

## INTRODUCTION

This manual covers the assembly and installation of the Channel Master Non-Penetrating Pole Mount for use with .90m, 1.0m or 1.2m AZ/EL Antenna Systems. Information on ballast requirements is also included. Read this manual thor-

oughly before beginning system or mount assembly. The system or mount should be installed by qualified antenna installation personnel. For best results in the assembly process, perform each step in the same sequence as listed in this manual.

## SPECIFICATIONS

ANTENNA				AZ/EL MOUNT	
6523					
MODEL	6019	6020	6022	MODEL	6031
SIZE	35.43" (.90m)	39.37" (1.0m)	47.34" (1.2m)	AZIMUTH	360°
F/D RATIO	.6	.6	.6	ELEVATION	10° - 70°
FOCAL LENGTH	21.26" (540.0mm)	23.62" (599.9mm)	28.34" (719.8mm)	MAST (TUBE DIA.)	3.0" (76mm)
OFFSET	22.6°	22.6°	22.6°		

## PRE-INSTALLATION MATERIALS CHECKLIST

Grounding Rod Clamp, Grounding Block & Ground Wire:

As required by National Electric Code or local electric codes.

Coaxial Cable:

(Size & length required.)

Roofing Paper: (If foam pads are not used, see Pages 15-20)

Two pieces 36" x 72" (to be placed between base frame of mount and roof surface).

Solid Concrete Cap Blocks:

3.6" x 7.6" x 15.6" (Quantity - see Ballast Requirements, pages 15-20).

Cable:

1/8" diameter minimum (1200 lbs. minimum breaking strength) 7 x 7 or 7 x 19 construction, stainless steel or galvanized steel (length as required).

Cable Clamps:

(See pages 15-20) 6 (minimum).

## ASSEMBLY TOOLS REQUIRED

The following list of tools are those required for hand assembly and installation of the antenna.

1 - Compass  
 1 - Clinometer  
 1 - Torque Wrench  
 1 - Phillips Screwdriver  
 1 - Ratchet Wrench (3/8" Drive)

1 - 10mm Socket (3/8" Drive)  
 1 - 10mm Nut Driver  
 1 - 13mm Socket (3/8" Drive)  
 1 - 13mm Nut Driver

## UNPACKING AND INSPECTION

The antenna and cap mount shipping carton should be unpacked and contents checked for damaged or missing parts. Should there be any parts that are damaged or missing, contact:

**Technical Service  
Channel Master  
1315 Industrial Park Drive  
Smithfield, N.C. 27577 U.S.A.  
(919) 989-2210**

### CARTON CONTENTS - MODELS 6523, 6920 & 6922

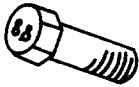
<u>QTY.</u>	<u>NAME &amp; PART NUMBER</u>	<u>QTY.</u>	<u>NAME &amp; PART NUMBER</u>
1	SMC Antenna PN 3040646-02 (1.2m)** PN 3040642-02 (1.0m)** Ku-Feed Carton w/Hardware PN 6100016* **	1	Mast PN 601047-02
1	Feed Support Leg-Bottom PN 2020329-06 (1.2m)** PN 2020329-03 (1.0m)**	1	Base Frame Assembly PN 2020486-02
2	Feed Support Legs-Side PN 6010100-06 (1.2m)** PN 6010100-05 (1.0m)**	1	Brace - Rear PN 2020484-02
1	AZ/EL Cap Mount (Mo. 6031) PN 6010017**	1	Front - Brace PN 2010146-08

\*Must Include Brand Name and LNB dB rating.

\*\*Model 6920, 1.0m & 6922, 1.2m Antenna System only.

### BOLT TORQUE

#### GRADE 8.8 (8G) - GOLD COLOR



**APPLY 24 N-m (18 FT.-LBS.) OF TORQUE TO M8 BOLT**

M6	M8	M10	M12	M16	M20
9.5 N-m	24 N-m	43 N-m	79 N-m	195 N-m	353 N-m
7 FT.-LBS.	18 FT.-LBS.	32 FT.-LBS.	58 FT.-LBS.	144 FT.-LBS.	260 FT.-LBS.

**EXCEPTIONS:**

M8 x 60	Round Head Square Neck Bolt (Securing Antenna to AZ/EL Cap)	16 N-m (12 ft-lbs)
M6 x 20	Hex Head Bolt (Securing Clamp to Junction Block)	5.4 N-m (4 ft-lbs)
M6 x 30	Hex Head Bolt (Securing Side Feed Legs to Junction Block & Antenna)	5.4 N-m (4 ft-lbs)

### SITE SELECTION

The first and most important consideration when choosing a prospective antenna site is whether or not the area can provide an acceptable "look angle" at the satellite. A site with a clear, unobstructed view is required. Your antenna site must be selected in advance so that you will be able to receive the strongest signal available.

The roof section must be flat and of sufficient area for the base of the roof mount (see ballast requirement and location chart for base size).

