Installation Instructions

Foundation Specifications

for 4.5-/4.6-Meter Earth Station Antennas

1.0 INTRODUCTION

1.1 This document specifies typical foundation characteristics, designs, requirements and dimensional specifications for the Andrew 4.5-/4.6-Meter Earth Station Antennas.

2.0 FOUNDATION LOADING CHARACTERISTICS

2.1 Foundation loads are applied to the foundation pad as shown in Figure 1. Positive applied forces are in the direction of the X, Y, and Z coordinate axes.

2.2 Varying load conditions are dependent upon icing, incident angle of the wind and elevation/azimuth angles of the antenna. Foundation loading for various icing, elevation/azimuth and wind conditions are listed in Table 1. Foundation loading moment for various elevation/azimuth versus wind conditions are listed in Table 2.

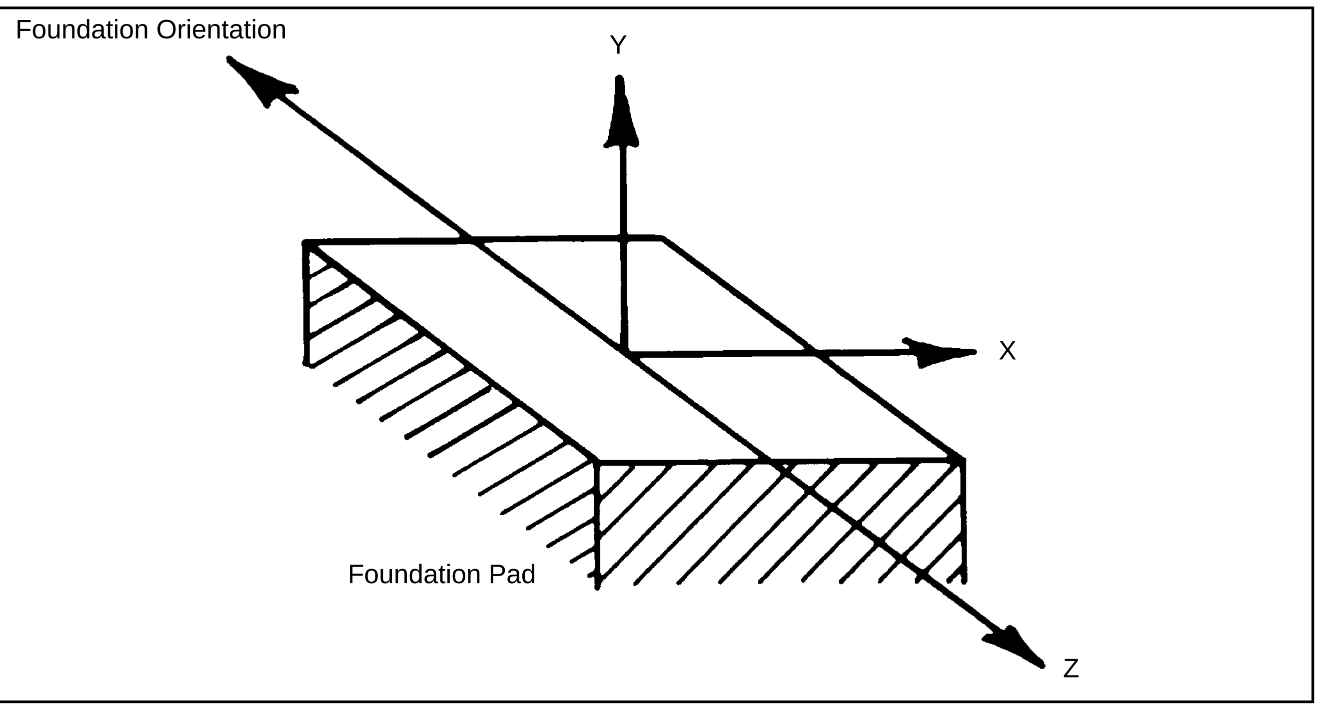

Figure 1

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EL = 0° **FOUNDATION LOADING FORCES (lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	**Angle (α)**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**
125	15°	354	-1841	11220	-9543	-1833	5918	9896	-1847	5305	-11220	-1841	354
125	-15°	-354	-1841	11220	-9896	-1833	5305	9543	-1847	5918	-11220	-1841	-354
125	30°	530	-1841	11210	-9444	-1833	6065	9975	-1847	5147	-11210	-1841	530
125	-30°	-530	-1841	11210	-9975	-1833	5147	9444	-1847	6065	-11210	-1841	-530
125	45°	420	-1841	10870	-9203	-1833	5799	9624	-1847	5071	-10870	-1841	420
125	-45°	-420	-1841	10870	-9624	-1833	5071	9203	-1847	5799	-10870	-1841	-420
125	60°	-707	-1841	10030	-9039	-1833	4402	8332	-1847	5627	-10030	-1841	-707
125	-60°	707	-1841	10030	-8332	-1833	5627	9039	-1847	4402	-10030	-1841	707
125	120°	-2426	-1841	-2634	1069	-1833	-3418	-3494	-1847	783	2634	-1841	-2426
125	-120°	2426	-1841	-2634	3494	-1833	784	-1068	-1847	-3418	2634	-1841	2426
125	135°	-2281	-1841	-4263	2552	-1833	-4106	-4832	-1847	-156	4263	-1841	-2281
125	-135°	2281	-1841	-4263	4832	-1833	-156	-2551	-1847	-4106	4263	-1841	2281
125	150°	-1646	-1841	-5590	4018	-1833	-4220	-5664	-1847	-1369	5590	-1841	-1646
125	-150°	1646	-1841	-5590	5664	-1833	-1369	-4018	-1847	-4220	5590	-1841	1646

EL 30° **FOUNDATION LOADING FORCES (lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	**Angle (α)**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**
125	60°	-667	-6646	8804	-7957	-6638	3824	7291	-6653	4979	-8804	-6646	-667
125	-60°	667	-6647	8803	-7291	-6639	4979	7957	-6653	3824	-8803	-6647	667
125	135°	-1862	-845	-4350	2836	-837	-3788	-4698	-851	-562	4350	-845	-1862
125	-135°	1862	-845	-4350	4698	-837	-562	-2836	-821	-3788	4350	-845	1862

EL = 60° **FOUNDATION LOADING FORCES (lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	**Angle (α)**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**
125	±60	0	-10162	5627	-4873	-10154	2814	4873	-10168	2814	-5627	-10162	0
125	120°	-69	-762	-3417	2925	-753	-1768	-2993	-767	-1649	3417	-762	-69
125	-120°	69	-761	-3417	2993	-753	-1649	-2925	-767	-1768	3417	-761	69

EL = 90° **FOUNDATION LOADING FORCES (lbs)**

Wind			AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	**Angle (α)**		**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**
125	90°	Side Wind	-1921	-949	0	-960	-941	-1664	-961	-956	1664	0	-949	1921
		Frontal Wind	0	-949	-1921	-1664	-941	961	1664	-956	961	-1921	-949	0
125	-90°	Side Wind	1921	-949	0	961	-941	1664	960	-956	-1664	0	-949	-1921
		Frontal Wind	0	-949	1921	-1664	-941	961	1664	-956	961	1921	-949	0

Table 1

3.0 ANCHOR BOLT REQUIREMENTS

3.1 Typical anchor bolt installation configurations and dimensions are shown in Figure 2.

3.2 Andrew type 203666 Anchor Bolt Kit includes anchor bolts, alignment plates and required mounting hardware as shown.

4.0 FOUNDATION DESIGNS

4.1 The selected foundation for a particular site is dependent upon local conditions. Soil borings and foundation analysis should be performed by a qualified civil engineer.

EL = 0° — **FOUNDATION LOADING MOMENT (in-lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	Angle (α)	x	y	z	x	y	z	x	y	z	x	y	z
125	15°	985333	-48824	-32031	521078	-48829	837559	464633	-48838	-869208	32031	-48824	985333
125	-15°	985333	48824	33451	464299	48838	870256	521412	48829	-836512	-33451	48824	985333
125	30°	984407	-70569	-48407	534694	-70573	828390	449998	-70560	-876526	48407	-70569	984407
125	-30°	984406	70569	49834	449665	70560	877573	535028	70573	-827342	-49834	70569	984406
125	45°	952914	-94738	-38209	510056	-94753	806067	442959	-94748	-844014	38209	-94738	952914
125	-45°	952914	94738	39635	442625	94748	845062	510390	94748	-805019	-39635	94738	952914
125	60°	875109	-89366	66207	380659	-89357	790876	494458	-89367	-724343	-66207	-89366	875109
125	-60°	875109	89366	-64784	494125	89367	725391	380993	89357	-789829	64784	89366	875109
125	120°	-297894	232651	225420	-343669	232629	-145377	45783	232608	371040	-225420	232651	-297894
125	-120°	-297894	-232651	-223996	45542	-232649	-369993	-343335	-232653	146332	223996	-232651	-297894
125	135°	-448780	235374	211990	-407395	235320	-282740	-41220	235357	494973	-211990	235374	-448780
125	-135°	-448780	-235374	-210566	41554	-235357	-493925	-407061	-235344	283695	210566	-235374	-448780
125	150°	-571693	192460	153173	-417945	192441	-418528	-153546	192480	572037	-153173	192460	-571693
125	-150°	-571694	-192460	-151749	153880	-192480	-570989	-417620	-192441	419576	151749	-192460	-571694

EL = 30° — **FOUNDATION LOADING MOMENT (in-lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	Angle (α)	x	y	z	x	y	z	x	y	z	x	y	z
125	60°	684612	-76965	13558	330988	-76958	599555	-353588	-76876	-585703	-13558	-76965	684612
125	-60°	684464	76865	-12134	353254	76976	586750	331304	76858	-598477	12134	76865	684464
125	135°	-540579	155381	250334	-487154	155399	-342996	-53892	155381	593665	-250334	155381	-540579
125	-135°	-540593	-155381	248909	-54184	-155394	-592618	-485782	-155399	343134	-248909	-155381	-540593

EL = 60° — **FOUNDATION LOADING MOMENT (in-lbs)**

Wind		AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	Angle (α)	x	y	z	x	y	z	x	y	z	x	y	z
125	±60°	338700	0	712	169274	-8	293654	169607	8	-292607	-712	0	338721
125	120°	-500059	2889	11291	-259808	2889	-427418	-240624	2882	438930	-11291	2889	-500059
125	-120°	-499985	-2889	-9872	-240958	-2883	-437882	-258936	-2886	428429	9872	-2889	-499985

EL = 90° — **FOUNDATION LOADING MOMENT (in-lbs)**

Wind			AZ = 0°			AZ = +60°			AZ = -60°			AZ = 90°		
Speed (mph)	Angle (α)		x	y	z	x	y	z	x	y	z	x	y	z
125	90°	Side Wind	2273	-240	317030	-272957	-226	154809	275358	-226	156939	317030	-240	-2273
		Frontal Wind	318653	0	770	159217	-9	281972	159598	9	-275292	770	0	-318653
125	-90°	Side Wind	2304	240	-315610	275024	226	-150267	-272623	226	-159393	-315610	240	-2304
		Frontal Wind	318653	0	712	159217	-9	281964	159598	9	-275292	712	0	-318653

Table 2

4.2 A typical slab type foundation is shown in Figure 2. A copy of this design on a D-size (22" x 33") sheet is available from Andrew on request. Refer to drawing number 240001.

5.0 FOUNDATION ORIENTATION

5.1 Proper foundation orientation is required to obtain the desired orbital arc coverage from a particular site location. The required azimuth and elevation angles of the antenna, relative to the mount must be determined to establish the appropriate foundation orientation. A specific foundation orientation requirement may be requested with the antenna as part of the installation package.

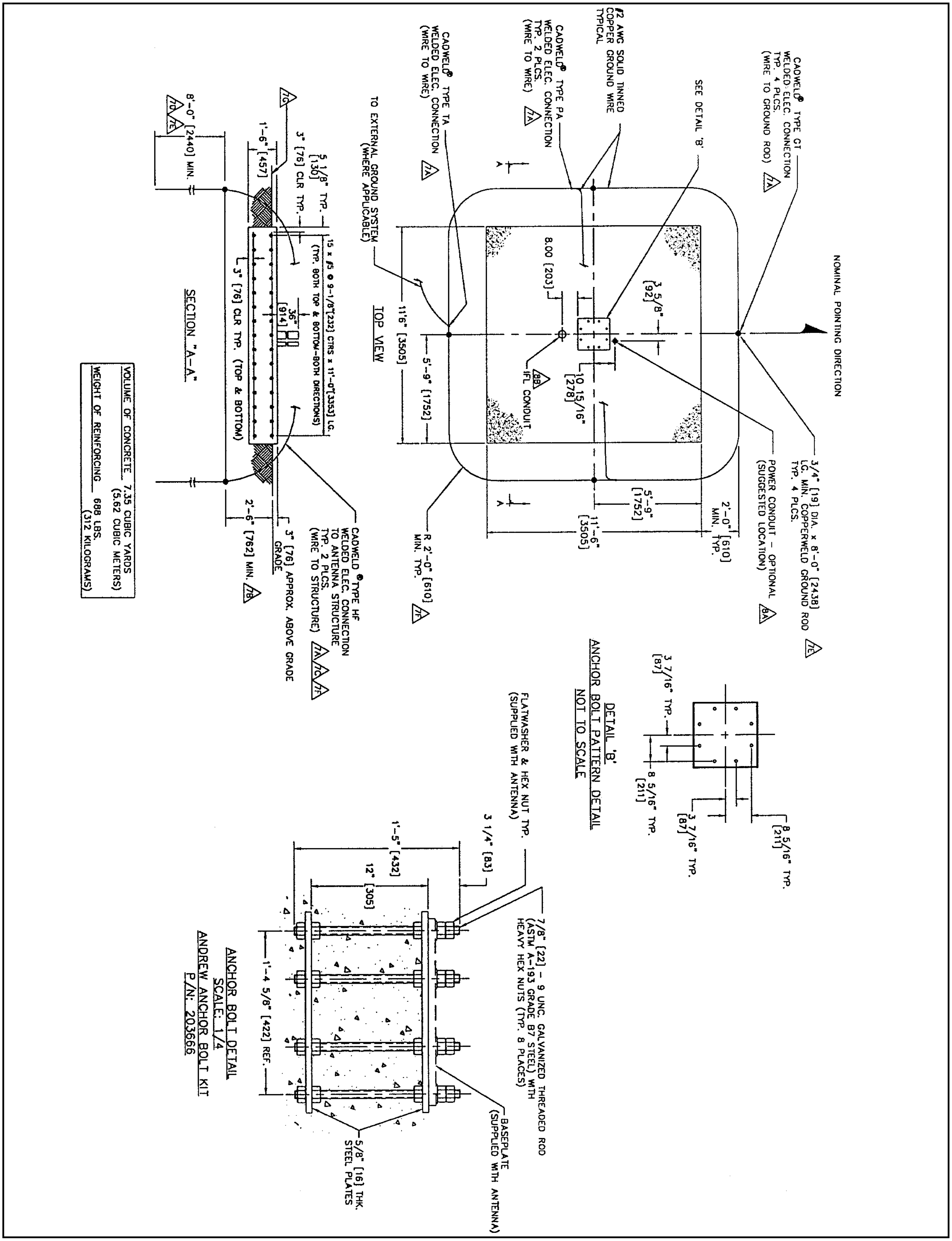

NOMINAL POINTING DIRECTION
CADWELD® TYPE GT WELDED ELEC. CONNECTION TYP. 4 PLCS. (WIRE TO GROUND ROD)
SEE DETAIL 'B'
#2 AWG SOLID TINNED COPPER GROUND WIRE TYPICAL
CADWELD® TYPE PA WELDED ELEC. CONNECTION TYP. 2 PLCS. (WIRE TO WIRE)
CADWELD® TYPE TA WELDED ELEC. CONNECTION (WIRE TO WIRE)
TO EXTERNAL GROUND SYSTEM (WHERE APPLICABLE)
3/4" [19] DIA. x 8'-0" [2438] LG. MIN. COPPERWELD GROUND ROD TYP. 4 PLCS.
POWER CONDUIT - OPTIONAL (SUGGESTED LOCATION)
2'-0" [610] MIN. TYP.
R 2'-0" [610] MIN. TYP.
TOP VIEW
IFL CONDUIT
CADWELD® TYPE HF WELDED ELEC. CONNECTION TO ANTENNA STRUCTURE TYP. 2 PLCS. (WIRE TO STRUCTURE)
3" [76] APPROX. ABOVE GRADE
GRADE
2'-6" [762] MIN.
8'-0" [2440] MIN.
15 x #5 @ 9-1/8"[232] CTRS x 11'-0"[3353] LG. (TYP. BOTH TOP & BOTTOM-BOTH DIRECTIONS)
3" [76] CLR TYP. (TOP & BOTTOM)
SECTION "A-A"
VOLUME OF CONCRETE 7.35 CUBIC YARDS (5.62 CUBIC METERS)
WEIGHT OF REINFORCING 688 LBS. (312 KILOGRAMS)
DETAIL 'B'
ANCHOR BOLT PATTERN DETAIL
NOT TO SCALE
FLATWASHER & HEX NUT TYP. (SUPPLIED WITH ANTENNA)
7/8" [22] - 9 UNC. GALVANIZED THREADED ROD (ASTM A-193 GRADE B7 STEEL) WITH HEAVY HEX NUTS (TYP. 8 PLACES)
BASEPLATE (SUPPLIED WITH ANTENNA)
5/8" [16] THK. STEEL PLATES
1'-4 5/8" [422] REF.
ANCHOR BOLT DETAIL
SCALE: 1/4
ANDREW ANCHOR BOLT KIT
P/N: 203666

Figure 2

1. Remove all burrs and sharp edges.
2. Dimensions apply before plating.
3. Interpret drawing per ANSI Y14.5M-1982.
4. Dimensions are shown in feet and inches. Dimensions in brackets [ ] are in millimeters.
5. A tolerance of ±1/8" [3] applies to all anchor bolt layout dimensions.

6. Foundation Notes:

A) This foundation is a typical design only. Certification of it's suitability for a particular installation by a professional engineer is required prior to it's use for actual fabrication.

B) Contractor shall field verify all dimensions locating existing construction before fabrication of new construction begins.

C) Concrete and related work shall be mixed, placed and cured in accordance with "Building Code Requirements for Reinforced Concrete" ACI 318-89 (Rev. 88) and "Specifications for Structural Concrete" ACI 301-84 (Rev. 88) publication SP-15 (88).

D) Concrete for foundations shall develop a compressive strength of at least 3000 psi [211 kgf/cm^2] in 28 days with a maximum slump of 3" [76] at time of placing.

E) Reinforcing bars shall conform to ASTM A 615 [S1] grade 60 deformed type Fy = 60000 psi [4219 kgf/cm^2].

F) Unless otherwise noted, concrete cover of reinforcing bars shall conform to minimum requirements of ACI 318-89 (Rev. 88).

G) Fabrication of reinforcing steel shall be in accordance with "Manual of Standard Practice for Detailing Reinforcing ConcreteStructures" ACI 315-80 (Rev. 86).

H) Provide 3/4" x 45° [19 x 45°] chamfer on all exposed concrete edges.

J) Foundations have been designed to rest on undisturbed soil (per EIA-411-A and RS-222-D) with a minimum allowable net vertical bearing capacity of 2000 psf [9770 kgf/m^2]. If undesirable soil conditions are encountered, the engineer shall be notified.

K) Backfills shall be suitable excavated material or other suitable material compacted in 6" lifts to 90% of maximum density as determined by ASTM D1557.

