PIPE	1
2	0211-436	MOUNT BRACKET	1
3	0211-725	MAST CLAMP	1
4	0413-125	BRACES	2
5	0200-1001	5/16" HARDWARE KIT	1



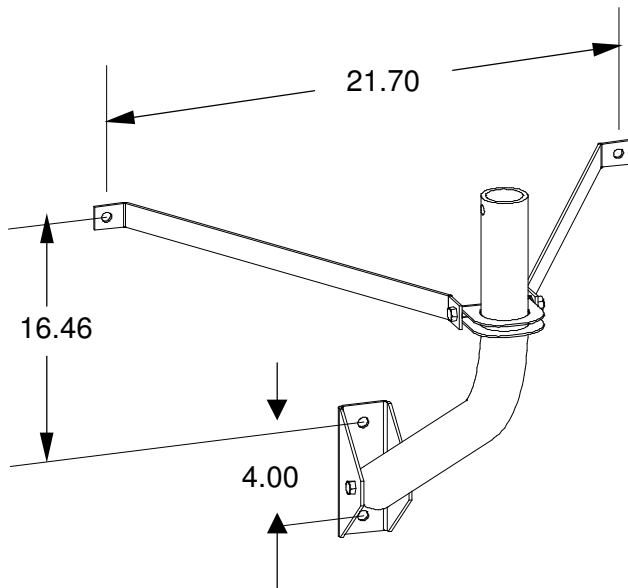
#### STEP 1:

Assemble the mount bracket (item 2) to the long end of the mast pipe ( item 1 ) with 5/16" x 3.00 hex bolt, lockwasher and hex nut

#### STEP 2:



- A) Slip the mast clamp ( item 3 ) over the short end of the mast pipe.
- B) Attach the wall braces ( item 4 ) to the clamp with 5/16" x 3.75" hex bolt, washers, lock washer and hex bolt.

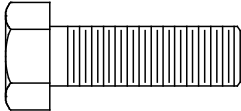
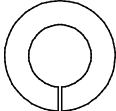
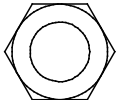


**STEP 3:**

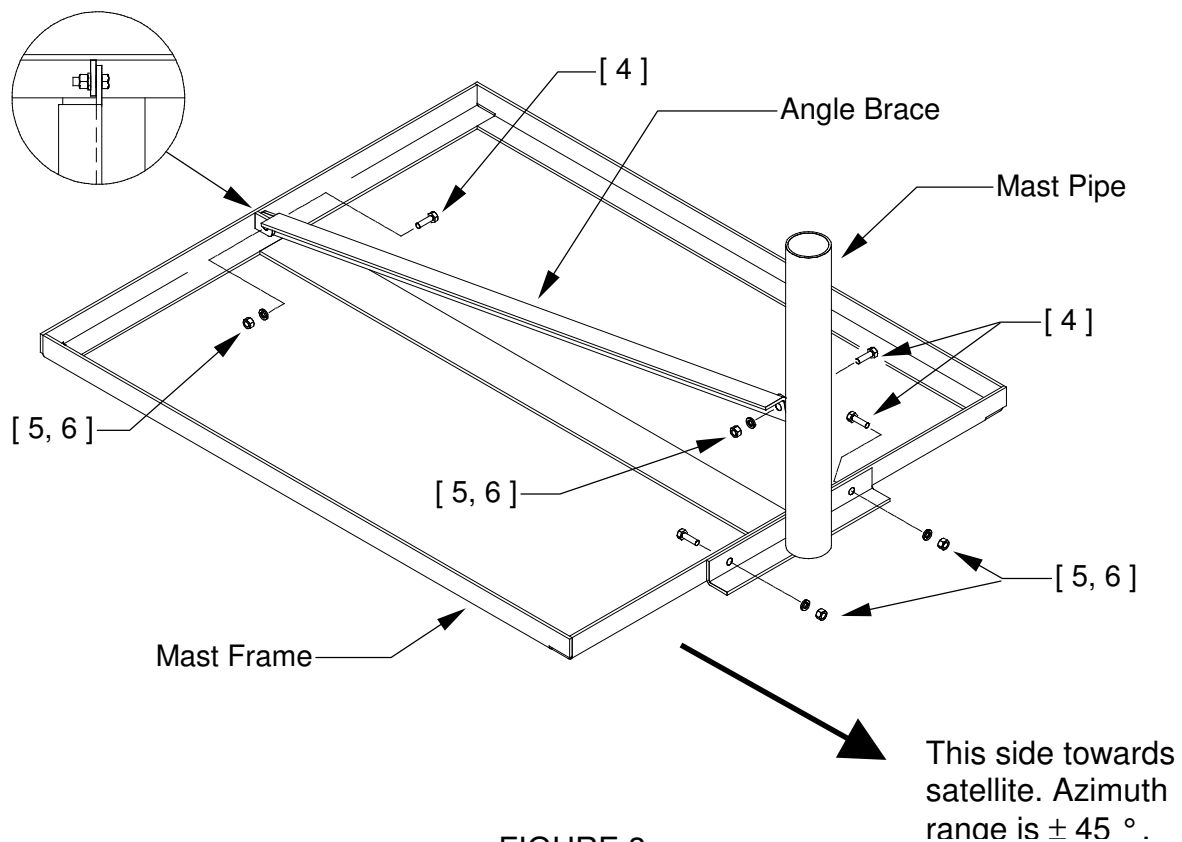
- A) Use the assembled wall mount as a template to mark the location of the anchor bolts on the wall. The mast base and wall brace should be flat against the wall when marking. Be sure that the upper part of the mast pipe is held vertical. Attach the mount to the wall using the chosen anchor bolts (not included), then complete the installation of the antenna system as instructed in section 2.