**The roof section must also be able to withstand the weight of ballast, antenna and mount assembly.**

Distributed loads (lb./sq.ft.) and total dead load are shown on Chart, pages 15-20, for your consideration. It is the customer's responsibility to make sure distributed loads of this product do not exceed roof design load. **If you do not know your roof design loads, consult a professional engineer.**

# ASSEMBLY & INSTALLATION

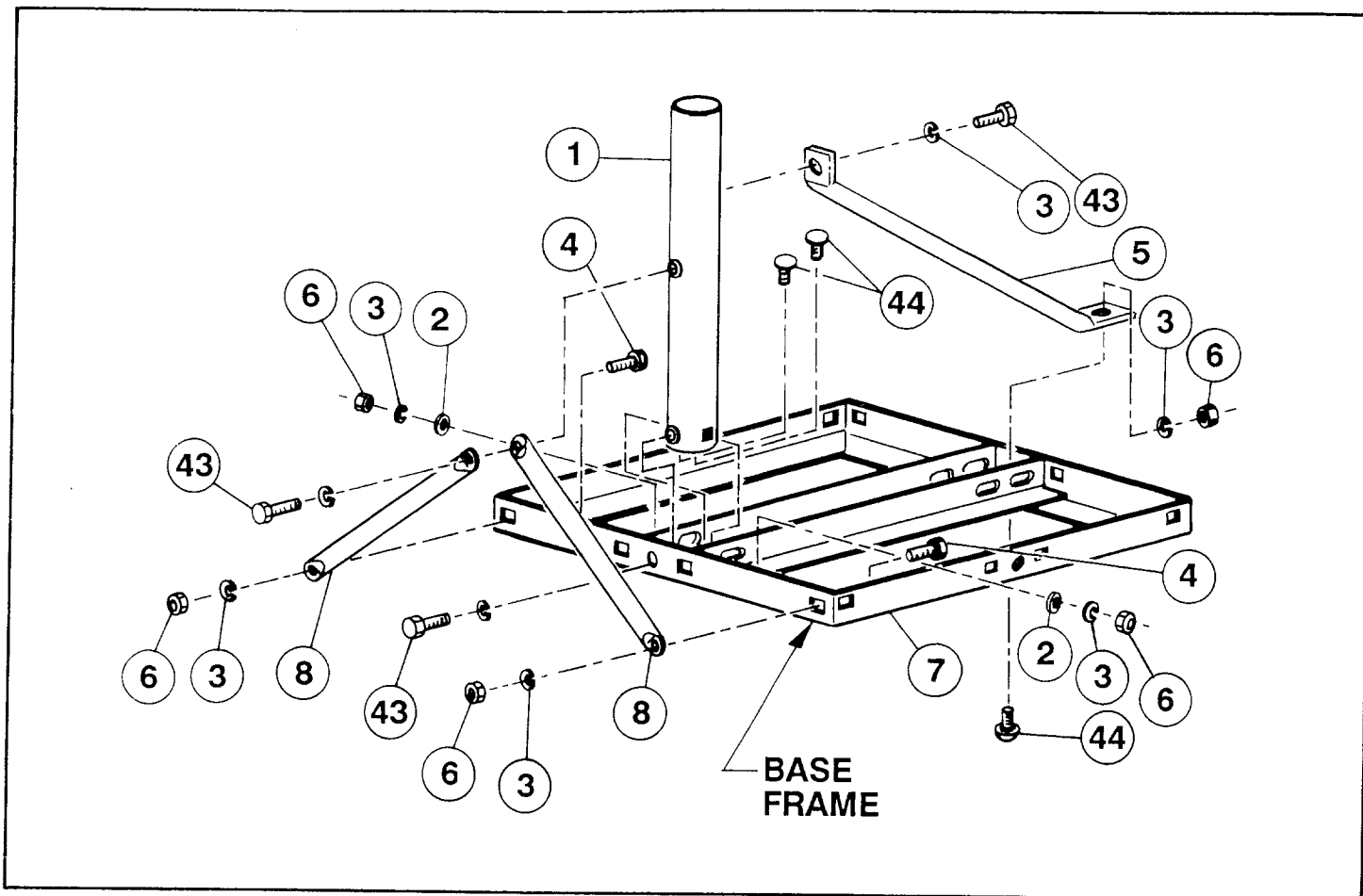


FIG. 1.1 - NON-PENETRATING POLE MOUNT, MODELS 6523, 6920 & 6922

## NON-PENETRATING POLE MOUNT

**NOTE: 10mm tools fit M6 hardware and 13mm tools fit M8 hardware.** Refer to "Assembly Tools Required," on Page 4 for additional tools needed for assembly and installation. A "Hardware Sorter" is provided, on Page 24 to help you identify hardware size. See Page 4 for a "Pre-installation Checklist".

Clear roof of all debris, gravel or other loose materials. It is recommended that a layer of roofing paper be placed under the base of the roof mount.

Place roof Mount on roof and swing mast up to the vertical position. Secure mast (1) to base frame (7) with two M8 x 25 round head bolts (44), lock washers (3), flat washers (2), and hex nuts (6). Do not tighten.

Swing side braces (8) down and align holes in braces with holes in base frame (7). Secure with two M8 x 20 hex bolts (4), lock washers (3) and hex nuts (6). Refer to Fig. 1.1 Do not tighten.

Assemble rear brace (5) to mast (1) and base frame (7) as shown in Figure 1.1. Secure with one M8 x 25 hex bolt (43) and lock washer (3). Secure rear brace to base frame with one M8 x 25 Rd HD Sq NK (44), lock washer (3) and hex nut (6) as shown in Figure 1.1.

Tighten and torque all hardware, including the bolts securing brace to mast and mast to the base frame, to 16 N-m (12 ft.-lbs.). Refer to Bolt Torque Chart, Page 5.

## AZ/EL CAPS MOUNT

As the AZ/EL cap mount is factory pre-assembled, there is no assembly required for the mount. Refer to Bolt Torque Chart, page 5.