L) If this foundation is to be located in an area where annual frost penetration depth exceeds 15" [381], the local building code specifying a minimum required foundation depth should be consulted.

7. Grounding Electrode System Notes:

The grounding system shown represents the minimum requirements to achieve satisfactory grounding. Actual site conditions and soil resistivity levels will determine final grounding system design to comply with the following:

A) All ground ring, ground rod and antenna structure connections to be EIRCO® products, Inc. Calweld® exothermic type welded electrical connections or equivalent.

B) Ground rods shall be driven to a depth below permanent moisture level (minimum depth shown) as dictated by geographical location.

C) The antenna structure shall be connected to a grounding electrode system consisting of a number of interconnected ground rods. The system shall meet the requirements of the Underwriters' Laboratories Publication No. ,UL96A for Lightning protection.

D) The grounding electrode system to earth resistance shall not exceed 10 Ohms, measured with a Biddle 3 terminal device or equivalent. The grounded conductor (neutral) supplied to all ac equipment on the antenna structure should be disconnected before taking measurement.

E) Actual site conditions may require longer ground rods, additional ground rods and/or land fill additives to reduce soil resistivity levels.

F) Avoid sharp bends when routing grounding wire. Grounding wires to antenna structure to be run as short and straight as possible.

G) Final grade directly above grounding electrode system to be water permeable.

8. Power/IFL Conduit Notes:

A) Electrical power - Drawing depicts suggested location for electrical power conduit to antenna. Size, type and depth to bury conduit to be determined by customer in compliance with local codes. Direction to route conduit to be determined by the relative location of communcations building/shelter. Power conduit to extend 6" (minimum) above surface of foundation slab. Open ends of conduit to be sealed to prevent moisture and foreign particle contamination.

Customer to provide main load center assembly and over-current protection devices for electrical equipment. Mounting location of load center to be determined by customer in accordance with local codes.

B) For routing IFL cables, 4” size conduit recommended. Type and depth to bury conduit to be determined by customer, in compliance with local codes. Location of conduit on foun-dation and direction to route conduit to be determined by location of communications building/shelter. Conduit to extend 36” (minimum) above surface of foundation slab. All bends to be large radius, maximum of two bends per run. Open ends of conduit to be sealed to prevent moisture and/or foreign particle contamination.

6.0 ANTENNA GEOMETRY

6.1 Figure 3 illustrates basic dimensional characteristics and azimuth adjustment range capabilities of the 4.5-meter motorizable antenna. Figure 4 illustrates the corresponding characterisitcs and capabilities of the 4.6-meter antenna.

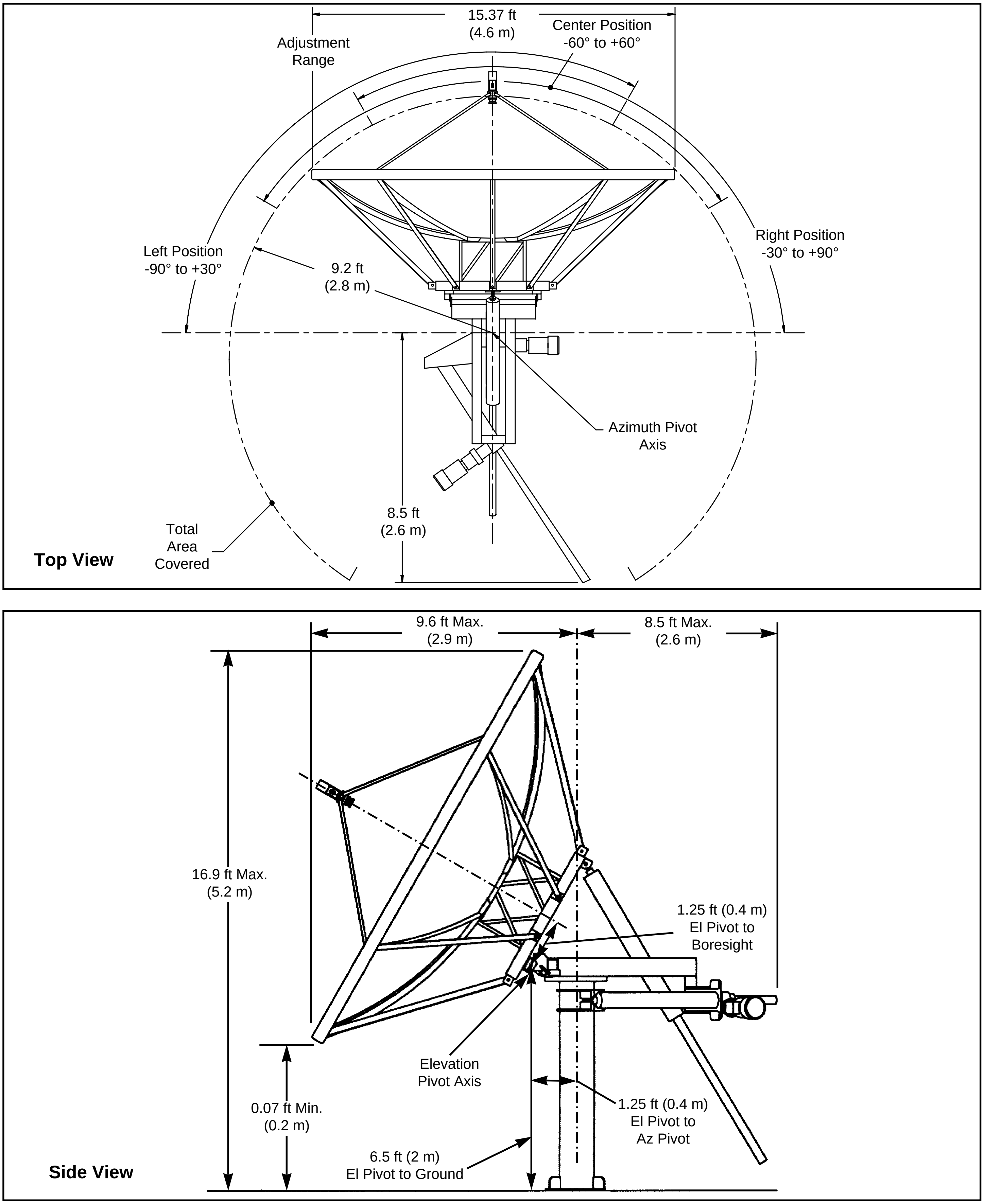
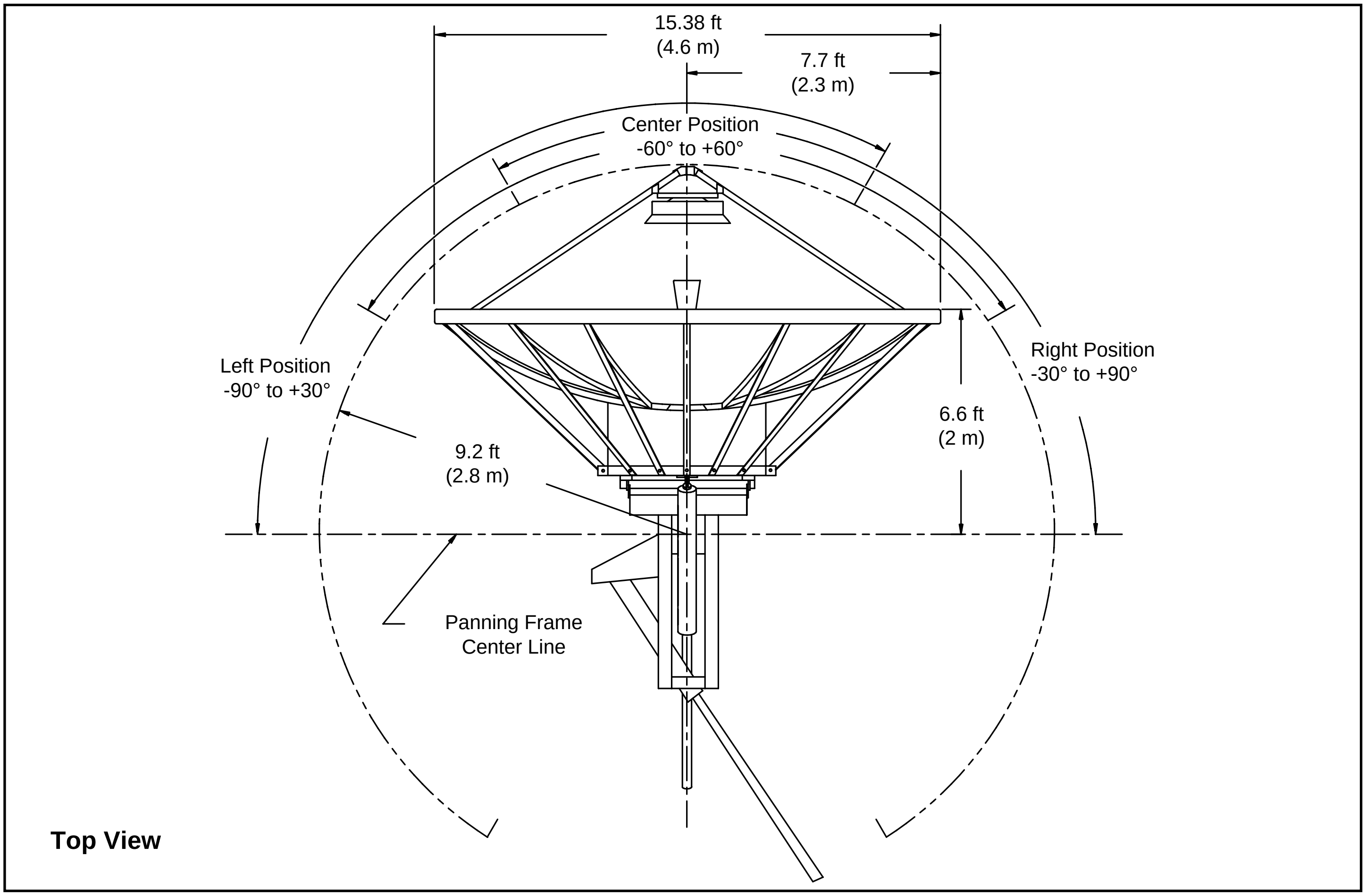


Figure 3 - 4.5-Meter Earth Station Antenna With Motorizable Mount



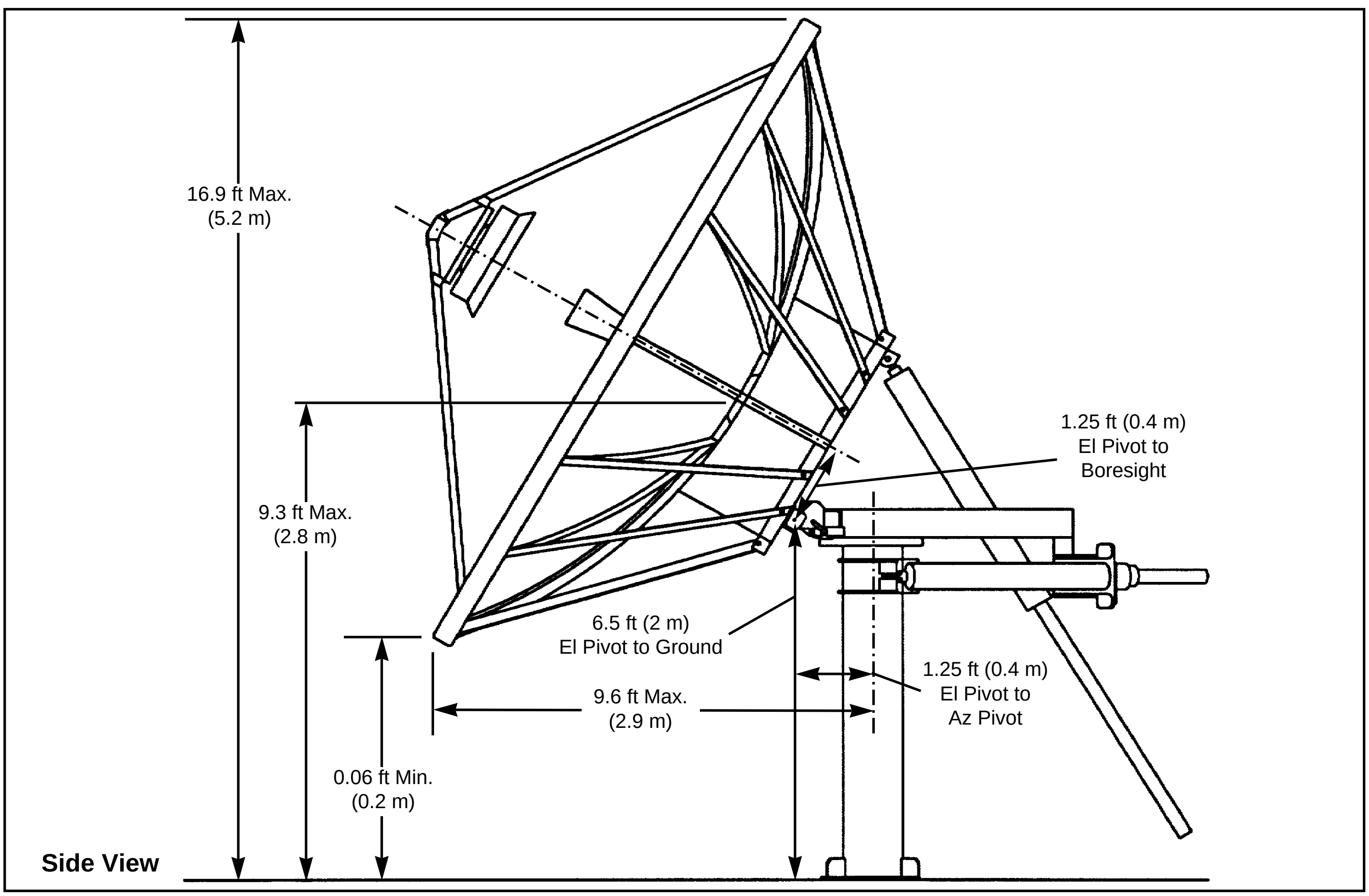
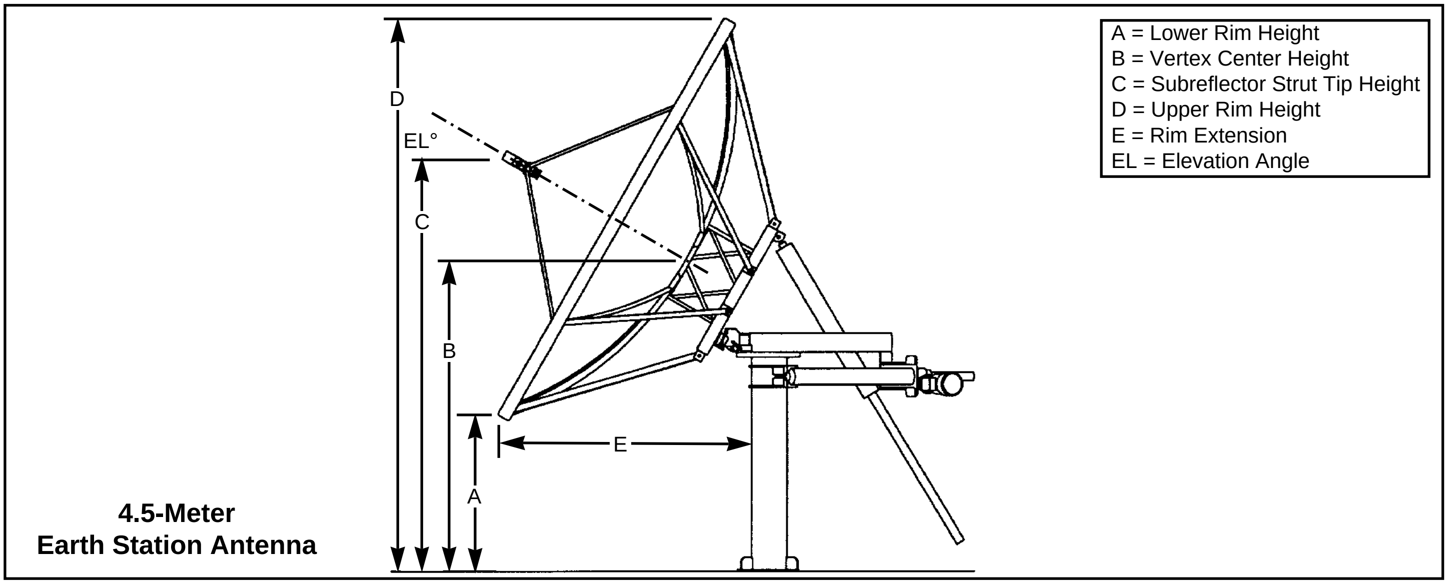
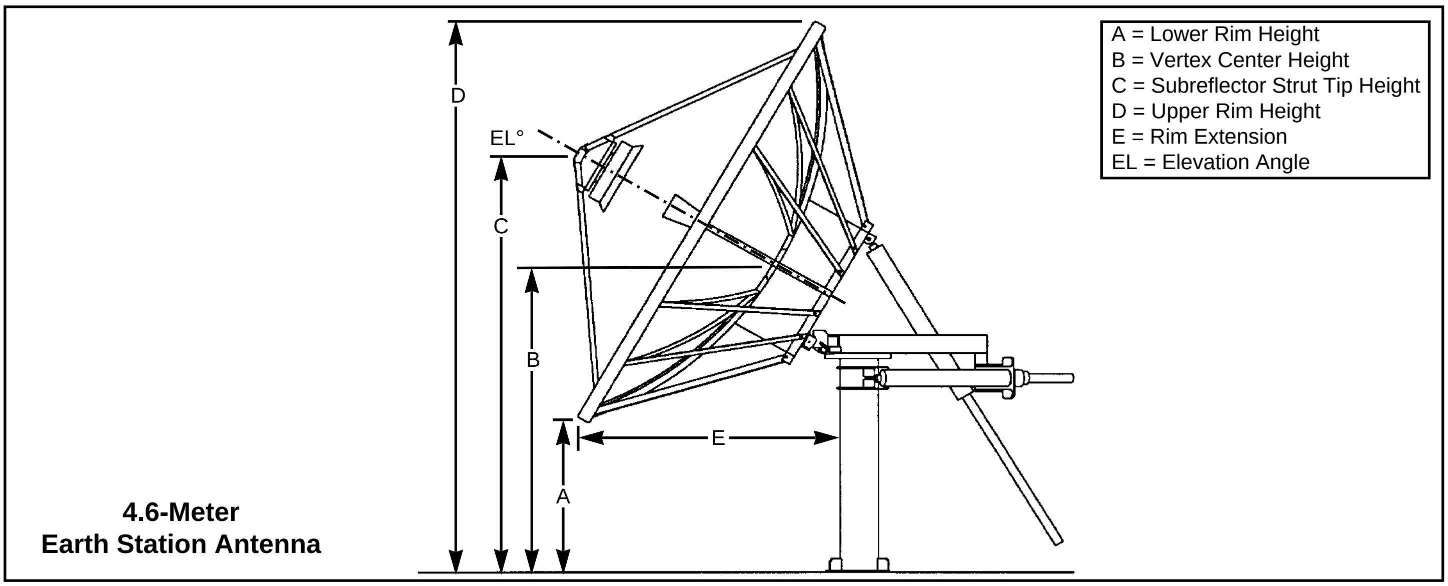


Figure 4 - 4.6-Meter Earth Station Antenna With Motorizable Mount

Figure 5 illustrates varying dimensions from ground reference of selected antenna points as the elevation angle fluctuates from 0° to 90°.