**1.6.3 NON – PENETRATING MAST MOUNT**

**SAFETY CABLE:** It is recommended that the NPMM be secured to some structure on the roof. A stainless steel or galvanized cable capable of withstanding 800 pounds of tension should be used. Wrap the cable around the mast and secure with a cable clamp. Fasten the other end to some roof structure capable of withstanding the above load. **NOTE: Prodelin Corporation will not be responsible for damages caused by improper installation of the NPMM.**

PARTS LIST - 1.0 M NPMM			
ITEM	PART NO.	DESCRIPTION	QTY
1	0490-196	MOUNT FRAME	1
2	0490-195	MAST PIPE	1
3	0225-364	ANGLE BRACE	1
4	8031-008	5/16 - 18 x 1.00 BOLT	4
			
5	8202-041	5/16" LOCKWASHER	4
			
6	8101-009	5/16" HEX NUT	4
			

- STEP 1:** Clear the roof area of debris, gravel or other loose materials. It is recommended that a layer of roofing paper or rubber pads be placed under the base to protect the roof surface.
- STEP 2:** Place the mount base on the roof and orient the mast end toward the satellite. See figure 3.
- STEP 3:** Attach the mast pipe to the base with [2] 5/16-16 x 1.00" bolts, [2] lockwashers and [2] 5/16-18 hex nuts (items # 4,5,6). Note that the bolt heads should be inside the frame.
- STEP 4:** Attach the notched end of the angle brace to the base and the other end to the mast pipe with [1] 5/16-18 x 1.00" bolt, lockwasher and 5/16-18 hex nut (items# 4,5,6) at each end as shown.
- STEP 5:** Place the recommended ballast (from the ballast chart) in the frame in the order shown. Repeat the order if a second layer of ballast is required.

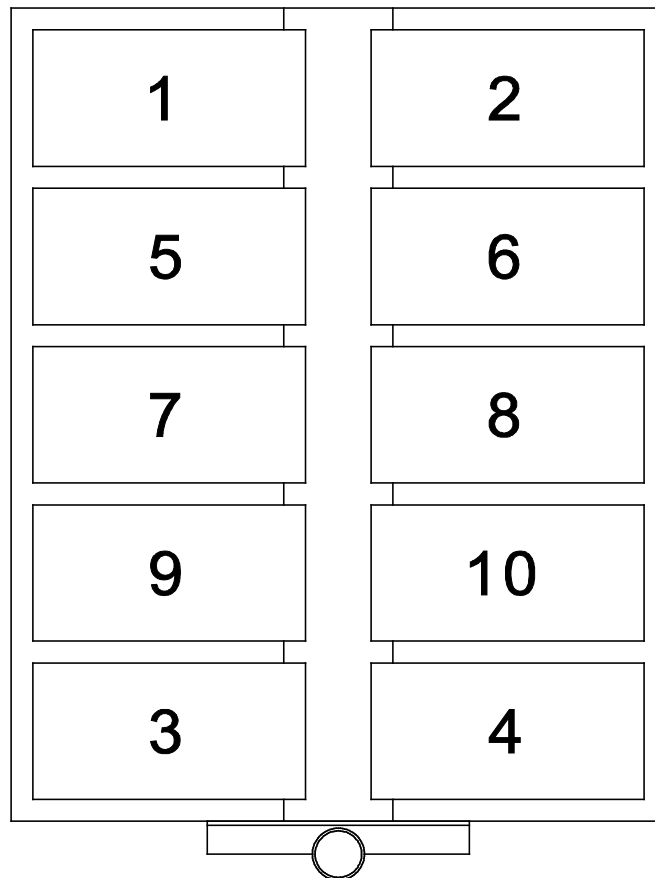


**FIGURE 3.**

**BALLAST:** The preferred ballast material is concrete cap blocks, available from most building supply companies. These blocks measure approximately 3.5" x 7.5" x 15.5" and weigh about 25 pounds each. See the ballast table for the number of blocks required. If more than 10 blocks are required, start a second layer.

<b>.84M ANTENNA - BALLAST REQUIREMENTS EXPOSURE "C"</b>						
Wind Speed (Mph)	70	80	90	100	110	120
No. Blocks @ 25 lbs ea.	9	12	15	19	23	28
Actual Weight (lbs)	262	337	412	412	612	737
Distributed Load ( lbs/f t )	30.1	38.9	47.5	59.1	70.1	85.0

<b>.84M ANTENNA - BALLAST REQUIREMENTS EXPOSURE "D"</b>						
Wind Speed (Mph)	70	80	90	100	110	120
No. Blocks @ 25 lbs ea.	12	16	20	25	30	36
Actual Weight (lbs)	337	437	537	662	787	937
Distributed Load ( lbs/f t )	38.9	50.34	60.9	76.4	90.8	108.1

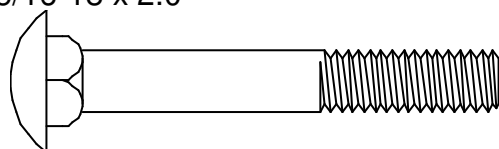
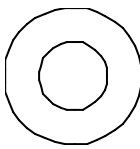
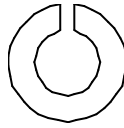
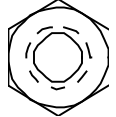


**FIGURE 4.**

**SECTION II**      **ANTENNA ASSEMBLY**

**2.0 MOUNT AND REFLECTOR ASSEMBLY**

The small aperture mount is designed to support Prodelin's .84 M Ku-Band receive only, antenna system. Refer to the figures and parts list and follow the instructions in the listed sequence.