## ASSEMBLING ANTENNA TO CAP MOUNT

Install four M8 x 60 (2 $\frac{3}{8}$  in.) round head, square neck bolts (9) into holes in center of antenna and cap mount flanges (Reference Fig. 1.4). Install four lock washers (3) and hex nuts (6) on bolts.

**IMPORTANT:** Tighten and torque to 12 ft.-lbs. (16.3 N-m), do not overtighten.

**NOTE:** Bottom feed leg hole to be located as shown in Figure 1.4.

## INSTALLING CAP MOUNT ONTO MAST

Lift antenna/cap mount assembly and slide cap mount onto mast tube (Reference Fig. 1.5). Face of antenna should be parallel to front of base.

Tighten M8 clamp nuts so that the antenna/cap mount assembly is held stationary on mast, but can be swiveled with slight pressure.

## FEED, FEED LEGS AND LNB INSTALLATION

Assemble feed assembly and feed legs to antenna as shown in Fig. 1.6 (Page 8).

Insert bottom feed leg (38) into hole in bottom edge of antenna (36). **NOTE:** Bottom feed leg is the one with a slight bend on one end of leg, lance on opposite end, and is shorter than the two side legs (34).

Install side legs (34) to antenna, from back side of antenna, and secure with M6 x 30mm (1/4" x 1-3/16") hex bolts and 1/4" flat washer (27 & 26). Do not tighten.

Insert one side leg (34) into junction block (31) and secure with M6 x 30mm (1/4" x 1-3/16") hex bolts and 1/4" flat washer (27 & 26). Do not tighten.

Insert bottom leg (38) into hole on center of junction block (31) until lance on leg is engaged.

Insert opposite side leg (34) into junction block (31) and secure with M6 x 30mm hex bolt and 1/4" flat washer (27 & 26). **Tighten and torque bolts securing side legs to junction block and antenna to 4 ft.-lbs.(5.4 N-m).**

Assemble horn, junction block (31) and clamp using two M6 x 20mm bolts and M6 flat washers (40 & 41) as illustrated in Fig. 1.6 & 2.0 (Pages 5 & 9).