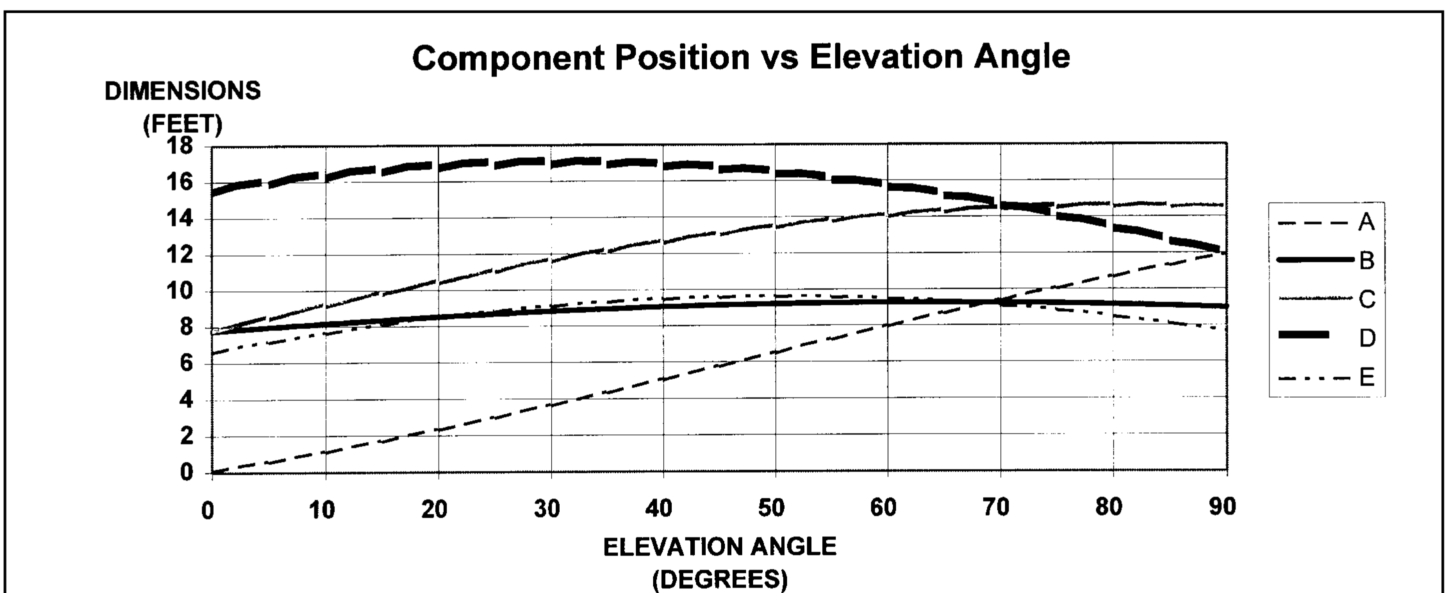


Figure 5

Installation Instructions

Bulletin 37843B
Revision E

Type 206317-( )

Main Reflector Assembly

for 4.6-Meter Earth Station Antennas

ANDREW®

1.0 Introduction

1.1 This bulletin provides assembly and installation instructions for the 4.6-meter earth station antenna main reflector assembly. **Be sure to adhere to all notes, cautions and warnings appearing throughout the installation text to ensure safe and accurate component assembly.**

Warning

A-325 hardware can only be used once. If the antenna is to be taken apart and reassembled, new A-325 hardware must be used.

1.2 Type A-325 hardware is utilized during the reflector backstructure assembly and during reflector attachment to the ground mount. Use of A-325 hardware eliminates slippage between mating surfaces under high loading conditions as well as the need for future retightening. Referto the A-325 hardware tensioning procedure in the following installation text.

Notice

The installation, maintenance or removal of antenna systems requires qualified, experienced personnel. Andrew installation instructions have been written for such personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance and condition of equipment.

Andrew disclaims any liability or responsibility for the results of improper or unsafe installation practices.

2.0 Description

2.1 The antenna main reflector assembly, illustrated in Figure 2-1, is comprised of eight (8) precision formed aluminum reflector panel segments, corresponding aluminum support ribs, backstructure support angles, an equipment enclosure assembly and a reflector hardware kit.

2.2 The segmented reflector assembly provides accurate surface contour which ensures exceptional operating characteristics in the Ku frequency band. The assembled reflector is 15.4 feet in diameter and segmented to reduce costly shipping volume.

2.3 The enclosure assembly, rib support assemblies and support angle kit comprise the reflector backstructure components while the hardware kit contains the required installation hardware for the reflector/backstructure assemblies. The equipment enclosure also provides weather protection for rf equipment and can accommodate up to a 4-port combining network.

Read the Instructions Thoroughly Before Assembly

3.0 Main Reflector Assembly Inspection

3.1 The main reflector assembly is shipped in a single crate containing the equipment enclosure assembly (206297), the reflector panel segments, the rib supports (206215), the backstructure support angles (206279), enclosed door panel assembly (206282A) and the reflector hardware kit (206285). Inspect the shipping crate for visual signs of damage denoting improper handling during shipment that may result in bending, breakage, distortion or other similar damage to the contents.

Warning

Adhere to any special instructions stenciled on the crate relative to crate opening, contents removal and/or personnel safety.

3.2 Cut and remove all strapping, if applicable. Carefully remove all crating and interior blocking/bracing materials permitting removal of all main reflector assembly components. To facilitate assembly, reflector/backstructure components are packed corresponding to the sequence each is used during the reflector/backstructure assembly. Visually inspect the main reflectorassembly components for evidence of any structural component damage. The equipment complement should correspond with the components illustrated in Figure 2-1 and the tabulation given in the corresponding parts listing. Any damage or shortages will prevent satisfactory assembly and installation of the antenna main reflector assembly.

3.3 Figure 2-1 illustrates the assembled main reflector assembly with the major assembly components identified. Refer to this figure in addition to the individually referenced illustrations as an aid in determining component relationship during assembly.

Note

Unless otherwise noted in the following procedures, hardware should initially be hand tightened only enough to hold the structural components safely in position. Final tightening of the hardware is referenced in the text as “fully tighten” to distinguish from initial tightening. Refer to appropriate tensioning procedure regarding A-325 hardware.

4.0 Main Reflector Assembly

Caution

Do not attempt to use hammers, screwdrivers or any other means of mechanical force to enable hardware attachment during any portion of the assembly procedure unless otherwise stated.

Note

The main reflector assembly should be performed in a level area in front of the foundation pad with the top of the reflector approximately 3 feet from the foundation pad. Loosely attach all hardware utilized throughout the main reflector assembly and do not tighten until the entire assembly is complete unless otherwise stated.

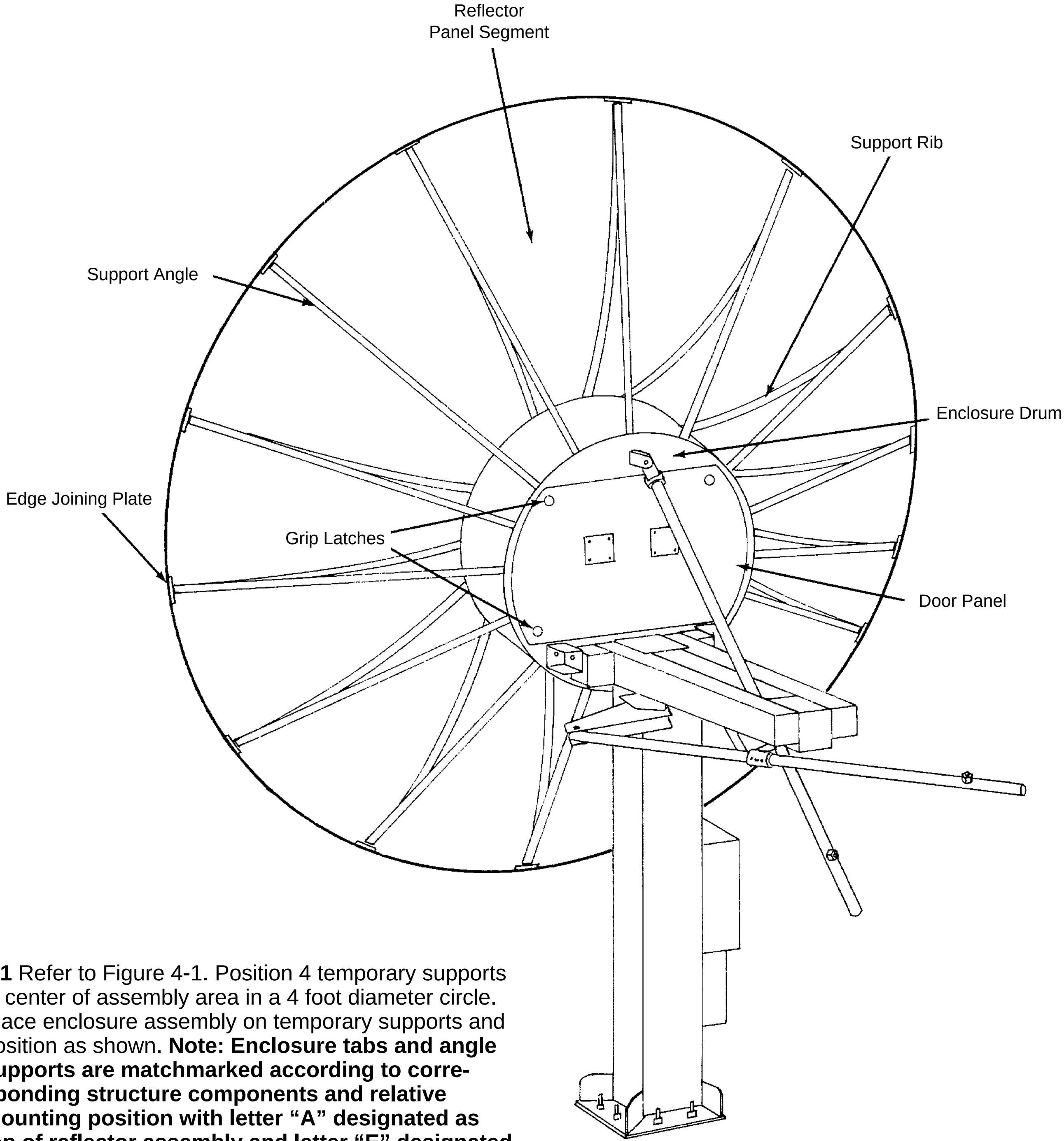


Figure 2-1

4.1 Refer to Figure 4-1. Position 4 temporary supports in center of assembly area in a 4 foot diameter circle. Place enclosure assembly on temporary supports and position as shown. **Note: Enclosure tabs and angle supports are matchmarked according to corresponding structure components and relative mounting position with letter “A” designated as top of reflector assembly and letter “E” designated as bottom of reflector assembly.**

4.2 Refer to Figure 4-2. Position matchmarked backstructure support angle and rib supports opposite corresponding matchmarked drum enclosure angles and tabs. Starting with any rib support/support angle pair, attach clipped end of backstrugture support angle to left side of lower enclosure tab using one A-325 bolt/nut assembly and flat washers as shown. **Note: A-325 hardware should be installed loosely. Ensure each A-325 bolt is lubricated with stick wax prior to installation.** Install rib support to right side of corresponding drum enclosure angle using one A-325 bolt/nut assembly and flat washers inserted in outside hole of enclosure angle/rib support connection. Ensure angled portion of rib support is toward enclosure vertex. Raise backstructure support angle and attach to support rib using one A-325 bolt/nut assembly and flat washers.

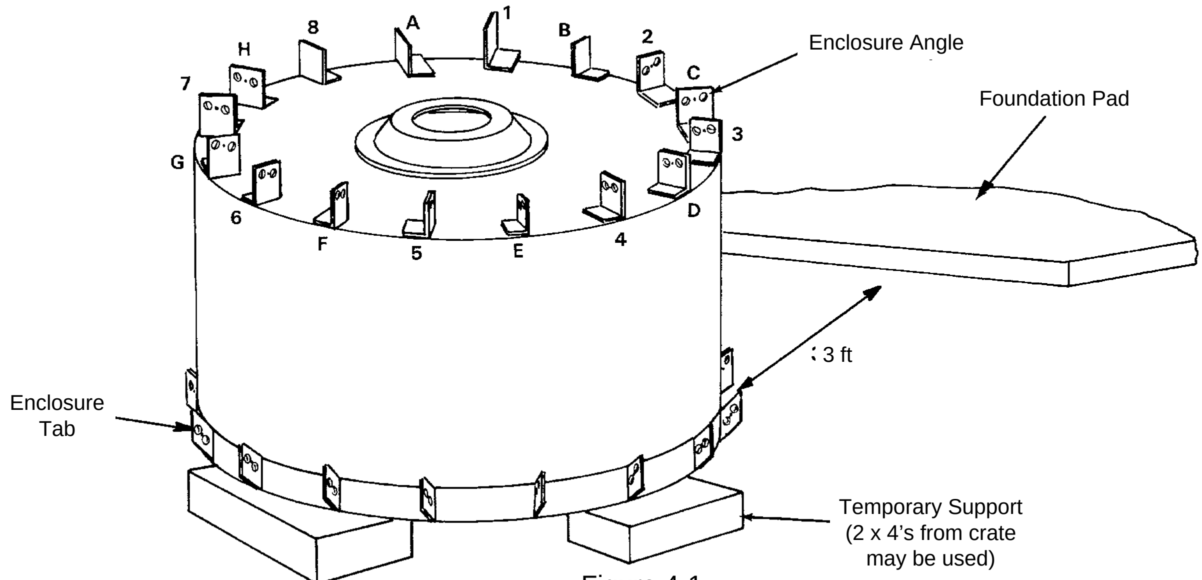


Figure 4-1

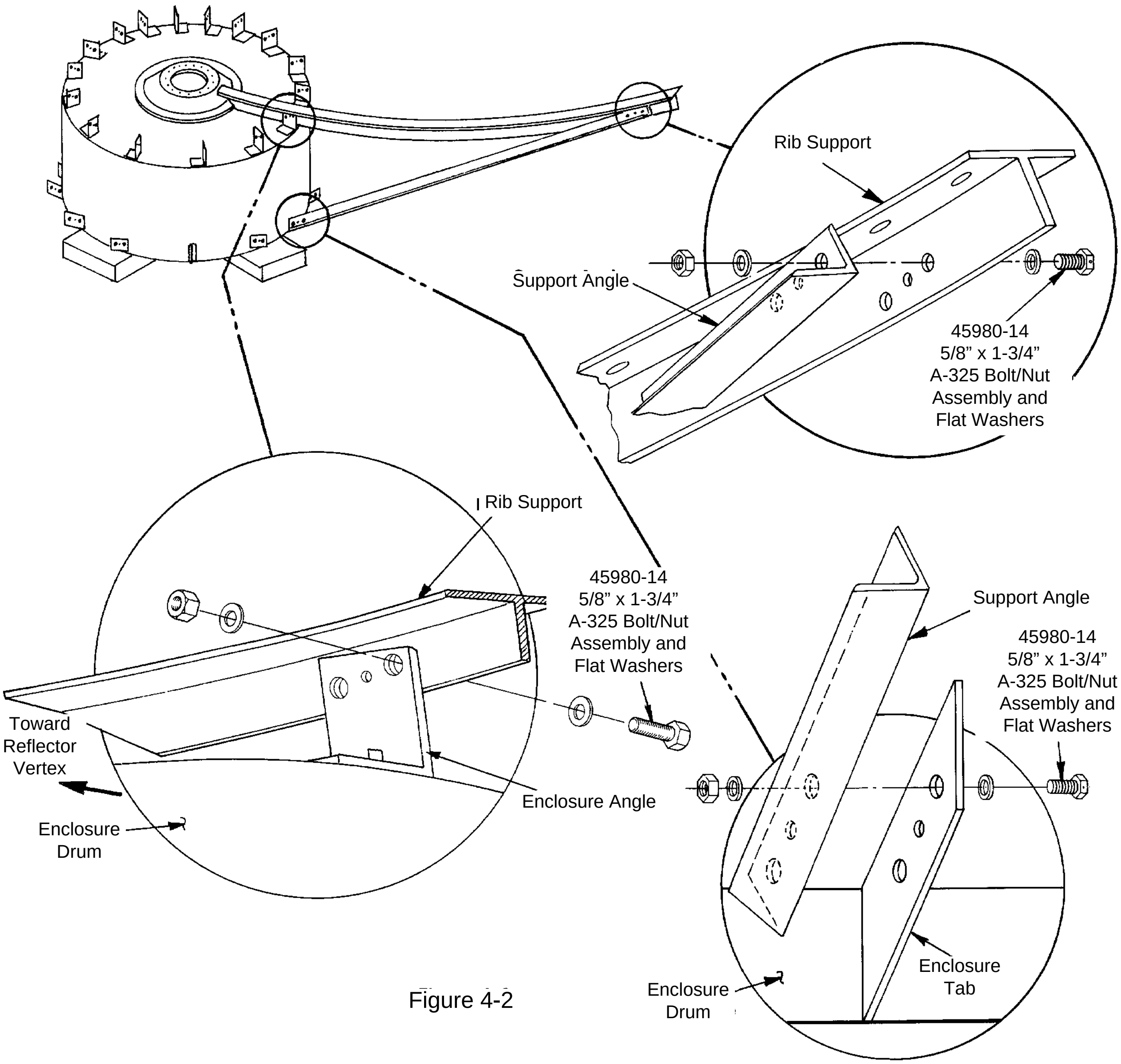


Figure 4-2

4.3 Refer to Figure 4-3. Install three tapered alignment pins by hand from strut side of connection in corresponding holes provided at indicated mounting positions using mechanical slack provided by moving corresponding rib/angle assemblies. **Note: Do not force pins.** Insert by hand until pin is firmly seated. Install second A-325 bolt/nut assembly and flat washers into each rib/angle, angle/tab and rib/support angle connection. Hand tighten each of six A-325 bolt/nut assemblies. **Note: Using hammer, tap three tapered pins until each is firmly seated.**