REFLECTOR AND MOUNT PARTS LIST			
ITEM	PART NO.	DESCRIPTION	QTY
1	0179-570	.84M REFLECTOR	1
2	0185-240	Az/EI CAP ASSEMBLY	1
3	8038-012	BOLT, CARRIAGE 5/16-18 x 2.0 	4
4	8201-041	FLAT WASHER 5/16 	4
5	8202-041	LOCK WASHER 5/16 	4
6	8101-009	HEX NUT 5/16-18 	4

**STEP 1:** Before beginning assembly, loosen the elevation adjustment bolts (2 places each side) and the canister bolts (2 places). This will make reflector attachment easier and facilitate Az & El adjustment later.

STEP 2: Attach the reflector to the Az/EI Cap with four carriage bolts (item# 3 inserted from the front of reflector), four flat washers (item #4), four lock washers (item #5) and four hex nuts (item #6).

STEP 3: Place the Az/EI Cap/reflector assembly over the mast pipe and secure by tightening the two 5/16" nuts on the canister, snug, but not tight enough to prevent Azimuth rotation.

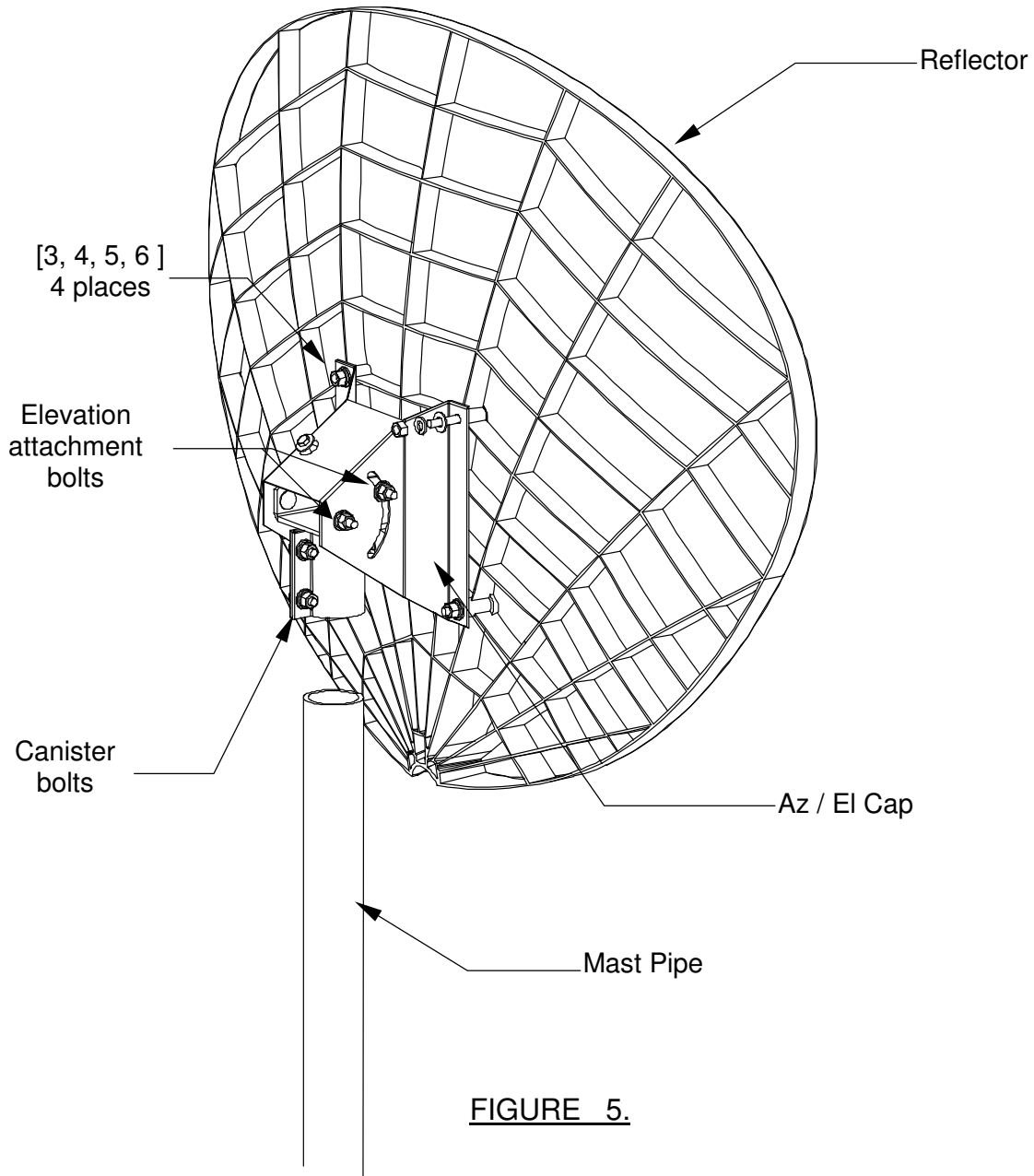
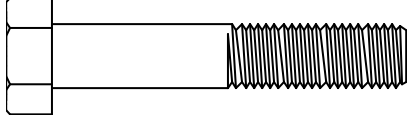

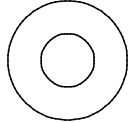
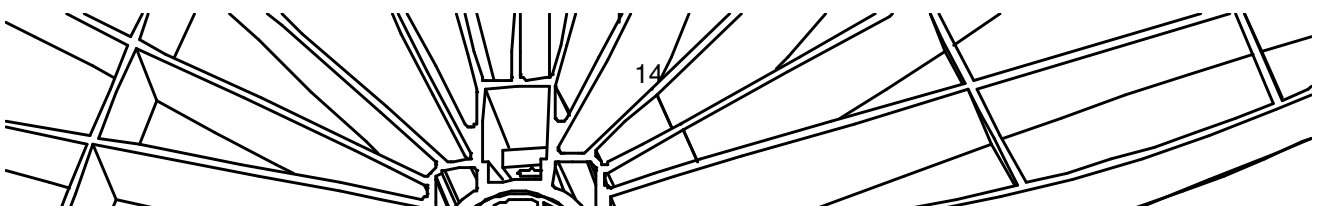