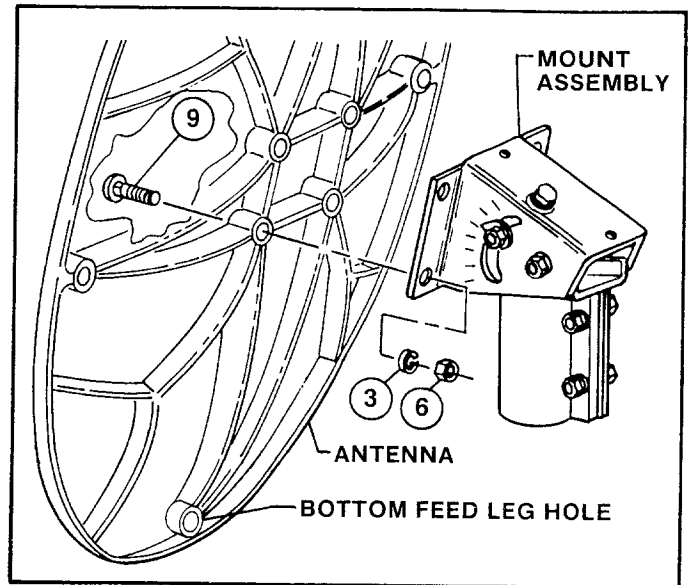


FIG. 1.4—ASSEMBLING ANTENNA TO AZ/EL CAP MOUNT

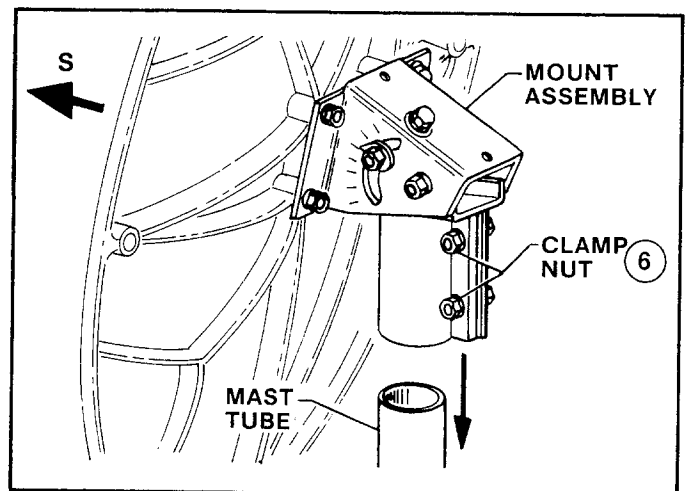
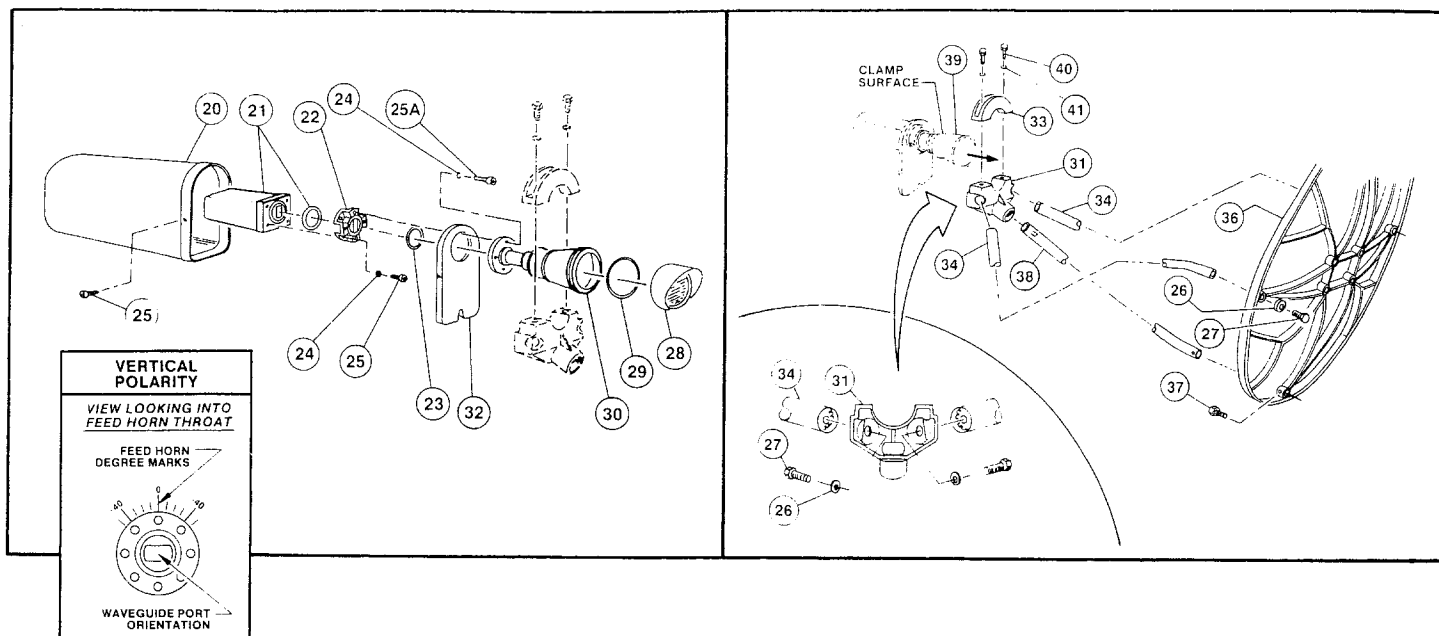


FIG. 1.5 - INSTALLING ANTENNA/MOUNT ASSEMBLY ONTO MAST



**FIG. 1.6 - INSTALLATION OF FEED AND FEED SUPPORT LEGS TO ANTENNA**

Assemble feed assembly (39) to junction block (31) as shown in illustration.

Remove cover (20) from feed assembly (39).

Feed models with LNB's are factory assembled as shown in Figure 1.6. For models not supplied with LNB's refer to instructions packed with feed.

**IMPORTANT: Sealing RF coaxial connector:**

The copper-plated center conductor in the RF coaxial cable, which connects receiver to LNB, can experience electrolysis corrosion at the LNB connector. Moisture and DC current cause this type of corrosion. To prevent corrosion, apply a moderate coat of silicon grease to the center conductor and then wrap the entire connection with **COAX-SEAL®** tape to seal.

(COAX-SEAL® IS A REGISTERED TRADEMARK OF UNIVERSAL ELECTRONICS, INC.)

Use bottom feed leg (38) as conduit and route coaxial cable up through leg. Leave approximately 305mm (12") length beyond junction block. Install "F" connector onto cable and assemble to LNB.

Make sure feed cable is in the groove on bottom of header (32) and install cover (20). Secure with two M4 screws (25).

Be sure bottom feed leg (38) is seated and tighten hex screw (37) on boss, rear of antenna, securing leg to antenna.

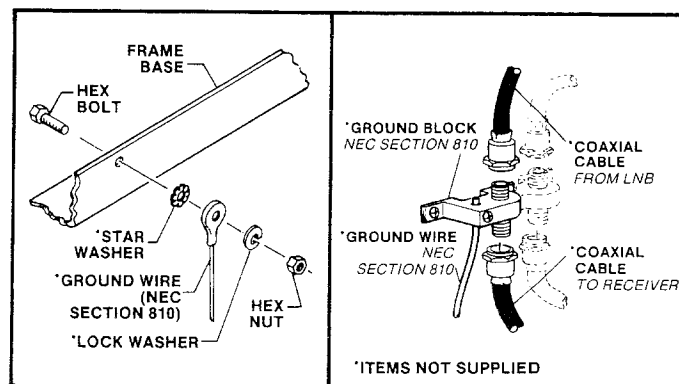
## GROUNDING

**NOTE: ALL INSTALLATIONS TO CONFORM TO LATEST ISSUE OF NATIONAL ELECTRIC CODE.**

Ground antenna mount assembly and feed cables in accordance with current National Electric Code and local electric codes. Figure 1.7 illustrates typical grounding methods.

Clamps that provide a solid connection between ground wire and ground source should be used.

Tighten and torque all hardware as shown in Torque Chart on page 5.



**FIG. 1.7- TYPICAL GROUNDING ANTENNA MOUNT ASSEMBLY & FEED CABLES**

# ANTENNA ALIGNMENT PROCEDURE

The three adjustments necessary to align the antenna are:

- (1) Polarization of the feed (Ref. Fig. 2.0).
- (2) Elevation (Ref. Fig. 2.1). See Charts, Pages 11-14.
- (3) Azimuth (Ref. Fig. 2.2 & 2.3). See Charts, Pages 11-14, for appropriate values.