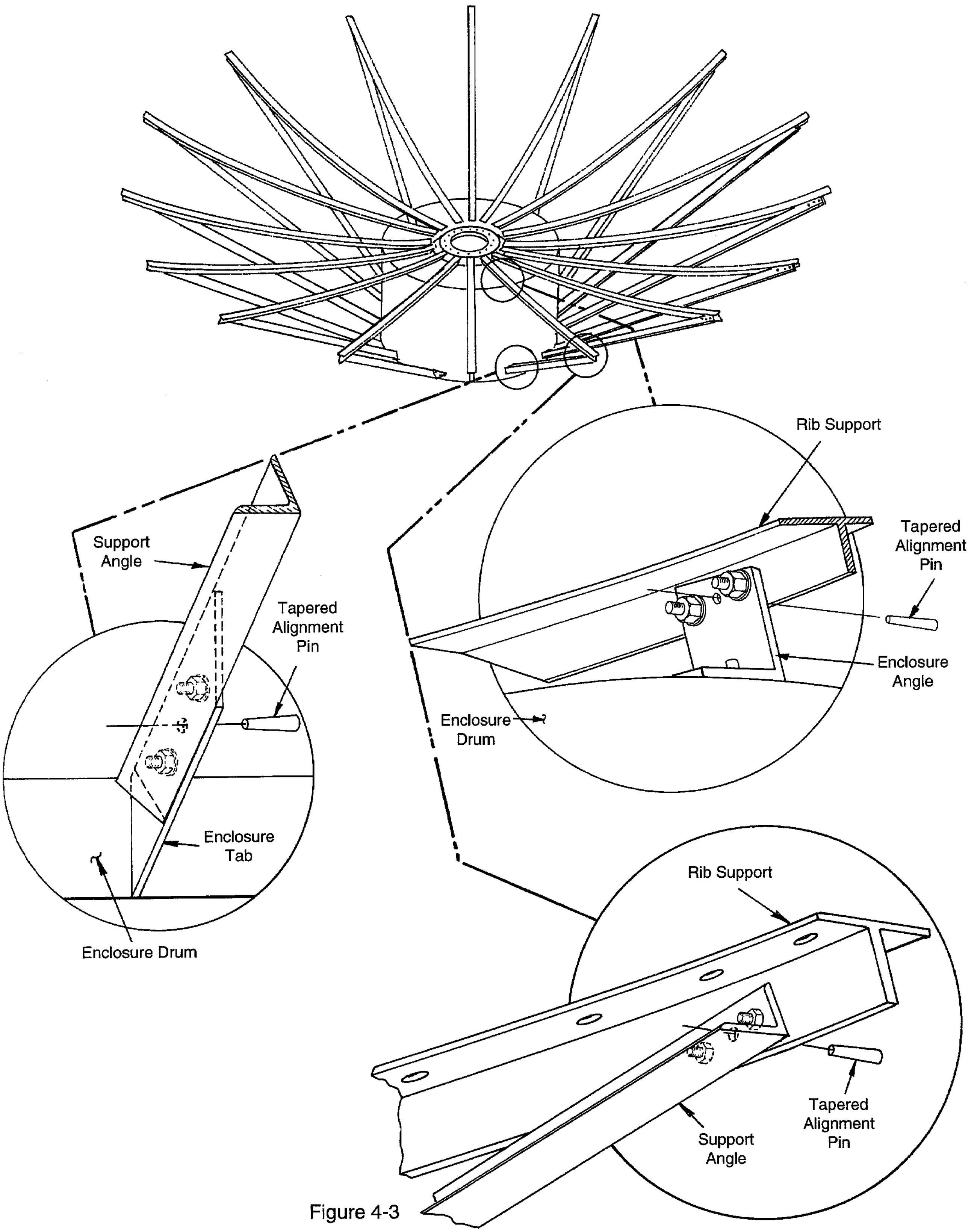
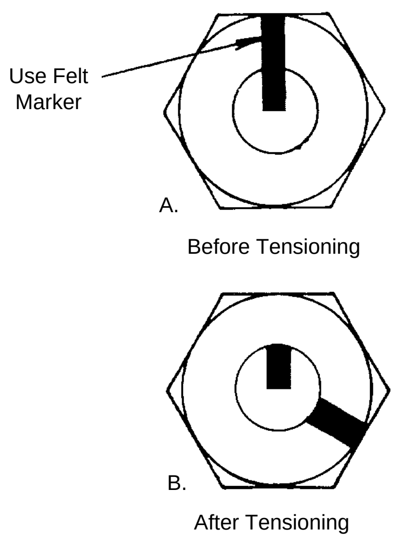


Figure 4-3

4.4 Refer to A-325 hardware tensioning procedure. Fully tighten all A-325 hardware in following sequence: Drum angle/rib support, support angle/rib support, support angle/lower drum tab. Continue installing rib supports, angle supports and tapered pins in manner described in paragraphs 4.2 through 4.4. After all A-325 hardware is fully tightened, ensure all tapered pins remain installed. Do not remove. **Note: Reassembly of reflector assembly will require new A-325 hardware and tapered pins.**



Type A-325 Hardware
Tensioning Procedure

All angle bracketconnectionsuseTypeA-325 hardware. Bolts must be properly tensioned to avoid slippage between bolted surfaces under high loads. Slippage can distort reflector surface during hoisting. Make sure all bolts are tensioned and replace any that break.

Proper tensioning:

1. Lubricate bolt threads with stick wax to reduce friction.

2. Insert bolt.

3. Add nut and finger tighten.

4. After all angle braces are attached, tighten nuts until surfaces are joined tightly and nuts are snug. **Note:** Snug is defined as the tension achieved with the full effort of an installer using an ordinary spud wrench. Do not proceed with steps 5 and 6 unless the connection is to be final.

5. Mark nuts and ends of bolts with straight line. See A.

6. Tighten nuts further with extra long wrench until nuts are moved 1/3 turn (120° ±30°). See B.

4.5 Refer to Figure 4-5. Align mounting holes and position back ring over enclosure vertex opening as shown keeping flat portion of back ring against enclosure vertex surface. Beginning with any panel segment, place panel on corresponding rib supports ensuring the panel match markings correspond with those on the support ribs and struts (refer to Figure 4-4). Position panel segment to align two inner most (vertex) holes with the corresponding pair of holes in the back ring/enclosure below the panel. Place the vertex ring on top of the reflector segment aligning two holes with the corresponding vertex holes in the panel segment. Insert 1/4” shoulder bolts through the vertex ring/panel segment/back ring/enclosure. **Note: Do not force shoulder bolts in place.** Carefully joggle panel to align bolt holes if necessary. Hand tighten nuts and lock washers as shown in Figure 4-5b. Insert 5/16” seam hardware in all seam holes and finger tighten nuts and lock washers. **Note: Do not force seam hardware in place.** Joggle panel segment laterally to align panel/rib bolt holes if necessary. Continue installing adjacent reflector panel segments in corresponding matchmarked locations working either clockwise or counterclockwise by sliding vertex edge of panels under vertex ring and following above procedure ensuring finger tightening of hardware only. If reflector assembly is to be lifted onto ground mount assembly, install supplied lifting tabs on panel seams A, C, E and G at bolt hole ring locations 3 and 4 as shown using indicated hardware.

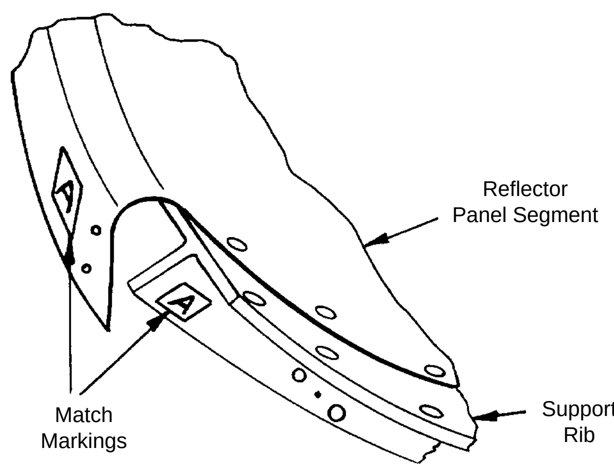
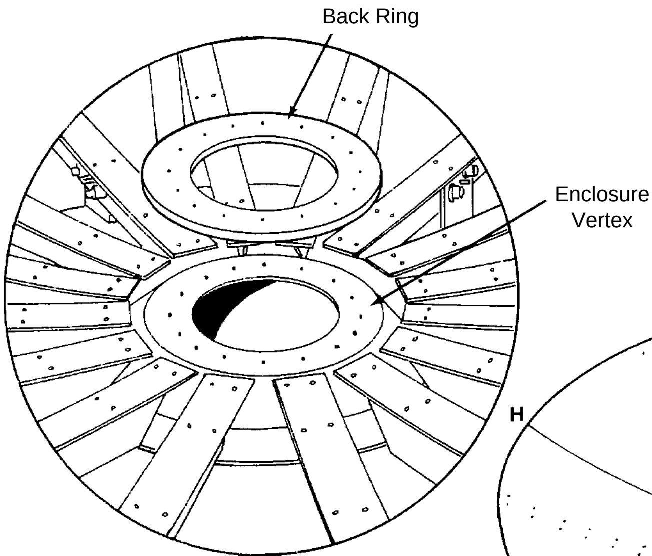
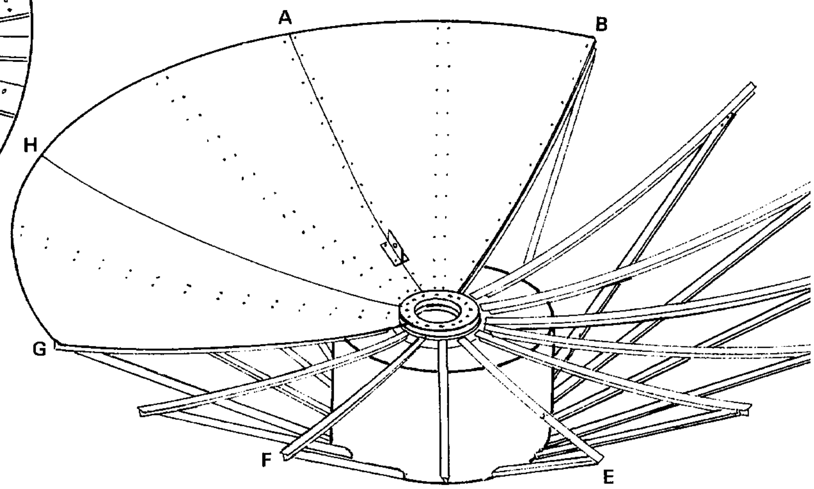


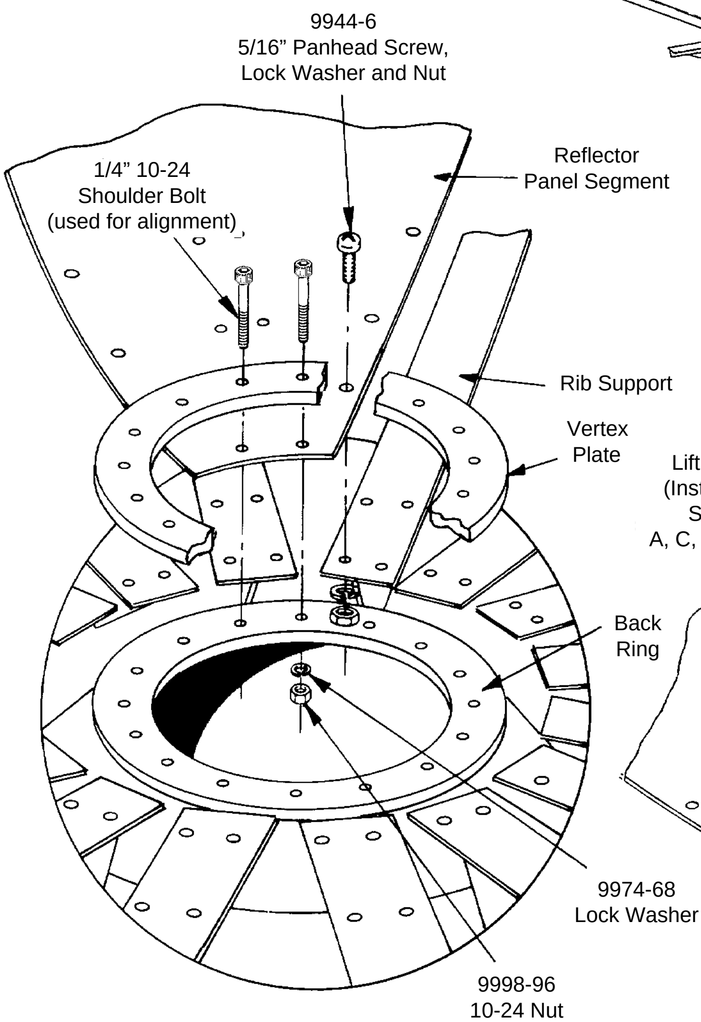
Figure 4-4



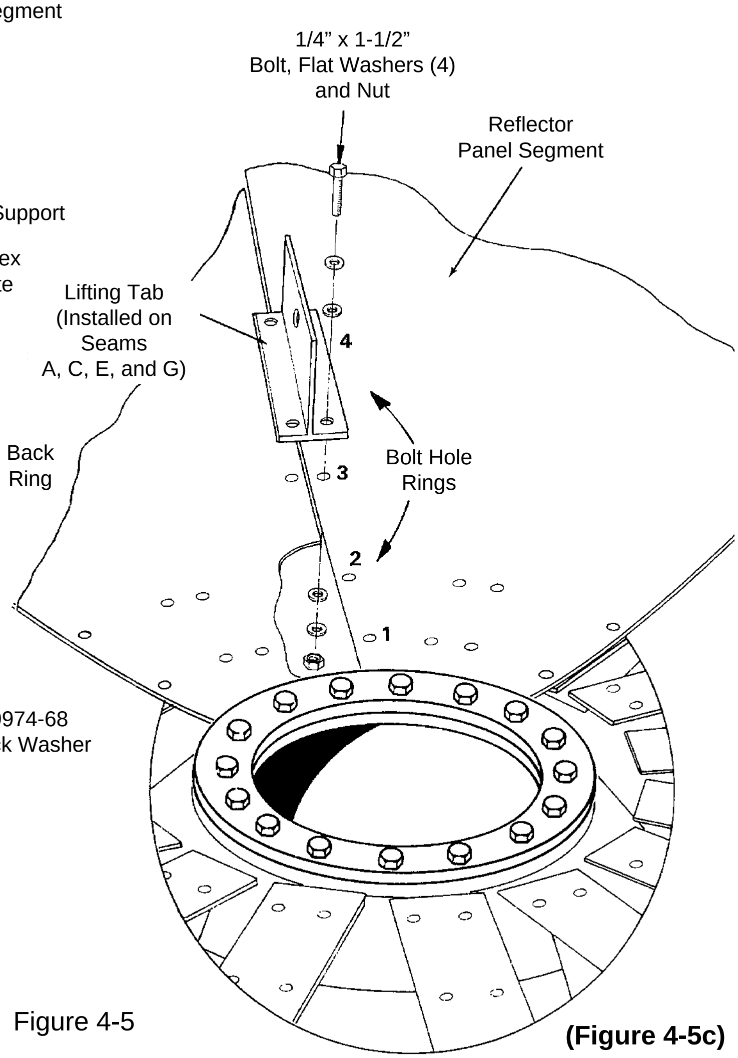
(Figure 4-5a)



(Figure 4-5d)



(Figure 4-5b)



(Figure 4-5c)

Figure 4-5

4.6 Refer to Figure 4-6. Install supplied edge joining plates across panel segment seams on inside of reflector rim at all 16 locations using indicated hardware. Finger tighten hardware only.

4.7 Begin reflector segment seam hardware tensioning by tightening all the “Number” radials and then by tightening all the “Letter” radials. The “Number” radials are down the center of the 8 panel segments, and the “Letter” radials are on the edges or seams of two adjacent panel segments. Refer to Figure 4-7A.

“Number” Radials:

Refer to Figure 4-7B. Tighten the number radials from the #1 position out to the #14 position (from inside to outside). Completely tighten all 14 pairs on each radial before proceeding to the next. The radial sequence should be as follows: 1, 5, 3, 7, 2, 6, 4, and 8. Like the tire on a car, this will ensure equal tensioning around the center line of the reflector. When tightening of the number radials are all completed, proceed to the letter radials.

“Letter” Radials:

Refer to Figure 4-7C. Begin the letter radial tightening by first tightening the vertex ring shoulder bolts. Then begin tightening the letter radials in circles starting at the #1 position, progressing outward to the #14 position. Be sure to complete one full circle before moving to the next. When all the reflector segment seam hardware is tightened per the above procedures, tighten all edge joining plate hardware.

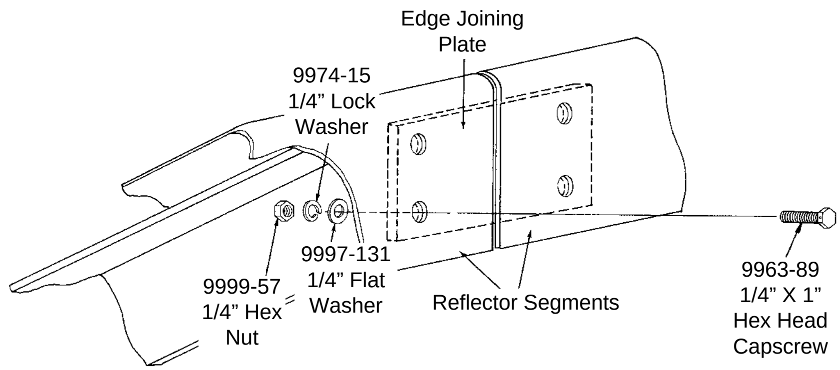


Figure 4-6

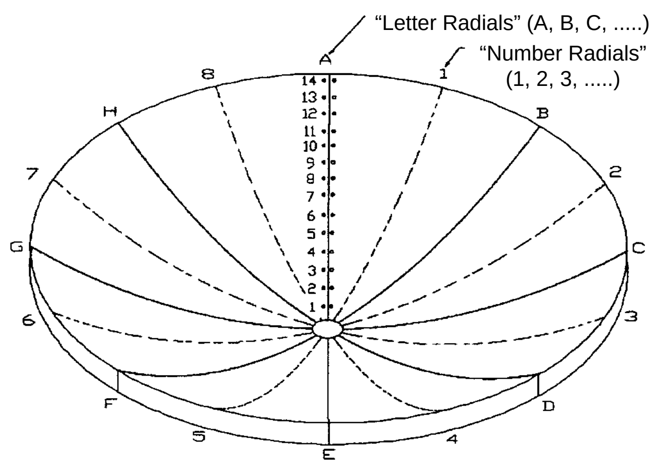


Figure 4-7A

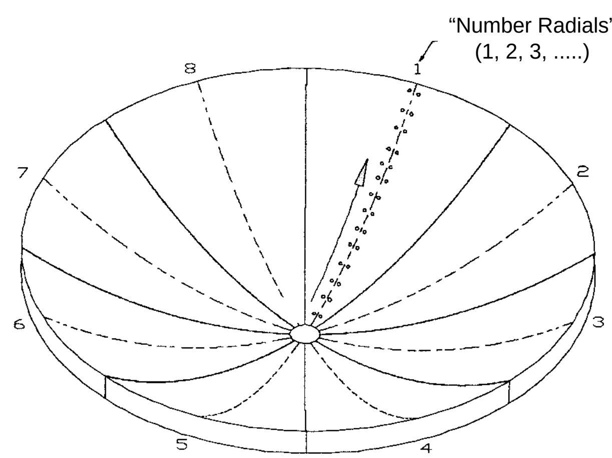


Figure 4-7B

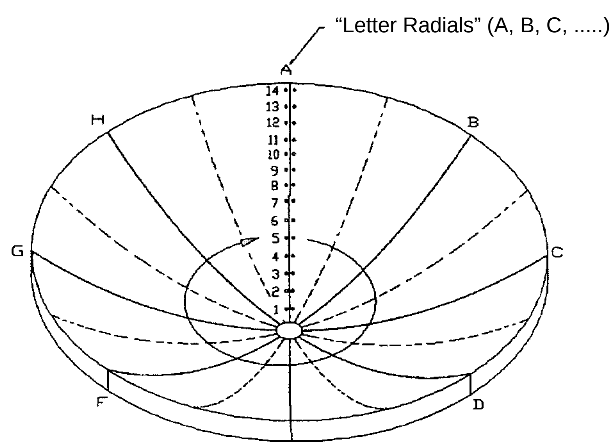


Figure 4-7C

5.0 Reflector to Mount Assembly

5.1 Refer to Figure 5-1. Attach shackles with corresponding chokers to four previously installed lifting tabs as shown. Fully retract elevation strut and raise reflector/backstructure assembly.