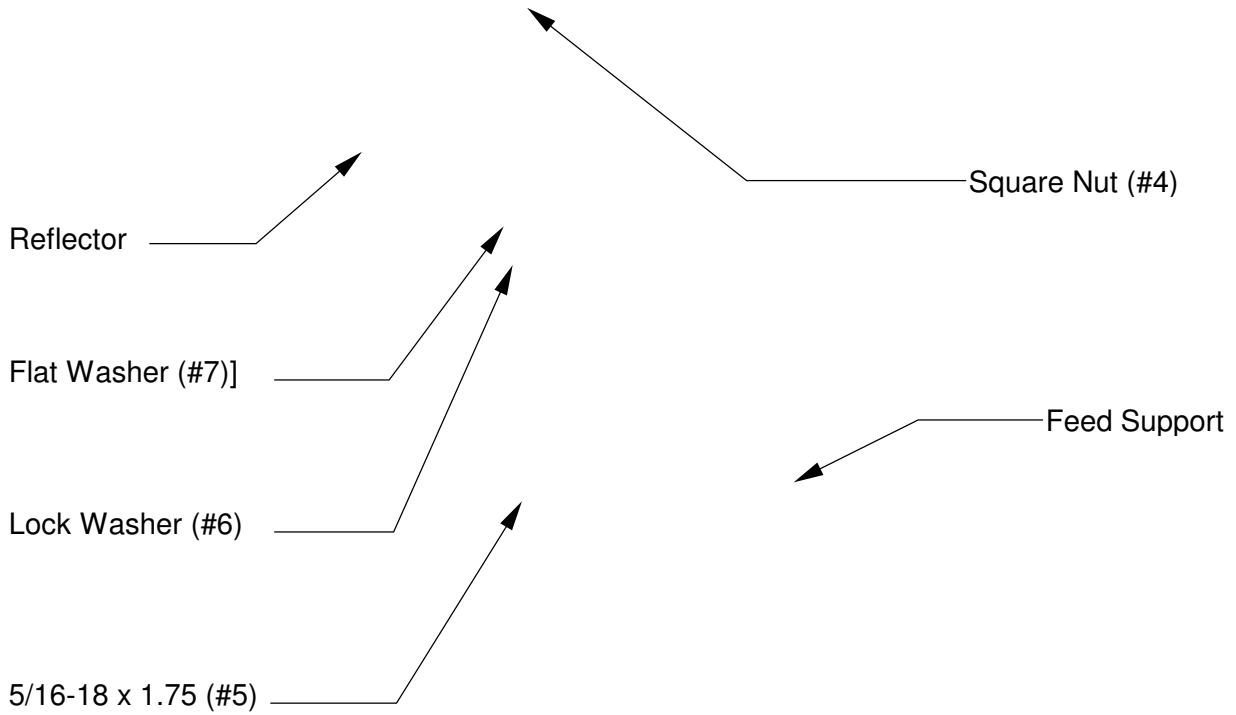
FIGURE 5.

**2.1 FEED ASSEMBLY**

This section covers the feed assembly for the antenna system. Refer to the parts list and figures and follow the instructions in the listed sequence.

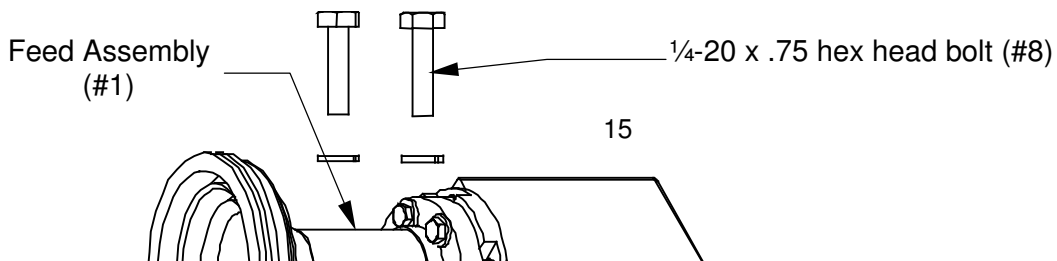
PARTS LIST - FEED ASSEMBLY			
ITEM	PART NO.	DESCRIPTION	QTY
1	0183-255	FEED ASSEMBLY	1
2	0250-794	FEED SUPPORT	1
3	4080-118	FEED BRACKET	1
4	8113-008	5/16-18 SQUARE NUT	1
5	8031-014	5/16 – 18 x 1.75 BOLT 	2
6	8202-041	5/16-INCH LOCK WASHER 	2
7	8201-041	5/16-INCH FLAT WASHER 	2
8	8030-006	1/4-20 x .75 BOLT	2
9	8202-040	1/4-INCH LOCK WASHER	2
10	0338-126	FEED SHROUD (COVER)	2
11	8304-004	#8-32 x .50 PPH	2
12	8320-002	#8-18 PPH SCREW	1