## POLARIZATION OF THE FEED

Polarization of feed is obtained by using a 10mm nut driver and loosening two M6 x 20mm clamp bolts (40) and turning feed. Align alignment mark on clamp with "0" (zero) mark on horn scale (Ref. Fig. 2.0). The polarization setting for the satellite is shown on Pages 11-14. Make sure clamp is installed with arrow pointed toward antenna as shown in Fig. 2.0. Keep cable groove on header in the down position when adjusting polarization.

**NOTE: Single Polarity Feed is factory assembled for vertical polarity. If horizontal polarity is desired, rotate feed 90° clockwise or counterclockwise from values shown in charts on pages 11-14.**

## ELEVATION

To obtain elevation value for your satellite, refer to charts on Pages 11-14. Loosen bolts in curved slots (both sides), and pivot bolts (both sides) of AZ/EL Housing 1/4 turn (Ref. Fig. 2.1). Turn elevation adjustment bolt clockwise to decrease elevation and counterclockwise to increase elevation. Align the pointer with appropriate mark at the desired elevation reading (Ref. Fig. 2.1). This will be an approximate setting. Optimum setting achieved when fine tuning. Temporarily tighten elevation bracket nuts.

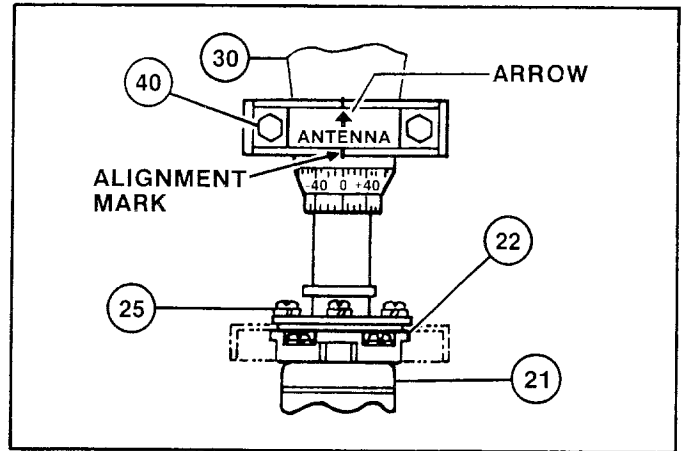


FIG. 2.0 - POLARIZATION OF THE FEED

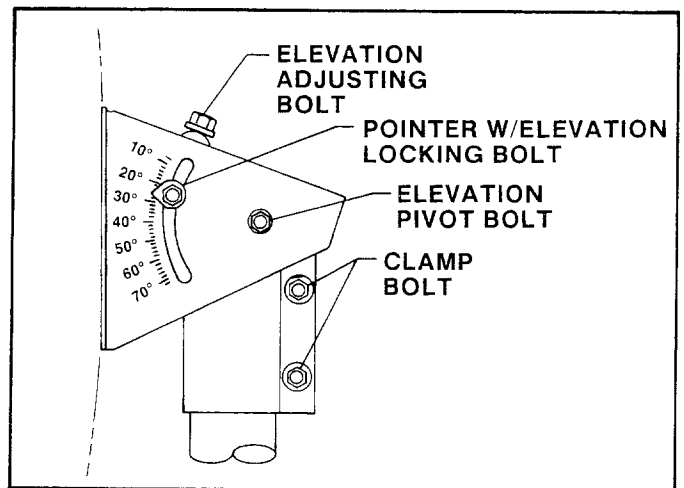


FIG. 2.1 - SETTING THE ELEVATION

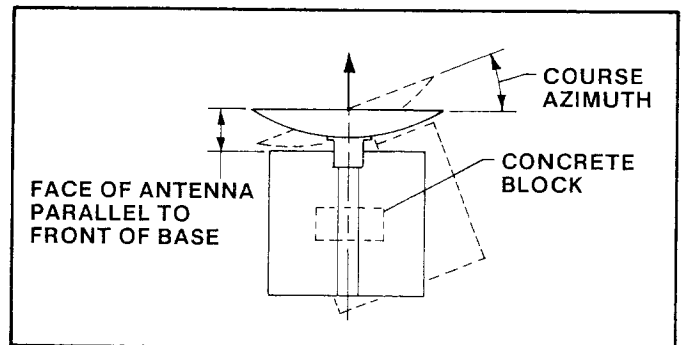


FIG. 2.2 - ROTATING ANTENNA AND BASE FOR COURSE AZIMUTH SETTING

## AZIMUTH

Obtain azimuth for your satellite from charts on Pages 11-14. Face of antenna should be parallel to front of base frame (Refer to Fig. 2.2). Temporarily place a concrete block on base frame during course azimuth adjustment. Rotate antenna and base frame assembly, pointing it to the correct compass reading for your location and satellite. Slowly sweep antenna and base frame in azimuth until a signal is found. If desired signal is not found, increase or decrease elevation setting and repeat the above procedure until the desired signal is found.

**WARNING: Do not rotate antenna and cap mount on mast to obtain course azimuth setting. To do so will greatly reduce allowed wind speed values shown in charts on Pages 15-20.**

## BALLAST

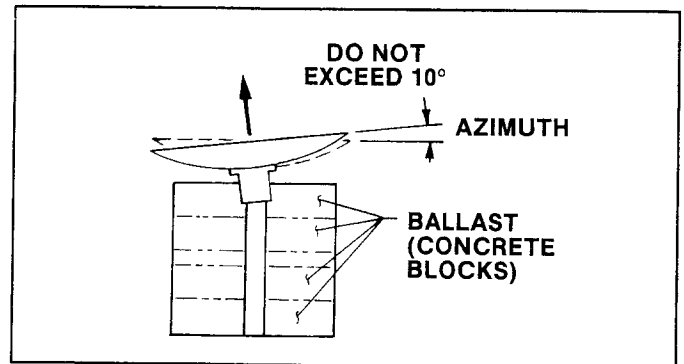
Referring to the ballast requirements and location chart, Pages 15-20, add the number of concrete blocks for ballast to base frame. Take care not to move base when adding ballast.