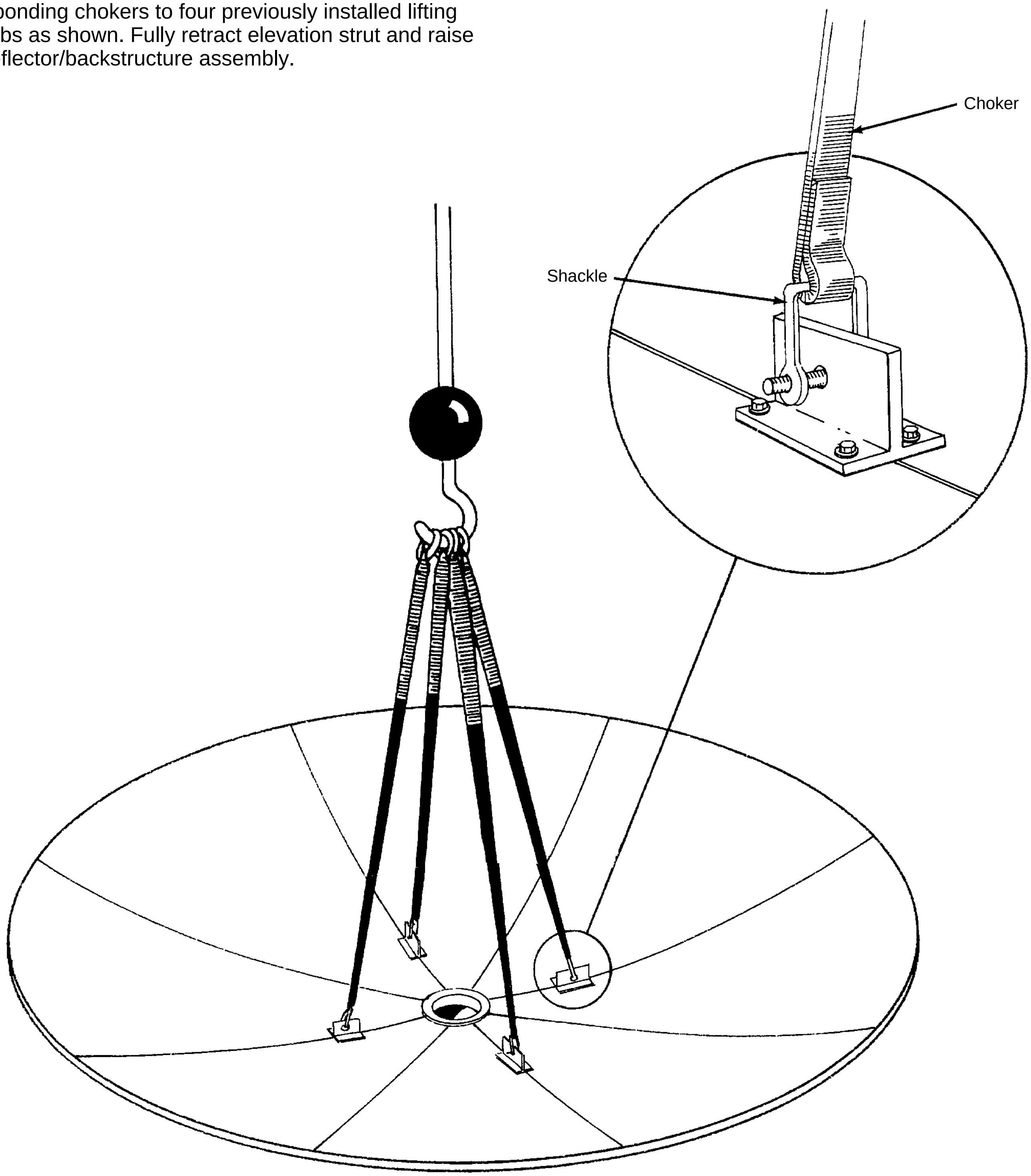


Figure 5-1

5.2 Refer to Figure 5-2. Attach rear of enclosure to corresponding ground mount angle assemblies using 7/8 in bolts, nuts and flat washers with nuts and washers on inside of enclosure.

5.3 Disassemble clevis and replace 3/4” x 2” bolt with 3/4” x 2-1/4” bolt (supplied as part of reflector hardware kit) to clevis. Use Loctite after reassembly of clevis as shown in Figure 5-2. Attach elevation strut to top rear portion of enclosure assembly as shown using 3/4 in bolt, flat washer and nut. Securely tighten all mounting hardware per A-325 hardware tensioning procedure. Attach door panel to enclosure assembly and securely tighten remaining reflector assembly mounting hardware.

5.4 Remove lifting tabs. Install and tighten hardware.

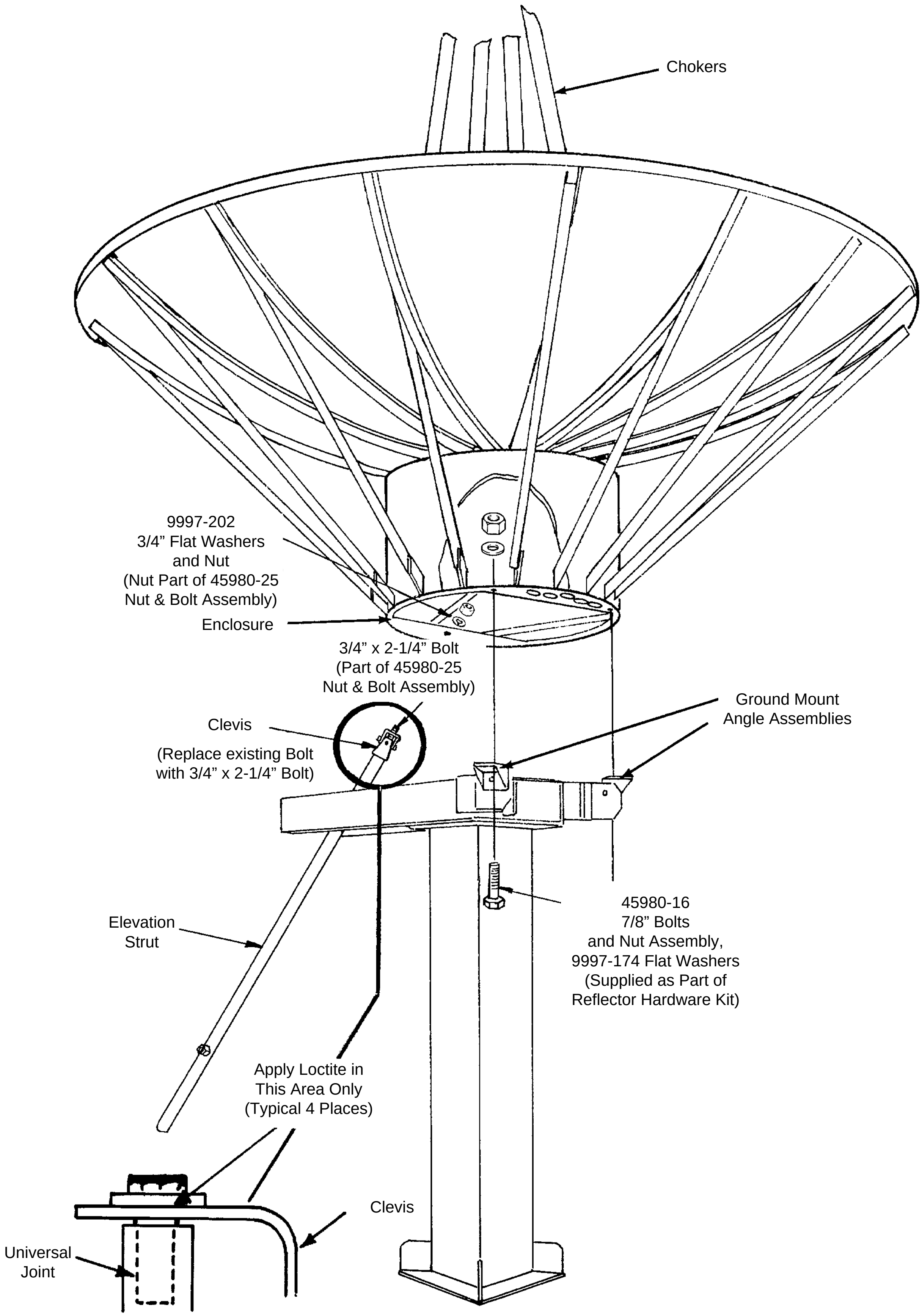

Chokers
9997-202
3/4” Flat Washers
and Nut
(Nut Part of 45980-25
Nut & Bolt Assembly)
Enclosure
3/4” x 2-1/4” Bolt
(Part of 45980-25
Nut & Bolt Assembly)
Clevis
(Replace existing Bolt
with 3/4” x 2-1/4” Bolt)
Ground Mount
Angle Assemblies
45980-16
7/8” Bolts
and Nut Assembly,
9997-174 Flat Washers
(Supplied as Part of
Reflector Hardware Kit)
Elevation
Strut
Apply Loctite in
This Area Only
(Typical 4 Places)
Clevis
Universal
Joint

Figure 5-2

Type 206317-( ) Reflector Assembly
Parts List

Type No.	Description	Qty.
206297	Enclosure Weldment	1
206215	Rib Support	16
206279	Back Structure Support Angle	16
206282A	Door Panel	1
206285	Hardware Kit, consists of:	
49693	Edge Joining Plate	16
200852	Stick Wax	1
9912-179	#6 Taper Pin	53*
45980-14	5/8-11 x 1-3/4” Nut and Bolt Assembly	106*
9974-17	5/16” Lock Washer	493*
9997-227	5/8” Flat Washer	211*
9999-59	5/16” Hex Nut	493*
9963-120	1/4-20 x 1-1/2” Hex Nut	18*
9974-15	1/4” Lock Washer	88*
9997-131	1/4” Flat Washer	140*
9999-57	1/4” Hex Nut	88*
9844-6	5/16-18 Panhead Screw	493*
203130	Vertex Plate	1
203131	Back Ring	1
206278	Lifting Tab	4
9963-89	1/4-20 x 1“ Hex Bolt	70*
9997-174	7/8” Flat Washer	2
9997-202	3/4” Flat Washer	1
45980-16	7/8” Nut and Bolt Assembly	2
45980-25	3/4” Nut and Bolt Assembly	1
9858-16	1/4” #10-24 Shoulder Bolt	18*
9974-68	#10 Lock Washer	18*
9998-96	#10-24 Nut	18*
9869-77	Plug	5
201197-4	3/4” Knockout Plug	2
36165-10	Loctite, 1/2 oz.	1

* Includes spare(s).

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Type 203330
Ground Mount
for 4.6-Meter Earth Station Antennas

ANDREW®

1.0 Introduction

1.1 Type 203330 Ground Mount Assembly is a galvanized steel elevation-over-azimuth pedestal mount optimized for geostationary satellite applications in the Ku (12 - 14 GHz) frequency band. The elevation/azimuth mount design simplifies installation and minimizes foundation requirements while enabling horizon-to-horizon coverage from any worldwide location.

1.2 The ground mount assembly enables 180° positioning for selected azimuth viewing. Azimuth range coverage is ±90° divided into three 120° continuous ranges with 30° overlap. Elevation adjustment is continuous from 0 to 90°.

READ THE INSTRUCTIONS THOROUGHLY BEFORE ASSEMBLY

2.0 Ground Mount Assembly

2.1 The following major assemblies are required to install the 4.6-meter ground mount. Check all assemblies before beginning installation. Refer to parts list for detailed description.

Type No.	Description	Qty.
203330	**Ground Mount Assembly, consists of:**	
203331A	Azimuth Strut Weldment	1
202951	Azimuth/Elevation Strut Kit	1
203341	Hardware Kit	1

2.2 Refer to Figure 1. Carefully remove 203330 ground mount assembly from packing crate. Securely attach crane/hoist as shown using nylon sling. **Note:** Use of a 1 ton minimum capacity crane or hoist will be required for proper ground mount installation.

WARNING:

Attach nylon sling below azimuth strut weldment mounting plates and ensure brake assembly hardware is securely tightened (40-45 ft-lbs) before raising ground mount assembly to prevent disengagement of panning frame weldment from square tube weldment. Do not attempt to loosen brake assembly hardware during ground mount assembly or while making azimuth/elevation adjustments.

2.3 Carefully raise entire ground mount assembly and attach to corresponding foundation anchor bolts using 7/8 in flatwashers and nuts. **Note:** Ground mount positioning on foundation is dependent upon predetermined azimuth viewing requirements.

2.4 Position and mount 203331A azimuth strut weldment to ground mount assembly as shown using 3/4 by 1-1/2 in bolts, lockwashers and nuts. **Note:** Mounting position of azimuth strut weldment is dependent upon predetermined azimuth range requirements as shown in Figure 1, top view.

2.5 Apply supplied stick lubricant to setscrew threads and A-325 bolt threads. Loosely install 1/2 by 1 in setscrews in azimuth and 1/2 by 1-1/2 in setscrews in elevation strut supports; 7/8 by 2-3/4 in A-325 bolts, flat washers and nuts in ground mount angle assemblies; and 3/4 by 3-3/4 in bolt, lockwasher and nut in azimuth strut weldment for future use.

3.0 Azimuth/Elevation Strut Assembly

3.1 Remove elevation strut mechanical stop hardware. Loosen strut support setscrews and install 202835 azimuth and 33385-4 elevation strut assemblies in corresponding strut supports as shown. Temporarily tighten all elevation strut support hardware and reinstall previously removed mechanical stop hardware.

3.2 Attach forward portion of azimuth strut assembly to corresponding hole in azimuth strut weldment using 3/4 in by 3-3/4 in bolt lockwasher and nut. Securely tighten (35 ft-lbs) all azimuth strut support hardware.

Type 203330 Ground Mount Assembly Parts List

Type No.	Description	Qty.
203331A	**Azimuth Strut Weldment**	**1**
202951	**Azimuth/Elevation Strut Kit**	**1**
203341	**Hardware Kit consists of:**	
9974-10	3/4” Lockwasher	10*
9999-121	3/4” Hex Nut	10*
9953-25	1/2” x 1“ Stainless Steel Set Screw	9*
45980-2	7/8” x 2-3/4” Bolt and Nut Assembly	3*
9963-791	3/4” x 3-3/4” Hex Head Bolt	1
9997-202	3/4” Flatwasher	9*
9963-792	3/4” x 1-1/2” Hex Head Bolt	9*
9999-174	7/8” Hex Nut	9*
9997-174	7/8” Flatwasher	11*
9953-15	1/2” x 1-1/2” Stainless Steel Set Screw	4*
200852	Stick Lubricant	1

*Includes spare(s).

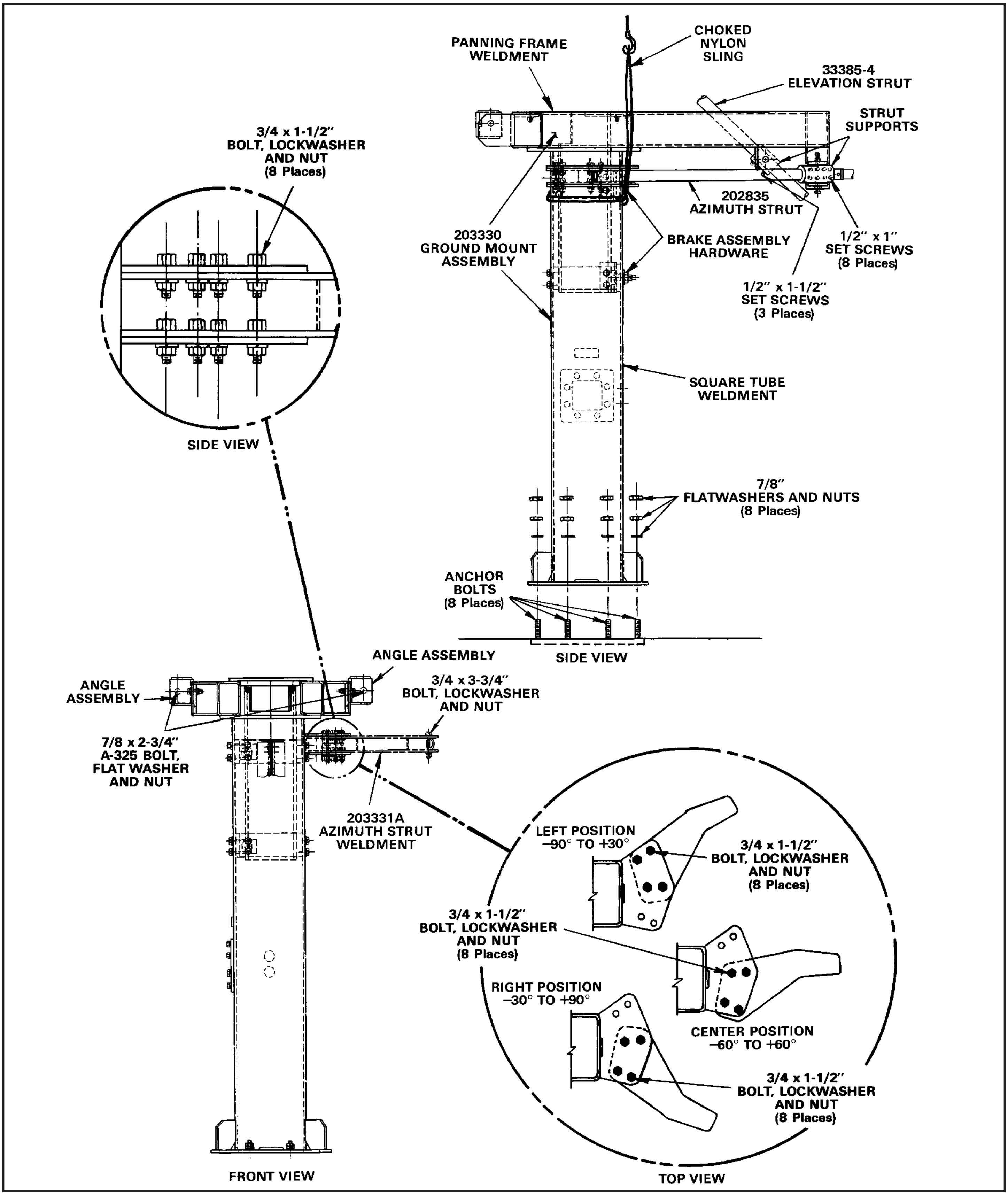

Figure 1

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Bulletin 37861
Revision B

Types 205947 and 206280

Subreflector and Subreflector Strut Kits

for 4.6-Meter Ku-Band Earth Station Antennas

ANDREW®

1.0 Introduction

1.1 This bulletin provides assembly and installation instructions for the 4.6-meter Ku-band earth station antenna subreflector and subreflector strut kit assemblies. Be sure to adhere to all notes, cautions and warnings appearing throughout the installation text to ensure safe and accurate component assembly.

Notice

The installation, maintenance or removal of antenna systems requires qualified, experienced personnel. Andrew installation instructions have been written for such personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance and condition of equipment.

Andrew disclaims any liability or responsibility for the results of improper or unsafe installation practices.

2.0 Description

2.1 The antenna subreflector/strut kit assemblies, illustrated in Figure 2-1, comprise a significant portion of the unique dual-reflector Gregorian optic system utilized on the 4.6-meter Ku-band earth station antenna to maximize gain and ensure exceptionally high efficiency in both the receive and transmit operating frequencies.

2.2 The Type 205947 Subreflector Kit is completely preassembled to ease installation and is basically comprised of a one piece, precision cast aluminum subreflector assembly, an adjustment ring and required adjustment hardware. The cast subreflector assembly ensures an accurate surface contour which provides exceptional operating characteristics in the Ku frequency band.

2.3 The Type 206280 Subreflector Strut Kit provides mechanical support for the subreflector assembly and basically includes strut weldments, angle clips, strut angles, a subreflector sefting rod and required mounting hardware.

Read the Instructions Thoroughly Before Assembly

3.0 Subreflector/Strut Kit Inspection

3.1 The subreflector/strut kit assemblies are shipped in two crates; one containing the preassembled subreflector assembly (205947), while the other crate contains the strut weldments, angle clips, strut angles and all corresponding mounting hardware for the subreflector strut kit assembly (206280). Inspect the shipping crates for visual signs of damage denoting improper handling during shipment that may result in bending, breakage, distortion or other similar damage to the contents.