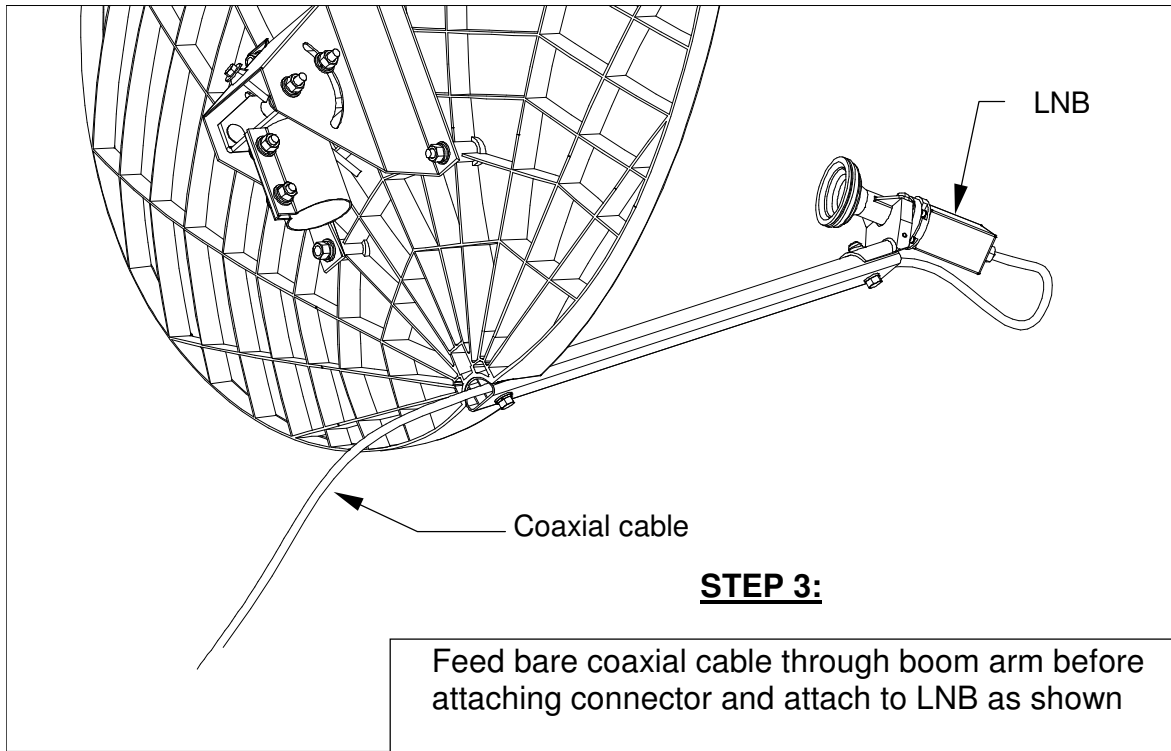
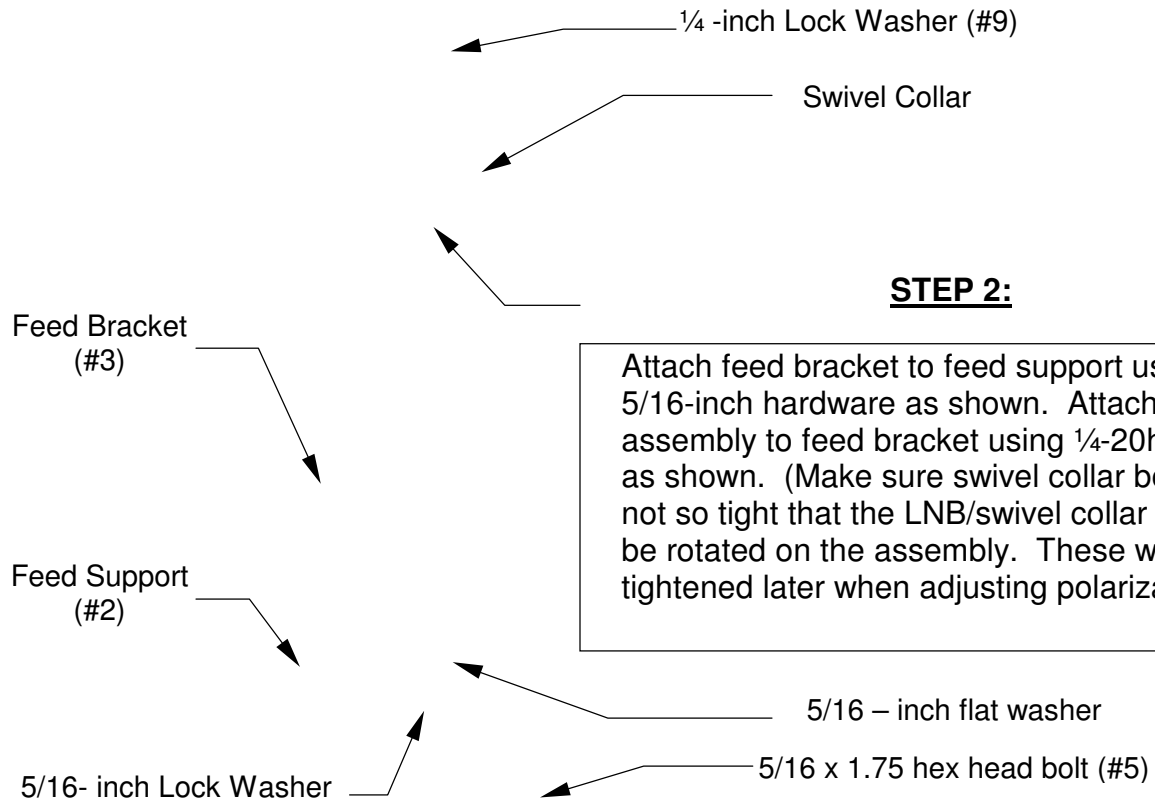




**STEP 1:**

Place square nut (item #4) into corresponding groove in back of reflector and attach feed support to bottom of reflector using flat washer, lock washer and 5/16-18 X 1.75 bolt (item #5).