## FINE TUNING

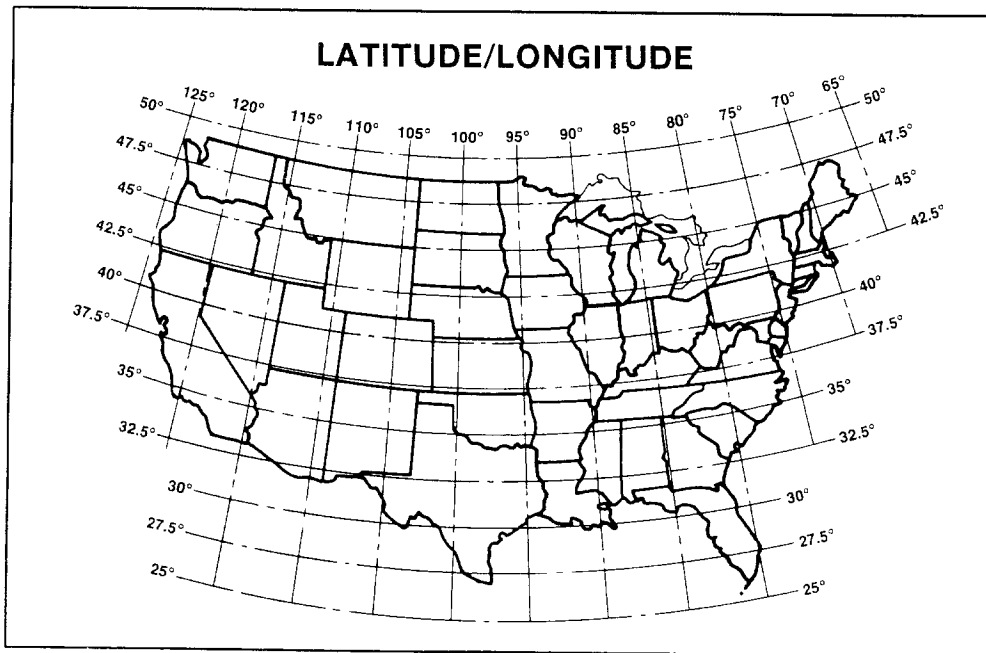
Use a signal strength measuring device for final adjustments to obtain maximum antenna performance. Alternate between elevation and azimuth fine tuning to reach maximum signal strength, until no improvement can be detected. When fine tuning azimuth, rotate antenna and cap mount on roof mount mast. Refer to Figure 2.3.

Slowly rotate feed to obtain maximum signal strength for polarization setting.

Tighten and torque all hardware (Refer to Torque Chart, page 5). **IMPORTANT:** Torque bolts (24) securing half clamp to junction block (29) to 5 N-m (4 ft.-lbs.) maximum.



**FIG. 2.3 - FINE TUNING AZIMUTH SETTING USING CAP MOUNT**



**C3 (ANIK) SATELLITE 117.5° W**

LAT.	LONG.	AZ	EL	POL.
25	80	241	39	+53
25	85	234	44	+49
25	90	226	48	+45
25	95	216	52	+39
25	100	206	55	+33
30	80	237	36	+47
30	85	230	40	+43
30	90	221	44	+39
30	95	212	47	+34
30	100	202	50	+28
30	105	193	52	+21
30	110	182	54	+13
30	115	170	55	+ 5
35	75	244	30	+44
35	80	237	33	+41
35	85	228	37	+38
35	90	218	40	+33
35	95	210	43	+29
35	100	199	45	+23
35	105	189	47	+17
35	110	178	49	+11
35	115	167	49	+ 4
35	120	158	49	+ 3
40	70	250	23	+41
40	75	243	27	+39
40	80	236	30	+36
40	85	227	33	+33
40	90	216	36	+29
40	95	205	38	+25
40	100	196	40	+20
40	105	187	42	+15
40	110	175	43	+ 9
40	115	165	44	+ 3
40	120	157	44	- 3
40	125	148	43	- 8
45	70	257	20	+36
45	75	244	24	+34
45	80	235	26	+31
45	85	226	29	+28
45	90	213	31	+25
45	95	203	34	+21
45	100	193	35	+17
45	105	181	37	+12
45	110	173	38	+ 8
45	115	165	38	+ 3
45	120	157	38	- 2
45	125	150	38	- 7
50	70	255	18	+32
50	75	248	20	+30
50	80	237	23	+27
50	85	224	25	+24
50	90	212	27	+21
50	95	202	29	+18
50	100	190	30	+14
50	105	178	32	+11
50	110	171	32	+ 7
50	115	163	33	+ 2
50	120	156	33	- 2
50	125	149	32	- 6