Warning

Adhere to any special instructions stenciled on the crates relative to crate opening, contents removal and/or personnel safety.

3.2 Cut and remove all strapping, if applicable. Carefully remove all crating and interior blocking/bracing materials permitting removal of all subreflector/strut kit assembly components. Visually inspect the subreflector/strut kit assembly components for evidence of any structural component damage. The equipment complement should correspond with the components illustrated in Figure 2-1 and the tabulation given in the corresponding parts listing. Any damage or shortages will prevent satisfactory assembly and installation of subreflector/strut kit assemblies.

3.3 Figure 2-1 illustrates the assembled subreflector/ strut kits with the major kit assembly components identified. Refer to this figure in addition to the individually referenced illustrations as an aid in determining component relationship during assembly.

Note

Unless otherwise noted in the following procedures, hardware should initially be hand-tightened only enough to hold the structural components safely in position. Final tightening of the hardware is referenced in the text as "securely tighten" to distinguish from initial tightening.

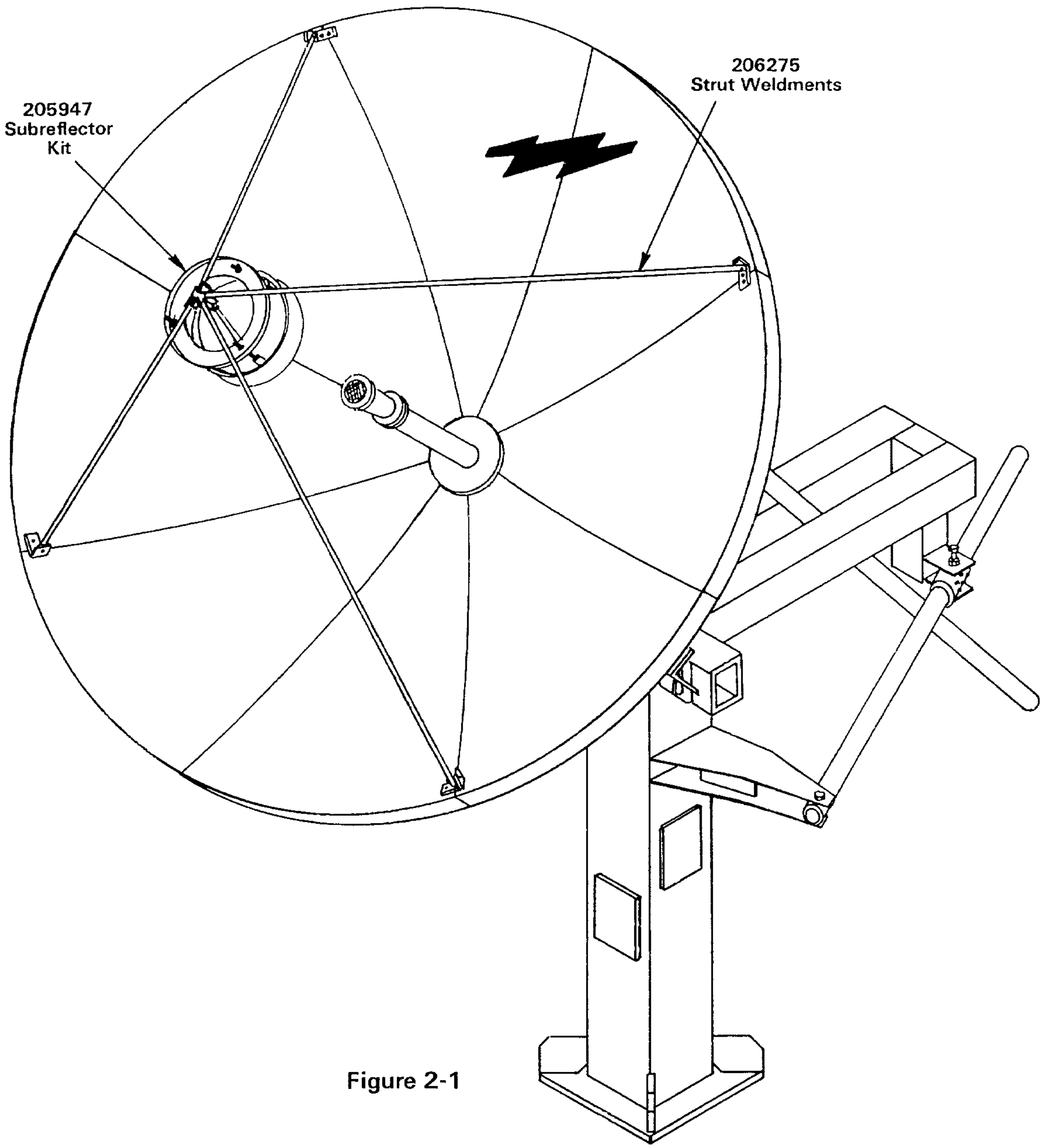


Figure 2-1

4.0 Subreflector/Strut Kit Assembly

Note

If a crane is available, paragraphs 4.1 through 4.3 may be performed on the ground with the preassembled subreflector/strut kit assembly raised into position and secured to the angle clips installed around the main reflector perimeter.

4.1 Refer to Figure 4-1. Loosely preassemble strut weldments as shown using supplied strut angles and corresponding mounting hardware.

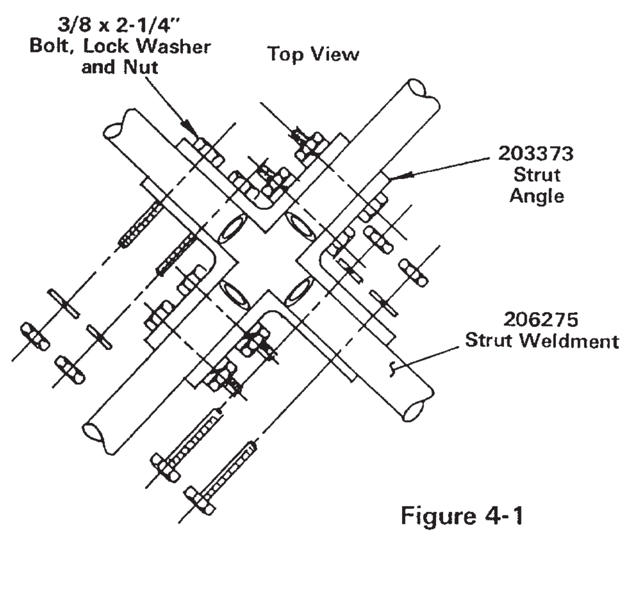


Figure 4-1

4.2 Refer to Figure 4-2. Loosely attach supplied angle clips around reflector perimeter at 2-, 4-, 8- and 10 o'clock positions using indicated bolts, lockwashers and nuts.

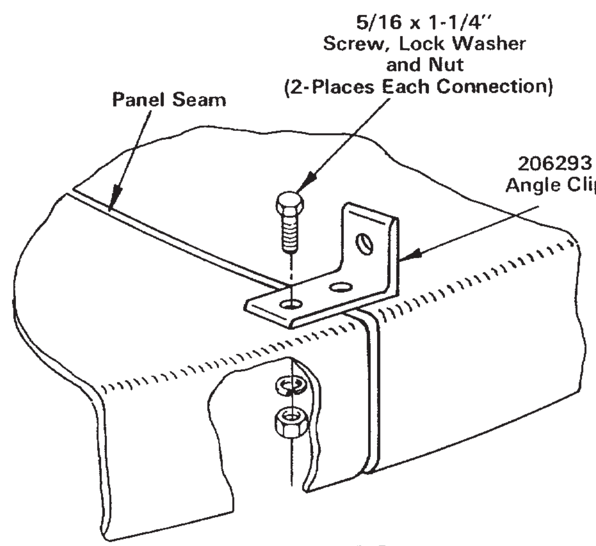
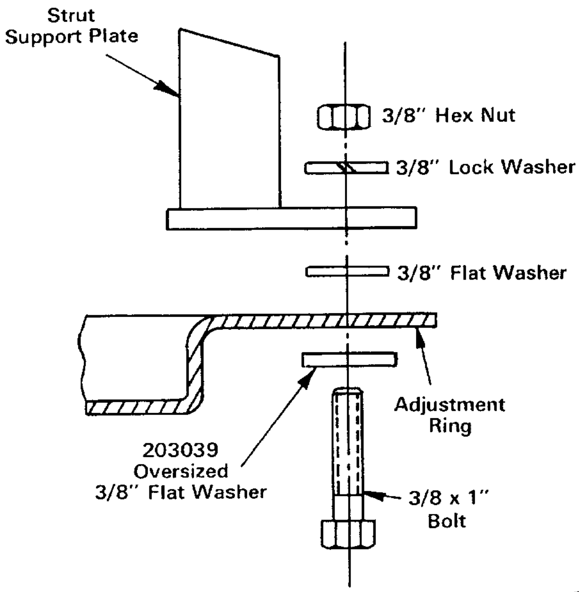


Figure 4-2

4.3 Refer to Figure 4-3. Carefully raise main reflector assembly to zenith (EL = 90°) position. Position and loosely attach preassembled subreflector/adjustment ring assembly to corresponding mounting holes in strut support plates (part of strut weldment) using supplied bolts, oversized flat washers, flat washers, lock washers and nuts. Attach temporary lifting strap as shown, being careful not to damage subreflector assembly. **Note:** Position subreflector assembly to ensure one subreflector adjustment stud will be located at 12 o'clock position when finally installed on main reflector assembly. Refer to Figure 5-1.



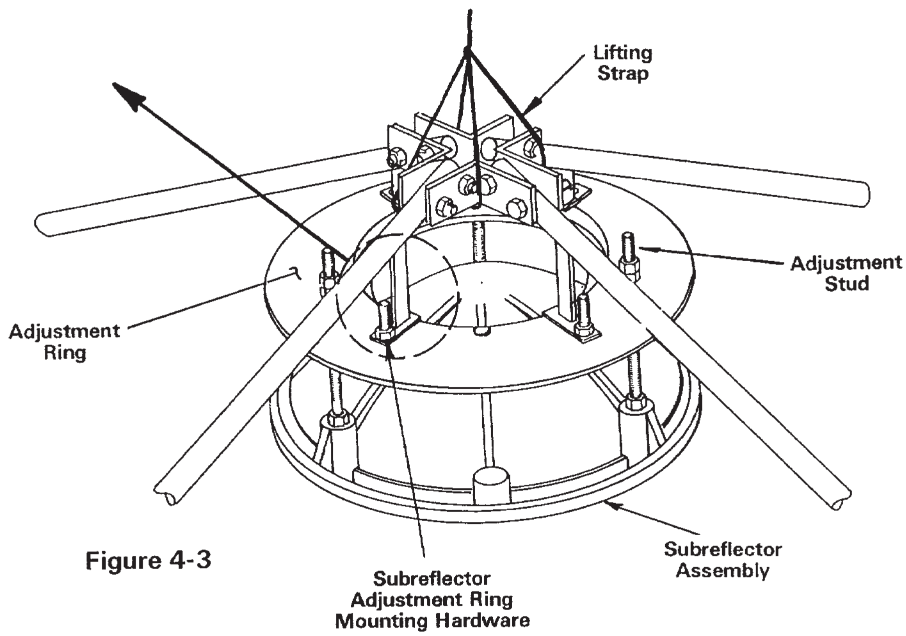


Figure 4-3

4.4 Refer to Figure 4-4. Carefully raise and attach preassembled subreflector/strut assemblies to corresponding angle clips as shown using supplied bolts, flat washers, lock washers and nuts. Securely tighten all subreflector/strut assembly mounting hardware while temporarily leaving subreflector adjustment hardware loosely attached. Remove temporary lifting strap.

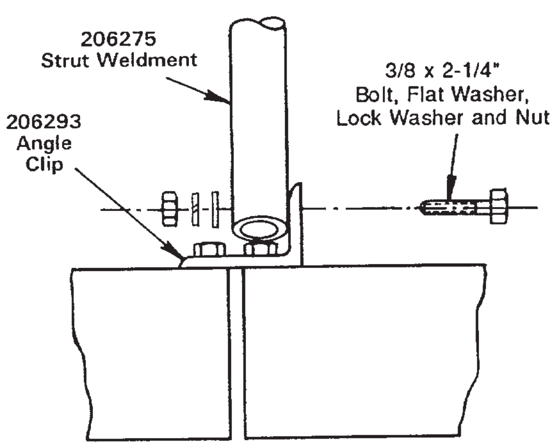


Figure 4-4

5.0 Subreflector Setting

5.1 Refer to Figure 5-1. Use subreflector setting rod to set distance between inner reflector panel seam hardware and subreflector aperture at three subreflector adjustment stud positions. Use subreflector adjustment hardware (refer to Figure 4-3) to achieve equal axial dimensioning at all three locations. Securely tighten adjustment hardware.

5.2 Measure and note the distance between outermost angle clip bolt head and the subreflector rim as shown. Obtain corresponding measurements from remaining . subreflector struts and adjust subreflector adjustment ring mounting hardware (refer to Figure 4-3) at all four locations to achieve a maximum differential of 1/16 in. Securely tighten adjustment hardware.

5.3 Repeat procedure described in paragraph 5.1. If any dimensional variation is noted, repeat procedure described in paragraph 5.1 and proceed to paragraph 5.2. If no dimensional variation is noted, proceed to paragraph 5.4

5.4 Carefully lower reflector assembly to operating position.

Type 205947 Subreflector Kit Parts List

Type No.	Description	Qty.
205339	Subreflector	1
206379	Adjustment Ring	1
9934-178	3/8 x 6” Stud	3
9999-79	3/8”Jam Nut	16*
9997-79	3/8” Flat Washer	7*

* Includes spare(s)

Type 206280 Subreflector Strut Kit Parts List

Type No.	Description	Qty.
206275	Strut Weldment	4
206293	Angle Clip	4
203373	Strut Angle	4
9963-127	3/8 x 2-1/4” Bolt	13*
9963-115	3/8 x 1” Bolt	5*
9974-63	3/8” Lock Washer	18*
9999-60	3/8” Hex Nut	18*
203039	3/8” Flat Washer (oversized)	5*
9844-8	5/16-18 x 1-1/4” Screw	9*
9974-17	5/16” Lock Washer	9*
9999-59	5/16” Hex Nut	9*
9997-79	3/8” Flat Washer	9*
300064-2	Subreflector Setting Rod	1

*Includes spare(s).

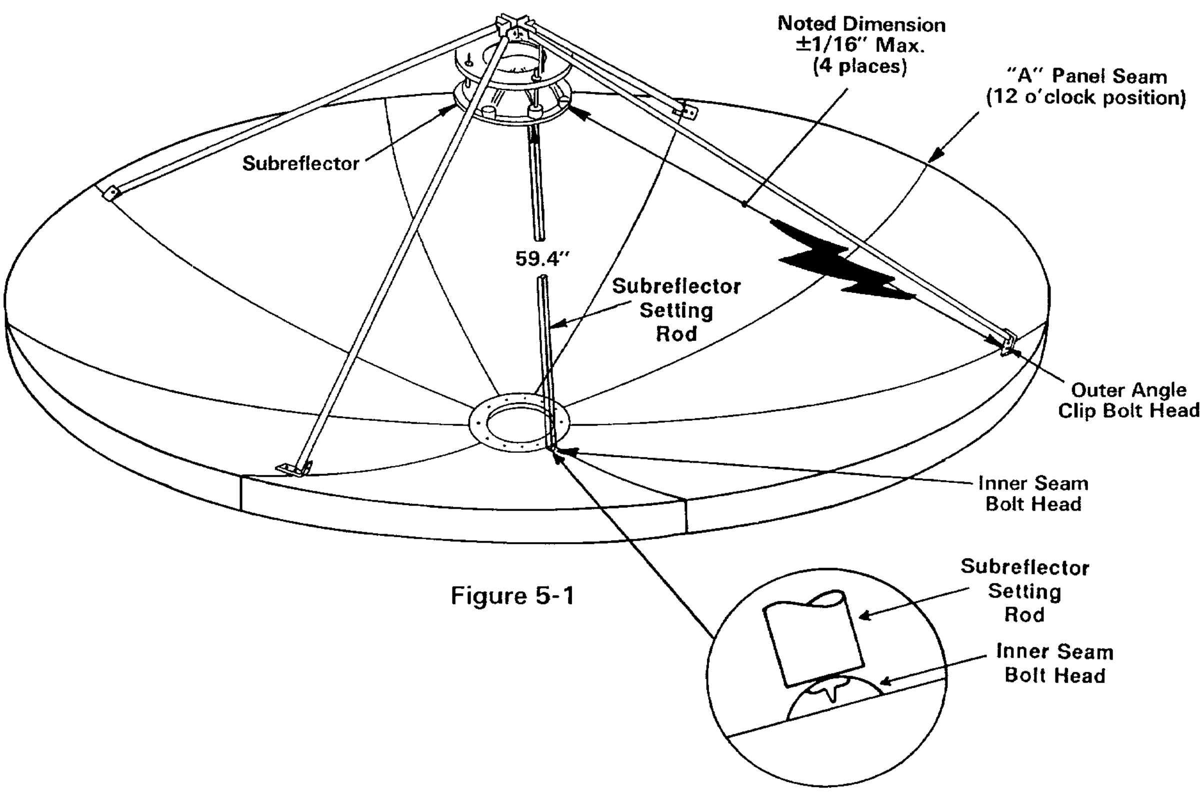


Figure 5-1

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APPLICATION	
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REVISIONS				
MF	REV	DESCRIPTION	DATE	APPROVED
		REL TO PRODUCTION	10NOV90	WF
	A	REVISED SHT 1.3 & 8. DCN D001.91(B)	27SEP91	TN,MK
(MF)	B	REVISED SHEETS 3 & 7. DCN D003.15(B)		MK

209167-2 4.6M SUBREFLECTOR KIT AND 209169-2 4.6M SUBREFLECTOR STRUT KIT INSTALLATION INSTRUCTIONS

REVISION STATUS OF SHEETS

REVISION	B	-	B	-	-	-	A	A
SHEET NO.	1	2	3	4	5	6	7	8

MATERIAL

FINISH

UNLESS OTHERWISE SPECIFIED	DRAWN	RWB	31OCT90
DIMENSIONS ARE IN INCHES	CHECKED		
TOLERANCES	APPD ENGRG	VS/TM	9NOV90
1 PLACE DECIMALS ± .1 2 PLACE DECIMALS ± .03 3 PLACE DECIMALS ± .010 ANGLE ± 0.5°	APPD ENGRG	RWK	9NOV90
	APPD MFG		
	APPD Q.C.		
ALL SURFACES	SIMILAR TO		
COMMERCIAL TOL APPLY TO STOCK SIZES	SUPERSEDES DWG OF		

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ANDREW CORPORATION
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4.6M SUBREFLECTOR AND STRUT KIT INSTALLATION INSTRUCTIONS

SIZE A | FSCM NO. 84147 | DWG. NO. 239516

SCALE NONE | CAD FILE NO ES077F1B | SHEET 1 of 8

PROD. GR 6 2 7 | DISTR A

GENERAL

READ THE INSTRUCTIONS THOROUGHLY BEFORE ASSEMBLY. FOLLOW THE SEQUENCES FOR PROPER ASSEMBLY AND OPERATION.

CAUTION: THIS WARNING INDICATES THAT FAILURE TO FOLLOW THE PROPER PROCEDURE AT THIS POINT COULD RESULT IN DAMAGE TO THE ANTENNA AND/OR OTHER PROPERTY AND POSSIBLE INJURY TO PERSONNEL.