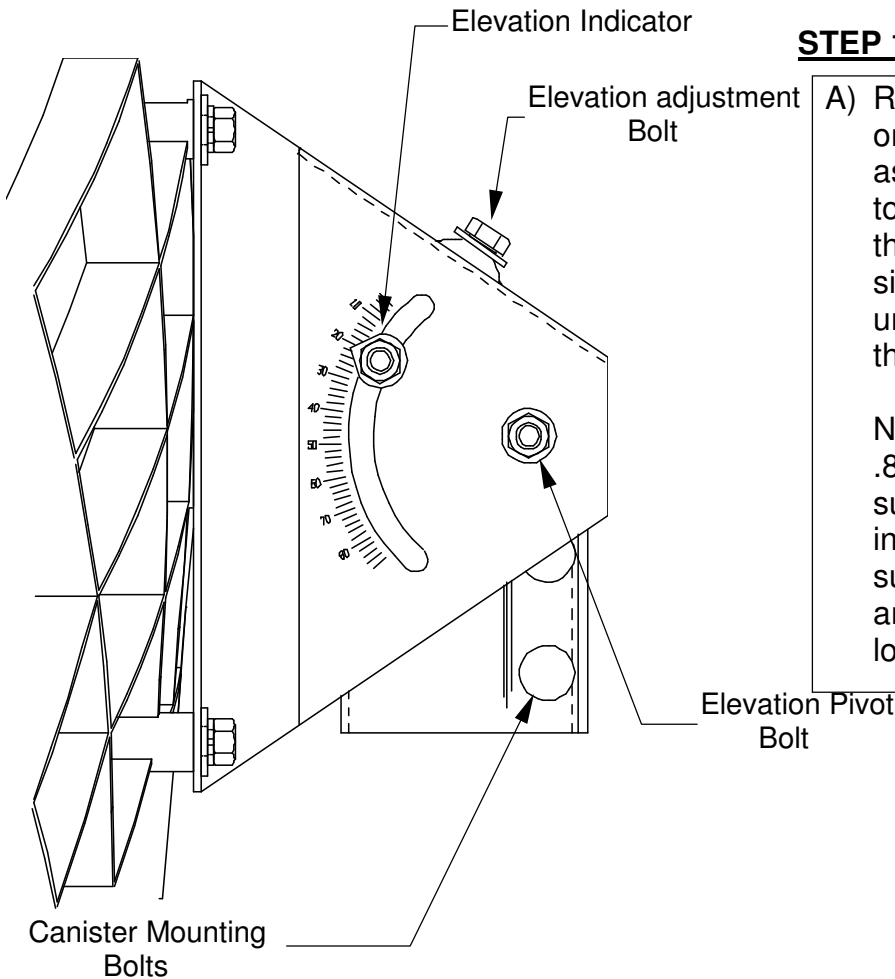




### SECTION III SATELLITE ALIGNMENT

#### 3.0 SATELLITE ALIGNMENT

The antenna assembly is now complete and the antenna is ready to be aligned to the selected satellite.

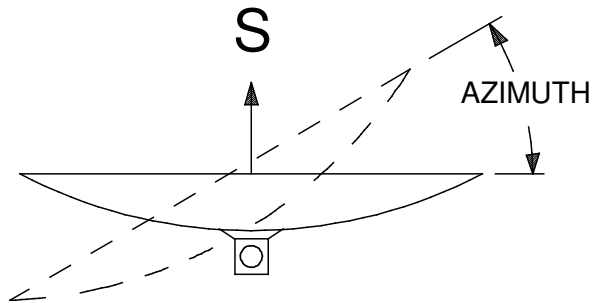


#### **STEP 1:**

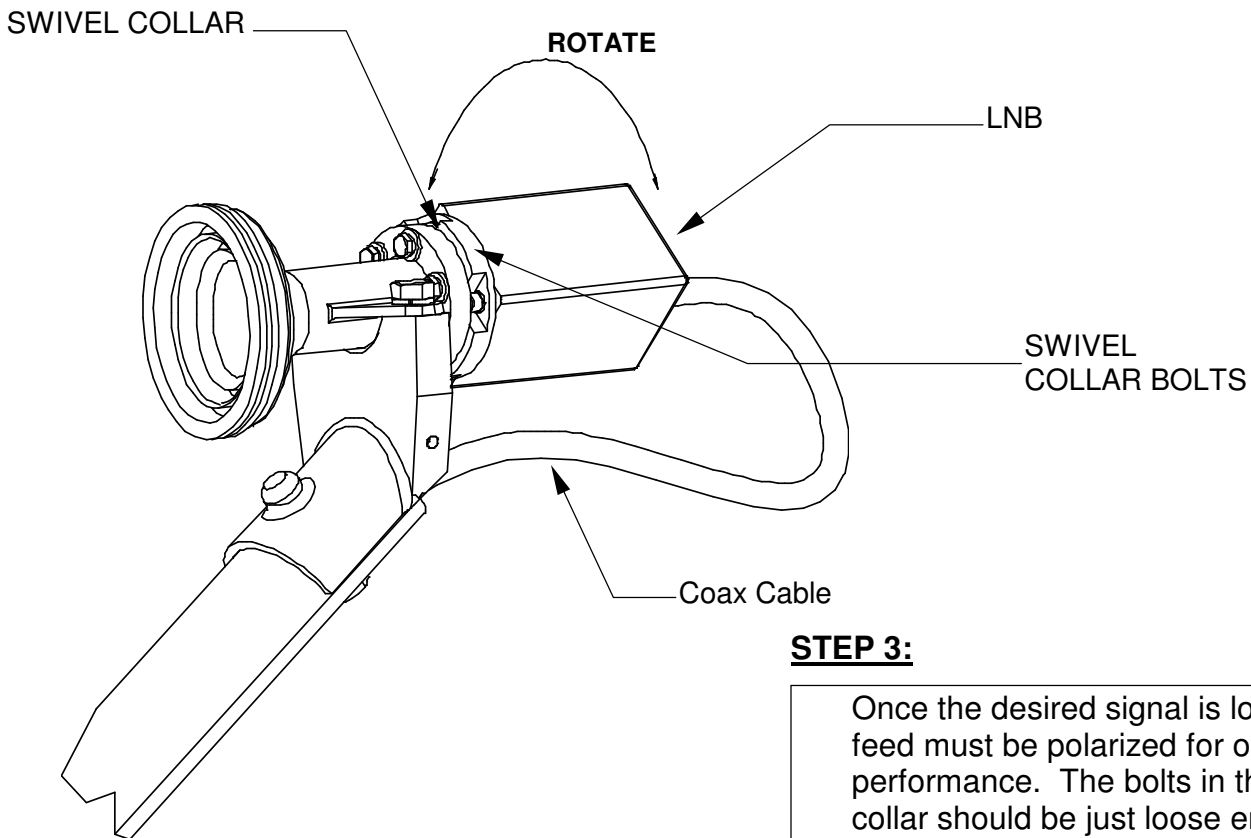
A) Refer to the elevation scale located on the side of the Az/EI positioner as shown. To set the antenna system to the correct elevation angle, loosen the elevation pivot hardware on both sides of the mount just enough to unlock the lock washers. Then turn the elevation adjustment screw.