**ASC-1 SATELLITE 128°**

LAT.	LONG.	AZ	EL	POL.
25	80	249	30	+57
25	85	244	34	+54
25	90	237	38	+51
25	95	229	43	+48
25	100	222	47	+43
30	80	246	28	+51
30	85	240	32	+48
30	90	232	36	+45
30	95	224	40	+41
30	100	217	44	+37
30	105	209	47	+31
30	110	200	50	+25
30	115	190	52	+18
35	75	253	22	+48
35	80	247	25	+46
35	85	238	29	+43
35	90	230	33	+40
35	95	223	36	+36
35	100	213	40	+32
35	105	205	43	+27
35	110	195	45	+21
35	115	185	47	+15
35	120	176	49	+ 8
40	70	258	16	+45
40	75	252	19	+43
40	80	246	23	+40
40	85	237	26	+38
40	90	228	30	+35
40	95	217	33	+31
40	100	210	36	+27
40	105	201	38	+23
40	110	190	40	+18
40	115	181	42	+13
40	120	173	43	+ 7
40	125	165	44	+ 1
45	70	266	14	+40
45	75	254	17	+38
45	80	246	20	+36
45	85	237	23	+33
45	90	225	26	+30
45	95	216	29	+27
45	100	207	32	+24
45	105	195	33	+20
45	110	187	35	+15
45	115	179	37	+11
45	120	171	38	+ 6
45	125	164	38	+ 1
50	70	264	11	+35
50	75	258	14	+33
50	80	247	17	+31
50	85	235	20	+29
50	90	224	22	+26
50	95	214	25	+23
50	100	203	27	+20
50	105	191	29	+17
50	110	184	30	+13
50	115	177	31	+ 9
50	120	169	32	+ 5
50	125	163	33	+ 1

**S2 SATELLITE 69° W**

LAT.	LONG.	AZ	EL	POL.
25	80	155	58	-22
25	85	144	56	-31
25	90	133	53	-38
25	95	123	49	-43
25	100	115	45	-48
30	80	159	53	-18
30	85	148	51	-26
30	90	138	48	-32
30	95	128	45	-37
30	100	120	41	-42
30	105	114	38	-46
30	110	107	34	-49
30	115	101	29	-51
35	75	176	50	- 9
35	80	165	48	-15
35	85	153	46	-22
35	90	142	44	-27
35	95	134	41	-32
35	100	124	38	-36
35	105	116	34	-40
35	110	108	31	-43
35	115	102	27	-46
35	120	97	23	-48
40	70	188	44	- 2
40	75	179	43	- 7
40	80	169	42	-13
40	85	158	41	-18
40	90	146	39	-23
40	95	135	37	-28
40	100	127	34	-32
40	105	120	31	-35
40	110	110	28	-38
40	115	103	24	-41
40	120	99	21	-43
40	125	93	17	-45
45	70	199	38	- 1
45	75	184	38	- 6
45	80	173	37	-11
45	85	162	36	-17
45	90	149	34	-20
45	95	138	32	-24
45	100	129	30	-27
45	105	118	27	-31
45	110	111	24	-33
45	115	105	21	-36
45	120	100	18	-38
45	125	96	15	-40
50	70	199	33	- 1
50	75	190	32	- 5
50	80	178	32	- 9
50	85	164	31	-13
50	90	151	29	-17
50	95	142	28	-20
50	100	130	26	-24
50	105	119	23	-26
50	110	112	21	-29
50	115	107	18	-31
50	120	101	16	-33
50	125	96	13	-35

**Legend:** LAT. = Latitude Degrees North  
LONG = Longitude Degrees West  
AZ = Azimuth Heading, Direct Compass Reading (**Magnetic Deviation is Included in Charts**)  
EL = Elevation in Degrees, Direct Reading  
POL. = Polarization of Feed Scale Setting in degrees for Vertical Polarity, Horizontal Polarity is 90° from values shown in charts.



**K2 SATELLITE 81°W**

LAT.	LONG.	AZ	EL	POL.
25	80	182	61	+ 9
25	85	169	60	- 2
25	90	155	59	-12
25	95	142	57	-20
25	100	131	54	-28
30	80	182	55	+ 9
30	85	170	55	0
30	90	157	54	- 8
30	95	146	52	-16
30	100	135	49	-22
30	105	127	46	-28
30	110	119	43	-33
30	115	112	39	-37
35	75	196	49	+15
35	80	186	49	+ 8
35	85	173	49	+ 1
35	90	160	48	- 6
35	95	153	47	-12
35	100	139	45	-18
35	105	130	42	-23
35	110	121	39	-28
35	115	113	36	-32
35	120	107	32	-35
40	70	209	42	+20
40	75	197	43	+14
40	80	188	44	+ 8
40	85	176	44	+ 2
40	90	163	43	- 4
40	95	151	42	- 9
40	100	142	40	-14
40	105	133	38	-19
40	110	122	35	-23
40	115	115	32	-27
40	120	109	29	-30
40	125	104	26	-33
45	70	215	37	+18
45	75	201	38	+13
45	80	189	38	+ 8
45	85	178	38	+ 3
45	90	164	37	- 2
45	95	154	36	- 7
45	100	143	35	-11
45	105	132	33	-15
45	110	124	31	-19
45	115	117	28	-22
45	120	111	26	-25
45	125	106	23	-28
50	70	214	32	+16
50	75	207	32	+12
50	80	193	33	+ 8
50	85	179	33	+ 3
50	90	166	32	- 1
50	95	156	31	- 5
50	100	144	30	- 8
50	105	132	28	-12
50	110	125	26	-15
50	115	119	24	-18
50	120	112	22	-21
50	125	107	19	-23