NOTICE

THIS INDICATES INFORMATION THAT SHOULD BE READ BEFORE PROCEEDING.

UNPACKING

CAREFULLY REMOVE ALL PARTS FROM SHIPPING BOXES. THE CONTENTS SHOULD CORRESPOND WITH THE PARTS LIST. ANY DAMAGE OR SHORTAGE WILL PREVENT SATISFACTORY ASSEMBLY, INSTALLATION, AND OPERATION OF THE ANTENNA.

NOTICE

'THE INSTALLATION, MAINTENANCE OR REMOVAL OF AN ANTENNA REQUIRES QUALIFIED, EXPERIENCED PERSONNEL. ANDREW INSTALLATION INSTRUCTIONS HAVE BEEN WRITTEN AND ILLUSTRATED FOR SUCH INSTALLATION PERSONNEL. ANTENNA SYSTEMS SHOULD BE INSPECTED ONCE A YEAR BY QUALIFIED PERSONNEL TO VERIFY PROPER INSTALLATION, MAINTENANCE AND CONDITION OF EQUIPMENT. ANDREW DISCLAIMS ANY LIABILITY OR RESPONSIBILITY FOR THE RESULTS OF IMPROPER OR UNSAFE INSTALLATION OR MAINTENANCE PRACTICES.'

TOOLS RECOMMENDED FOR PROPER INSTALLATION

1) OPEN OR COMBINATION WRENCHES: 0.5 AND 0.56 (QTY 2)
2) DRIVE SOCKETS: 0.5 AND 0.56
3) #2 PHILLIPS SCREWDRIVER
4) 12 FT. TAPE MEASURE
5) 10 FT. (EYE AND EYE TYPE) NYLON SLING (QTY 2) REQUIRED IF CRANE IS AVAILABLE

PARTS LIST

209169-2 4.6M SUBREFLECTOR STRUT KIT

QTY	ITEM	PART NO.	DESCRIPTION
4	1	209174	STRUT WELDMENT
4	2	222888	STRUT ANGLE
4	3	9963-115	0.375-16UNCx1.0LG HEX BOLT
4	4	206293	ANGLE CLIP
4	5	203039	0.375 FLATWASHER (OVERSIZED)
12	6	9963-127	0.375-16UNCx2.25LG HEX BOLT
16	7	9974-63	0.375 LOCKWASHER
16	8	9999-60	0.375-16UNC HEX NUT
8	9	9844-8	0.312-18UNCx1.25LG PHMS
8	10	9974-17	0.312 LOCKWASHER
8	11	9999-59	0.312-18UNC HEX NUT
~~4~~	~~12~~	~~9963-128~~	~~0.375-16UNCx1.75 HEX BOLT~~
8	13	9997-79	0.375 FLATWASHER
1	14	209167-2	4.6M SUBREFLECTOR KIT
1	15	300064	SUBREFLECTOR SETTING ROD

SIZE	FSCM NO.	
A	84147	239516
SCALE		SHEET 3

CAD FILE NO. ES077F3B

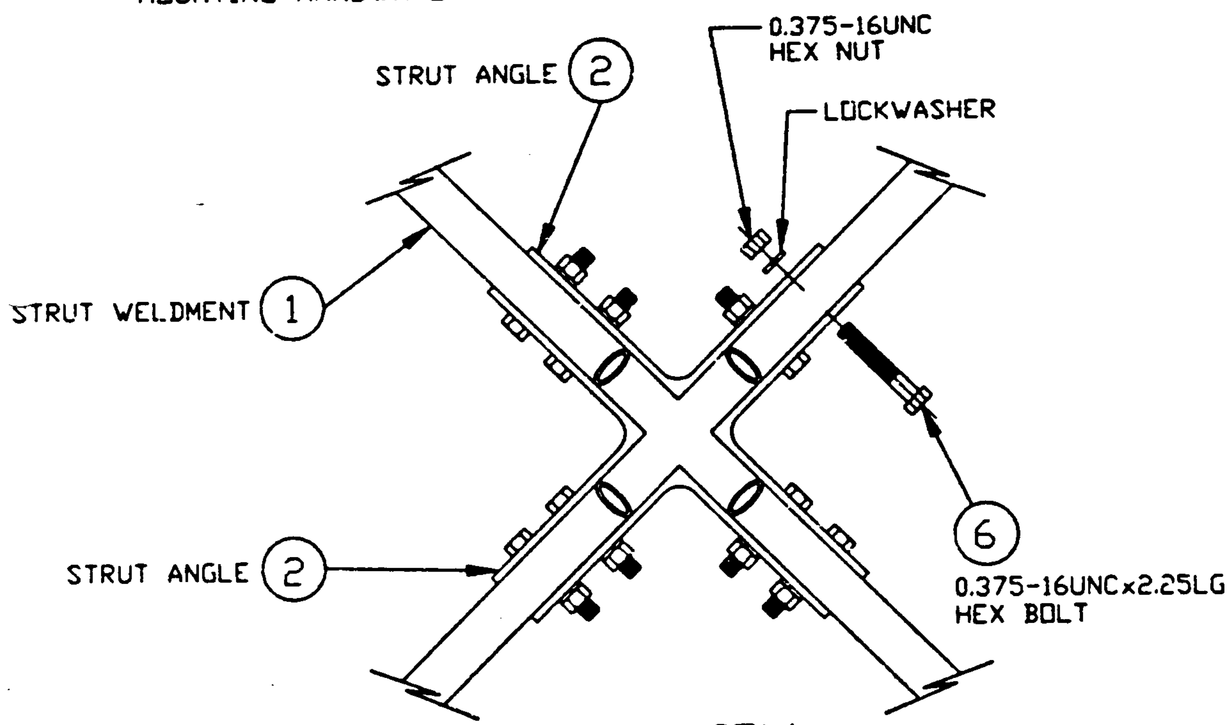
SUBREFLECTOR STRUT KIT ASSEMBLY

NOTICE

THE FOLLOWING INSTRUCTIONS HAVE BEEN WRITTEN SUCH THAT THE SUBREFLECTOR AND SUPPORT STRUTS ARE PREASSEMBLED ON THE GROUND AND LIFTED INTO REFLECTOR BY USE OF A CRANE. IF A CRANE IS NOT AVAILABLE PREASSEMBLE SUBREFLECTOR SUPPORT KIT IN REFLECTOR THEN INSTALL SUBREFLECTOR.

STEP 1:

REFER TO FIGURE 1. LOOSELY PREASSEMBLE STRUT WELDMENT AS SHOWN USING SUPPLIED STRUT ANGLES AND CORRESPONDING MOUNTING HARDWARE.



TOP VIEW

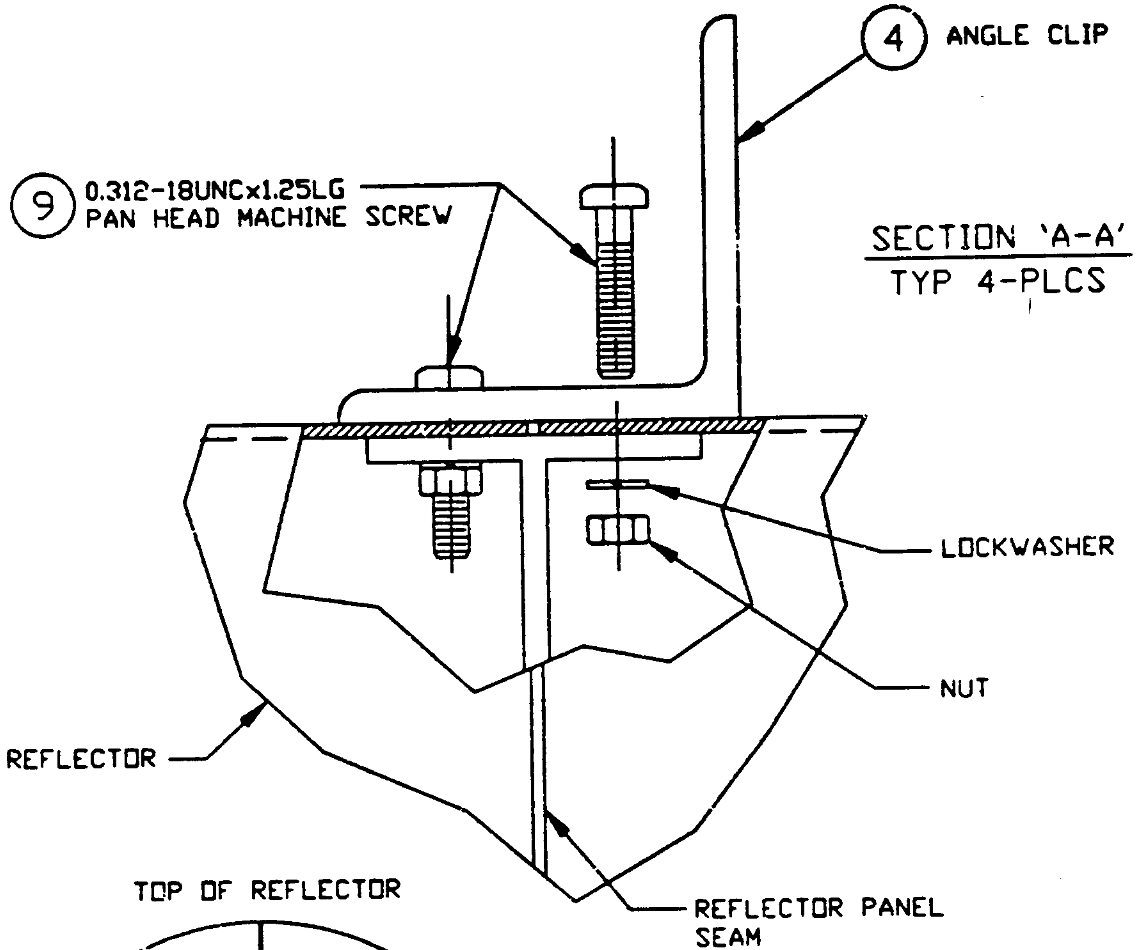
FIGURE 1

SIZE	FSCM NO.	
A	84147	239516
SCALE		SHEET 4

CAD FILE NO. ES077F4

STEP 2:

REFER TO FIGURE 2. LOOSELY ATTACH SUPPLIED ANGLE CLIPS AROUND REFLECTOR PERIMETER AT POSITIONS SHOWN USING INDICATED BOLTS, LOCKWASHERS AND NUTS IN THE FURTHEST SET OF PANEL SEAM HOLES FROM THE CENTER OF REFLECTOR.



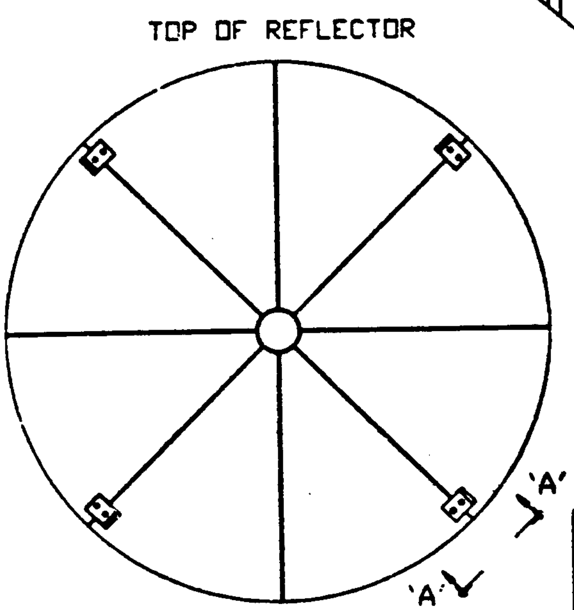


FIGURE 2

SCALE: NONE

SIZE	FSCM NO.	
A	84147	239516
SCALE ~~		SHEET 5

CAD FILE NO. ES077F5

STEP 3:

REFER TO FIGURE 3. PLACE MAIN REFLECTOR ASSEMBLY IN ZENITH (EL=90°) POSITION. POSITION AND LOOSELY ATTACH PREASSEMBLED SUBREFLECTOR/ADJUSTMENT RING ASSEMBLY TO CORRESPONDING MOUNTING HOLES IN STRUT SUPPORT PLATES (PART OF STRUT WELDMENT) USING SUPPLIED BOLTS, OVERSIZED FLATWASHERS, LOCKWASHERS AND NUTS. ATTACH TEMPORARY LIFTING STRAP AS SHOWN, BEING CAREFUL NOT TO DAMAGE SUBREFLECTOR ASSEMBLY.

NOTICE

POSITION SUBREFLECTOR ASSEMBLY SO THAT 'TOP' STENCILED ON THE ADJUSTMENT RING IS TOWARD TOP OF THE ANTENNA.

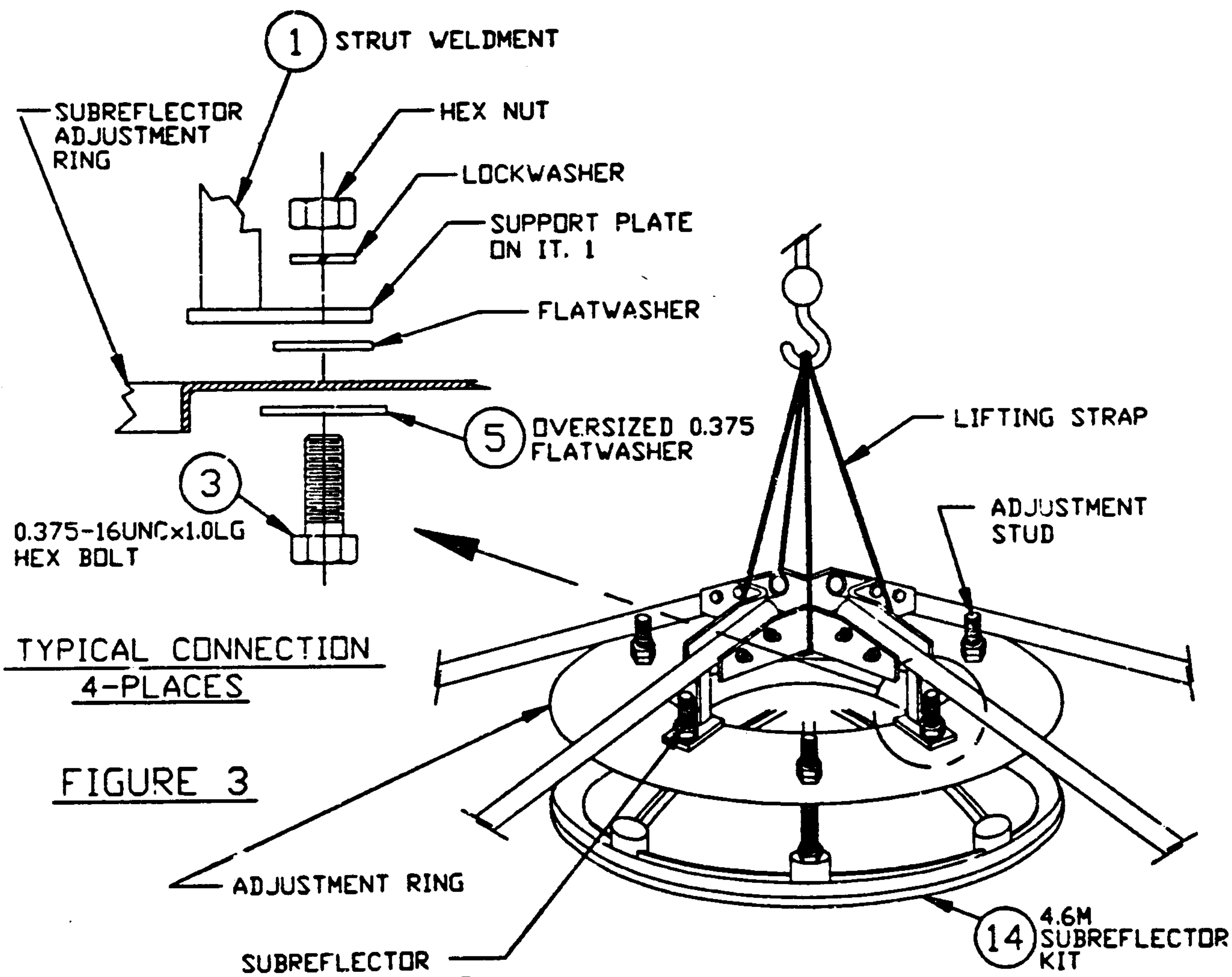


FIGURE 3

SIZE	FSCM NO.	
A	84147	239516
SCALE		SHEET 6

CAD FILE NO. ES077F6

STEP 4:

REFER TO FIGURE 4. CAREFULLY RAISE AND ATTACH PREASSEMBLED SUB-REFLECTOR/ STRUT ASSEMBLIES TO CORRESPONDING ANGLE CLIP AS SHOWN USING SUPPLIED BOLTS, FLATWASHERS, LOCKWASHERS AND NUTS. SECURELY TIGHTEN ALL SUBREFLECTOR/STRUT ASSEMBLY MOUNTING HARDWARE WHILE TEMPORARILY LEAVING SUBREFLECTOR ADJUSTMENT HARDWARE LOOSELY ATTACHED. REMOVE TEMPORARY LIFTING STRAP.

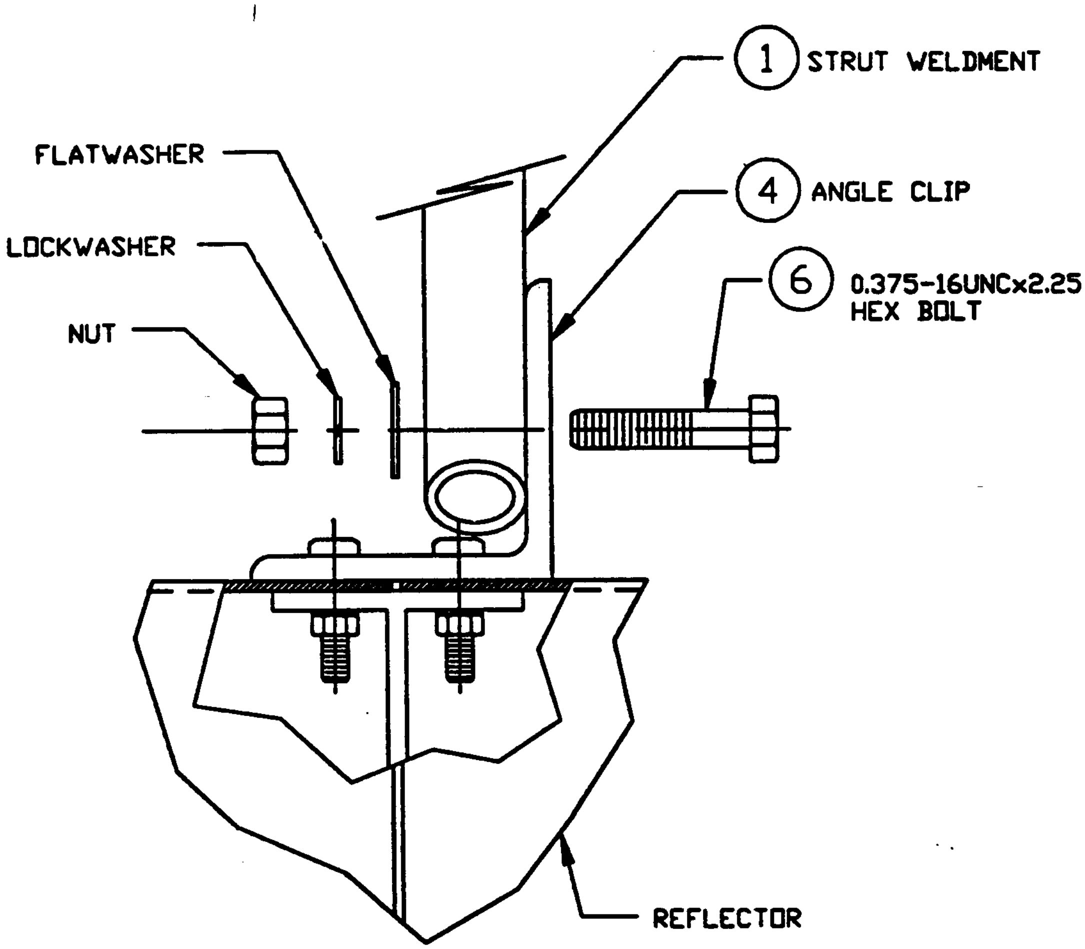


FIGURE 4

SIZE	FSCM NO.	
A	84147	239516
SCALE		SHEET 7

CAD FILE NO. ES077F7A

SUBREFLECTOR SETTING

STEP 5:
REFER TO FIGURE 5. USE THE SUBREFLECTOR SETTING ROD (ITEM 15) WHICH IS A 3/8" DIAMETER x 59.8" LONG ALUMINUM ROD TO SET INDICATED DIMENSION BETWEEN INNERMOST REFLECTOR PANEL SEAM HARDWARE AND SUBREFLECTOR APERTURE RIM AT THE THREE SUBREFLECTOR ADJUSTMENT STUD POSITIONS. USE SUBREFLECTOR ADJUSTMENT HARDWARE (REFER TO FIGURE 3) TO ACHIEVE EQUAL AXIAL DIMENSIONING AT ALL THREE LOCATIONS. SECURELY TIGHTEN THE ADJUSTMENT HARDWARE.