Note: Due to the offset angle of the .84M reflector, it is necessary to subtract two degrees from the actual indicator reading. i.e. If the indicator suggests a 20 degree look angle, the antenna is actually at an 18 degree look angle.

**STEP 2:**

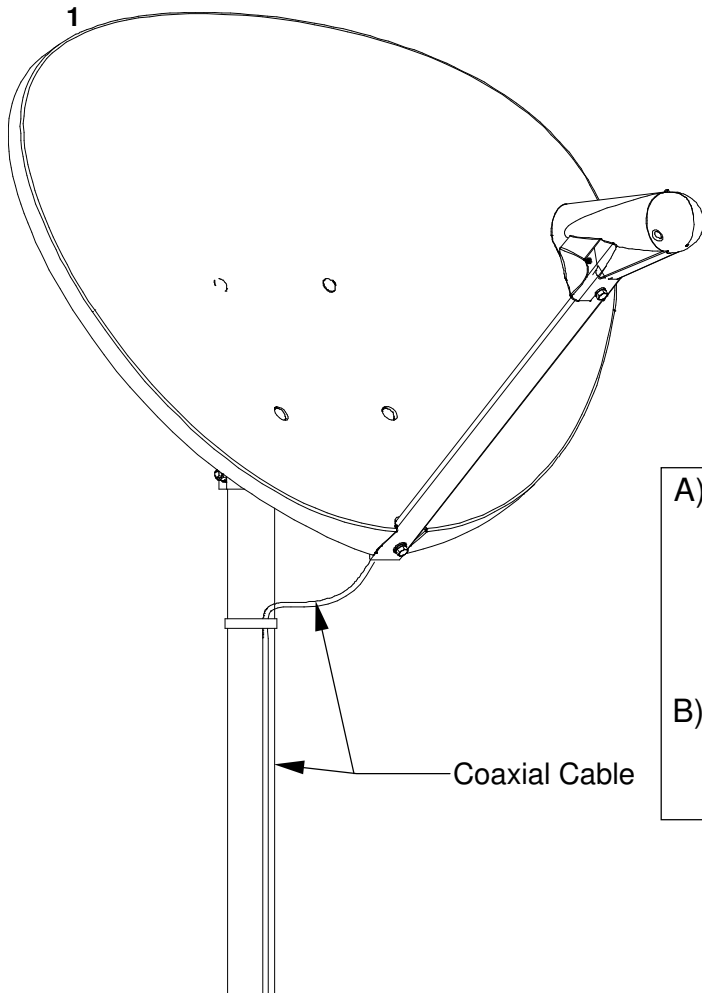
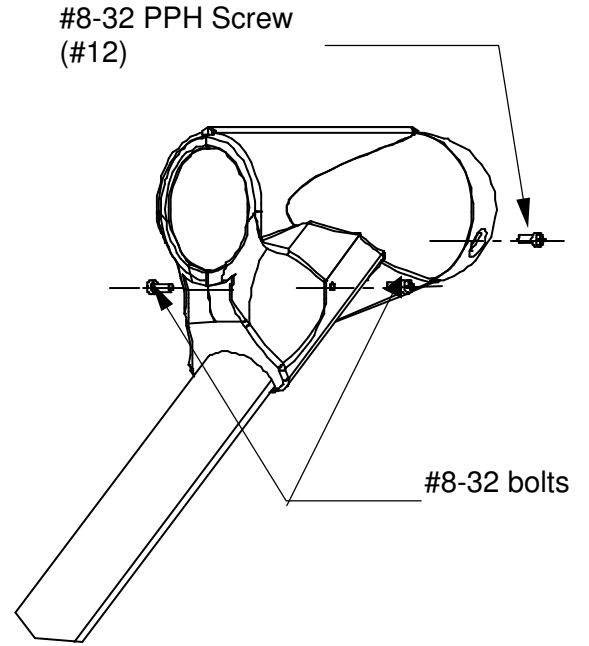
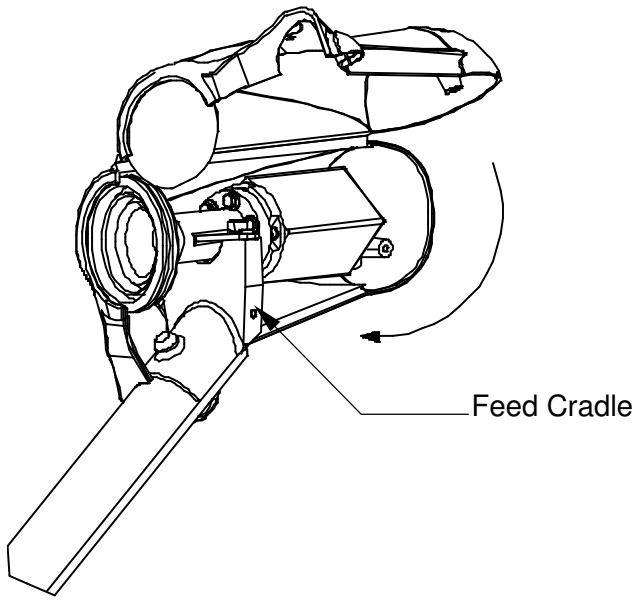


- A) After making the cable connections to the LNB, rotate the antenna in azimuth to the correct azimuth heading using a compass to determine direction. Sweep the antenna slowly in azimuth until a signal is found.
- B) If the desired signal is not found, it may be necessary to alter the elevation angle slightly, then repeat the above procedure.



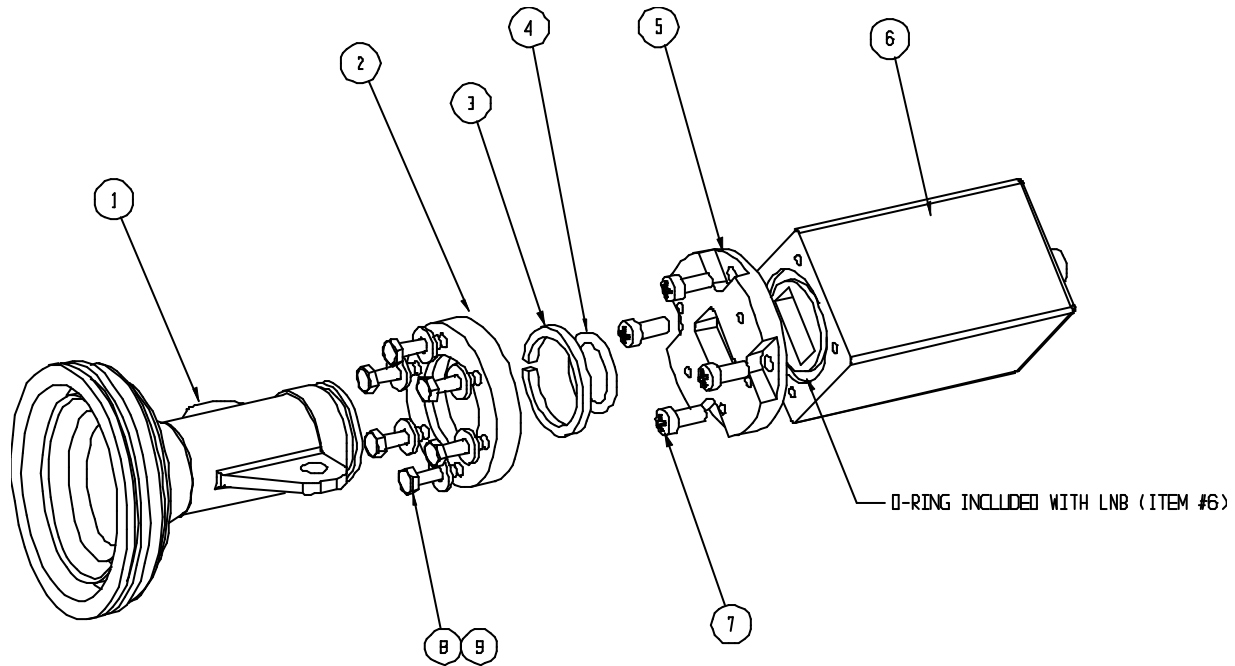
**STEP 3:**

Once the desired signal is located, the feed must be polarized for optimum performance. The bolts in the swivel collar should be just loose enough to allow it and the LNB to be rotated in both directions. Rotate the LNB until the signal is at its strongest. When the signal has been optimized, tighten the six bolts on the collar using the 5/16" wrench to lock it down and prevent it from moving.



**STEP 4:**

- A) After the final alignments are made, enclose feed assembly with feed shroud and secure to the feed cradle using the 2 #8-32 bolts (#11) and the PPH screw (#12).
- B) The Coaxial Cable should be secured to the mast as shown.



**Feed Parts List**

SEQ	PART NBR	DESCRIPTION	QTY
1.	4080-117	FD HORN	1
2.	0188-110	SWIVEL COLLAR	1
3.	0141-201	SNAP RING	1
4.	0198-126	O-RING	1
5.	4080-119	TRANSITION	1
6.	VARIABLES	CUSTOMER SUPPLIED LNB	1
7.	8302-022	SCR M4 X .7 8MM LONG FILH SLT	4
8.	8302-017	SCR HH SLOTTED #6-32 X .50 SS	6
9.	8200-010	LW #6 INTERNAL TOOTH	6

**SECTION IV      MAINTENANCE**

## 4.0 MAINTENANCE OVERVIEW

After installation, the antenna requires only periodic inspection. It is anticipated that maintenance, if required, will be minimal and easily handled by a local or in-house maintenance staff. The materials used in the construction of this Earth Station Antenna virtually eliminate any maintenance repairs.

## 4.1 PERIODIC INSPECTION

It is suggested that a periodic inspection be performed at least every six months.

NOTE: After any severe weather conditions, inspection of the antenna should be performed to determine if foreign objects have caused damage or if survival specifications have been exceeded.

This inspection should include the following:

STEP 1:     Check all bolting locations - all bolts should be tight.

STEP 2:     Check all structural members - repair or replace if damaged.

STEP 3:     Check the foundation anchor bolts - they must be secure and no failure signs in foundation.

STEP 4:     Check for corrosion - on the reflector structure and the mount.