STEP 6:
MEASURE AND NOTE THE DISTANCE BETWEEN OUTERMOST ANGLE CLIP BOLT HEAD AND THE SUBREFLECTOR RIM AS SHOWN. OBTAIN CORRESPONDING MEASUREMENTS FROM REMAINING SUBREFLECTOR STRUTS AND ADJUST SUBREFLECTOR ADJUSTMENT RING MOUNTING HARDWARE (REFER TO FIGURE 3) AT ALL FOUR LOCATIONS TO ACHIEVE A MAXIMUM DIFFERENTIAL OF 0.06 IN. SECURELY TIGHTEN ADJUSTMENT HARDWARE.

STEP 7:
REPEAT PROCEDURE DESCRIBED IN STEP 5. IF ANY DIMENSIONAL VARIATION IS NOTED, REPEAT PROCEDURE DESCRIBED IN STEP 5 AND PROCEED TO STEP 6. IF NO DIMENSIONAL VARIATION IS NOTED, PROCEED TO STEP 8.

STEP 8:
CAREFULLY LOWER REFLECTOR ASSEMBLY TO OPERATING POSITION.

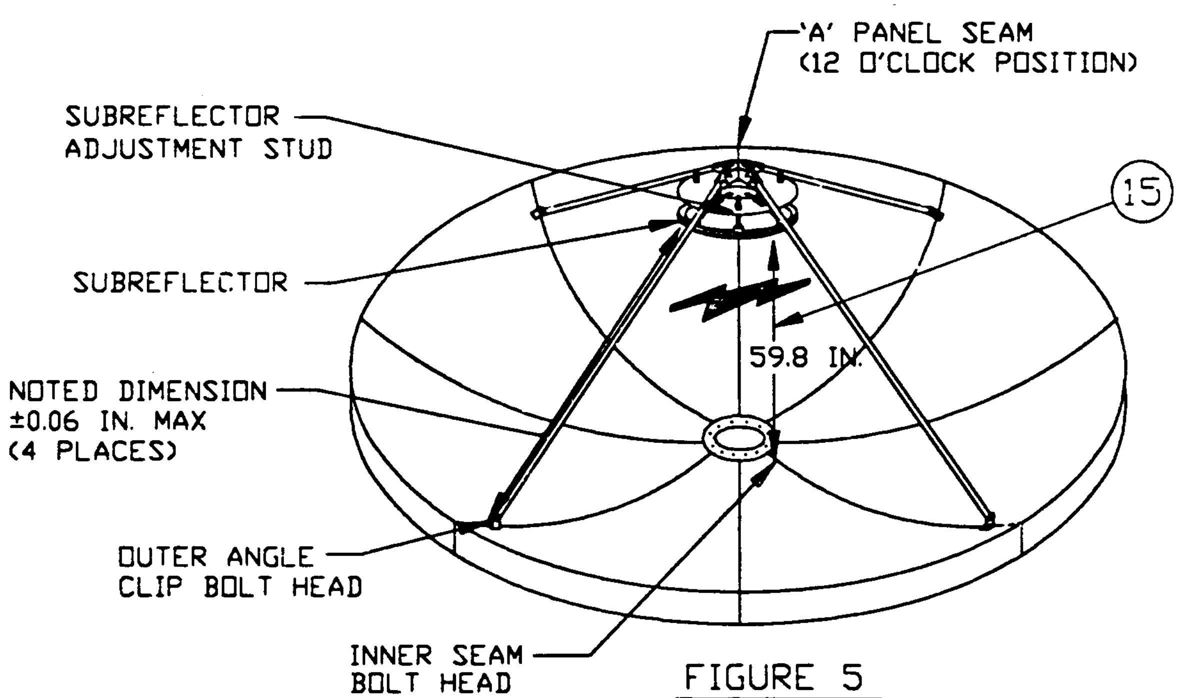


FIGURE 5

SIZE	FSCM NO.	
A	84147	239516
SCALE		SHEET 8

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Earth Station
Antenna Pointing
for 3.6- Thru 9.3-Meter Earth Station Antennas

ANDREW

1.0 INTRODUCTION

1.1 This document provides adjustment information required during installation of the Earth Station Antenna System. In addition, these same procedures are applicable as a follow-on to any corrective maintenance where readjustment and/or component replacement necessitates checking and/or reestablishing system settings and adjustments as well as antenna pointing information. Refer to applicable motor drive installation drawings for further information.

2.0 ACQUIRING A SATELLITE

2.1 While viewing the spectrum analyzer screen, a pure noise signal as shown in Figure 1 will probably be observed.

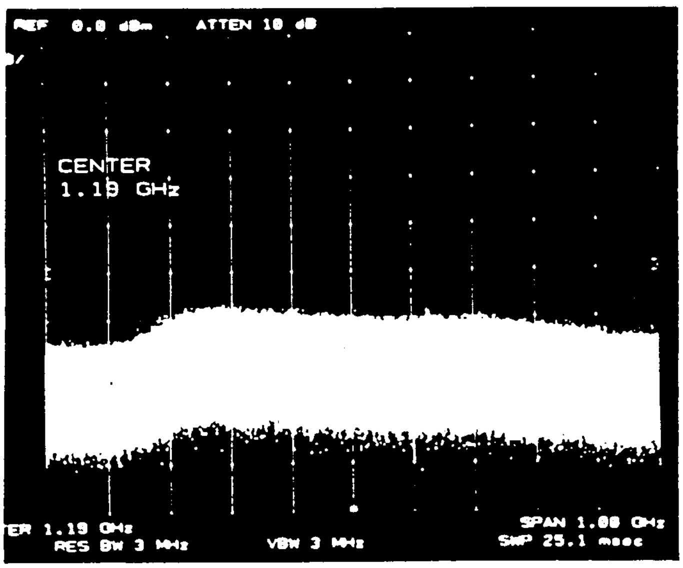

Figure 1. Pure Noise Signal on Spectrum Analyzer

2.2 Some transponder signal may be observed above the noise signal as shown in Figure 2.

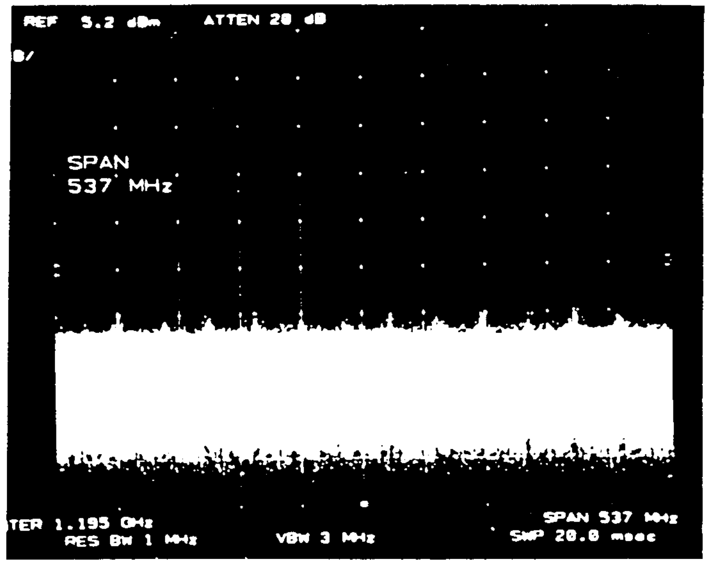

Figure 2. Minimum Transponder Signal on Spectrum Analyzer

2.3 Manually move the antenna in azimuth (scanning back-and-forth) to achieve the maximum (greatest amplitude) transponder signals. Scan in one direction until the amplitude continues to diminish and then scan in the opposite direction until the same condition occurs. Return to the position yielding the greatest amplitude. The maximum azimuth excursion from the original setting should not exceed ±1.5 degrees or the antenna may begin to access a different satellite. With the antenna positioned in azimuth such that the transponder signals are maximized, follow the same procedure manually moving the antenna in elevation (scanning up-and-down) to further maximize the transponder signals. Repeat this procedure alternating between the azimuth and elevation excursions of the antenna to peak the transponder signal amplitude. A transponder signal amplitude of 30 dB or more from peak to average noise signal indicates the antenna is receiving the signal on the main beam. A transponder signal amplitude less than 30 dB indicates the antenna is receiving the signal on a side lobe of the main beam.

2.4 With the antenna peaked on a side lobe in azimuth and/or elevation (refer to Figure 3, position A), move the antenna in azimuth while observing the spectrum analyzer screen.

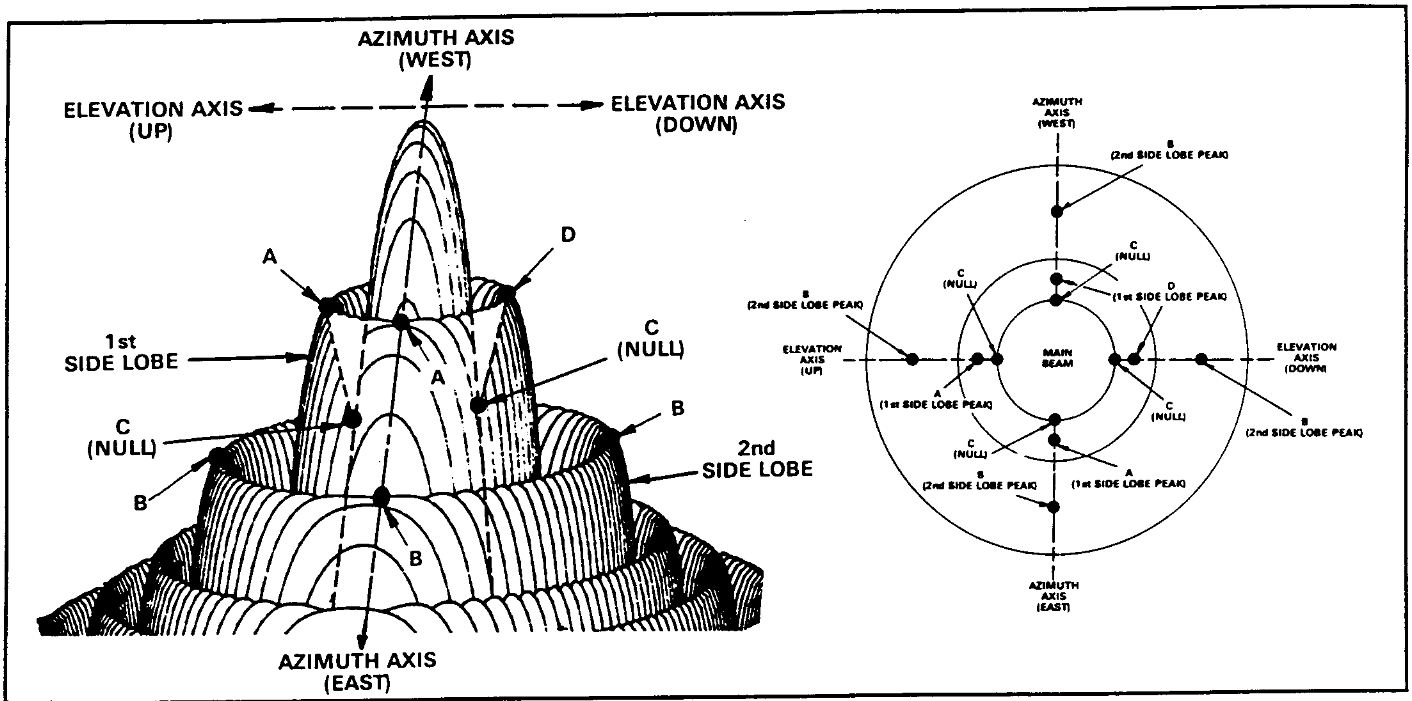

Figure 3. Antenna Radiation Pattern Topographical Diagram With Plan View

2.5 If the signal amplitude diminishes and does not increase (position B) to the level noted when the antenna was peaked on the side lobe, the antenna is moving away from the main beam; reverse the direction of antenna movement. From the original side lobe position (position A), the signal amplitude should now diminish to a null point at position C (minimum amplitude showing only signal noise) and then symmetrically increase again to the same level at position D as noted at position A. At the null point (position C), the antenna is aligned with the alternate (elevation) axis. If the antenna was peaked on a side lobe in azimuth, it was appropriately aligned with the elevation axis; proceed with paragraph 2.6. If the antenna was peaked on a side lobe in elevation, it was appropriately aligned with the azimuth axis; proceed with paragraph 2.6 moving the antenna in azimuth rather than elevation.

2.6 Move the antenna in elevation while observing the spectrum analyzer screen. If the signal amplitude increases, decreases and then increases again but to a lesser value, the antenna is moving in the wrong direction; reverse the direction of antenna movement. From the original null point (position C), the signal level should increase and decrease alternately but with increasing amplitude until the transponder signal increases to a level of at least 30 dB at which time the antenna is receiving the transponder signals on the main beam. Continue to manually peak the signal to a maximum level using the azimuth and elevation adjustments.

2.7 If the antenna is aligned in azimuth and elevation (signal maximized) and 24 transponder signals (12 horizontal and 12 vertical) are noted, the polarization adjustment is set incorrectly and must be modified. If 12 transponder signals are noted, they may or may not be the properly polarized signals. Therefore, 24 transponder signals must be visually noted in order to determine the proper polarization setting.

2.8 Rotate the feed assembly clockwise until 24 transponder signals are noted and of approximately equal amplitude as shown in Figure 4. **Note:** It is more accurate and visually easier to minimize the alternate set of transponder signals rather than maximizing the transponder set of interest.

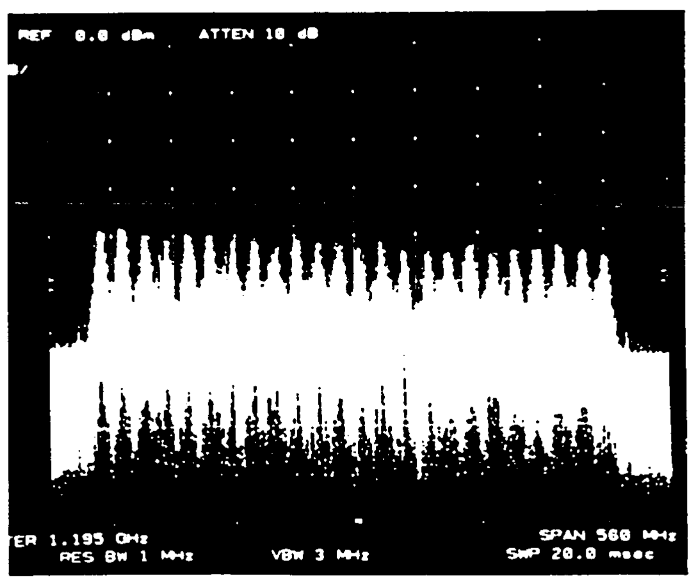

Figure 4. Polarization at 45° from Optimum Setting

2.9 With all 24 transponder signals of approximately equal amplitude appearing on the spectrum analyzer screen as shown in Figure 4 determine the specific antenna system and satellite parameters noted in paragraph 2.8. Rotate the feed assembly as required until the appropriate (odd or even) transponder signals are maximized. Figure 5 illustrates partial minimizing of the alternate transponder signals.

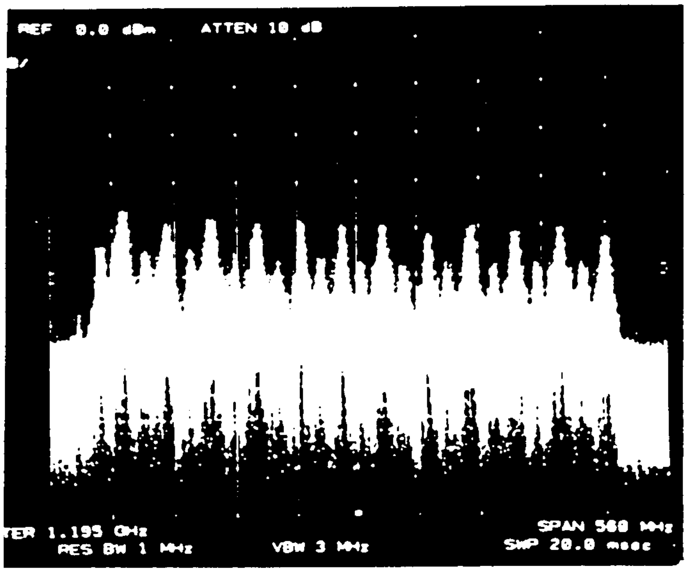

Figure 5. Maximizing Odd Transponders

2.10 Figure 6 illustrates full minimizing of the alternate signals; the desired result.

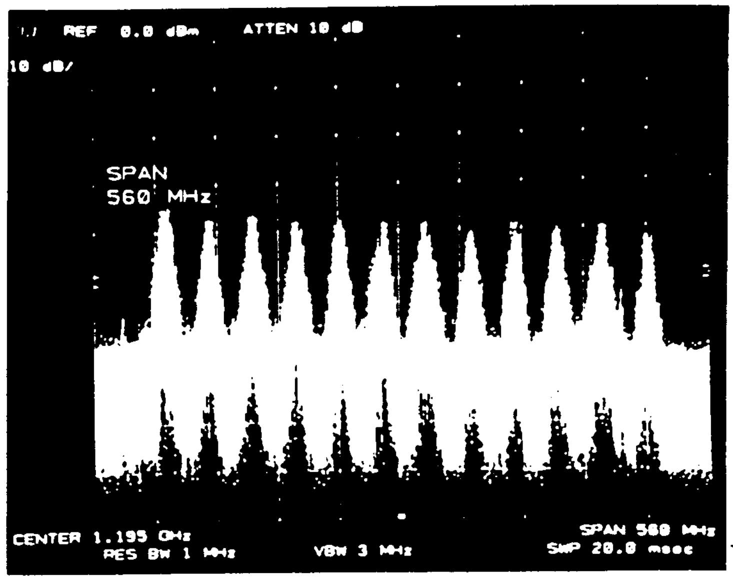

Figure 6. Optimum Polarization Setting

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