**K1 SATELLITE 85°W**

LAT.	LONG.	AZ	EL	POL.
25	80	192	60	+18
25	85	178	61	+ 7
25	90	163	60	- 4
25	95	149	59	-13
25	100	138	56	-22
30	80	190	55	+16
30	85	178	55	+ 7
30	90	165	55	0
30	95	153	53	-10
30	100	142	51	-17
30	105	133	49	-24
30	110	124	46	-29
30	115	116	42	-34
35	75	203	48	+21
35	80	193	49	+14
35	85	180	49	+ 7
35	90	167	49	0
35	95	157	48	- 7
35	100	145	46	-13
35	105	136	44	-19
35	110	126	41	-24
35	115	118	38	-29
35	120	111	35	-32
40	70	213	41	+24
40	75	203	43	+19
40	80	194	44	+13
40	85	182	44	+ 7
40	90	169	44	+ 1
40	95	155	43	- 4
40	100	147	41	-10
40	105	138	39	-15
40	110	127	37	-20
40	115	119	34	-24
40	120	114	32	-27
40	125	108	28	-31
45	70	221	36	+22
45	75	206	37	+17
45	80	195	38	+12
45	85	184	38	+ 7
45	90	170	38	+ 2
45	95	159	37	- 3
45	100	148	36	- 8
45	105	137	35	-12
45	110	129	33	-16
45	115	122	30	-20
45	120	115	28	-23
45	125	110	25	-26
50	70	219	31	+19
50	75	211	32	+15
50	80	199	33	+11
50	85	184	33	+ 7
50	90	172	32	+ 3
50	95	161	32	- 1
50	100	149	31	- 4
50	105	137	30	- 9
50	110	130	28	-13
50	115	123	26	-16
50	120	117	24	-19
50	125	111	21	-21

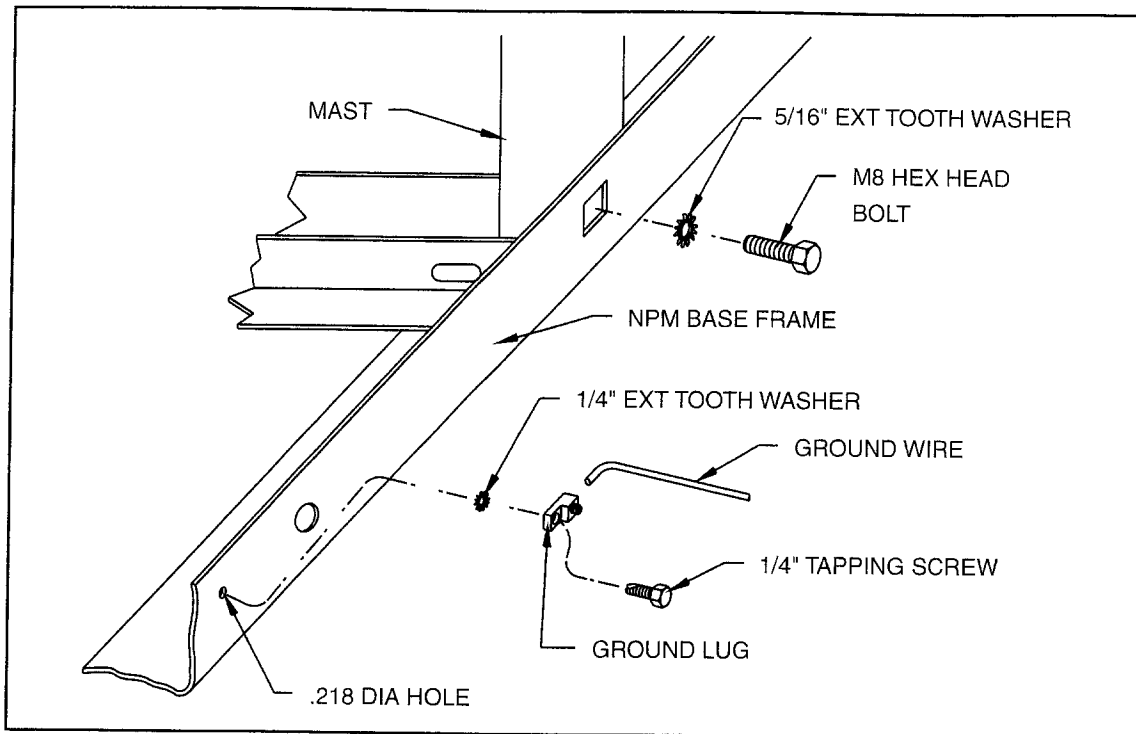
**GS1 SATELLITE 103°W**

LAT.	LONG.	AZ	EL	POL.
25	80	225	51	+66
25	85	216	55	+59
25	90	204	57	+52
25	95	190	59	+43
25	100	177	61	+32
30	80	220	47	+60
30	85	211	50	+54
30	90	200	52	+47
30	95	188	54	+40
30	100	176	55	+31
30	105	165	55	+23
30	110	153	54	+14
30	115	142	53	+ 6
35	75	229	40	+60
35	80	221	43	+55
35	85	210	45	+50
35	90	198	47	+44
35	95	188	49	+37
35	100	175	49	+30
35	105	164	49	+23
35	110	153	49	+16
35	115	147	47	+10
35	120	134	46	+ 4
40	70	235	33	+59
40	75	228	36	+55
40	80	219	38	+51
40	85	209	40	+46
40	90	197	42	+41
40	95	184	43	+35
40	100	175	44	+30
40	105	160	44	+24
40	110	152	43	+18
40	115	143	42	+12
40	120	136	41	+ 7
40	125	128	39	+ 2
45	70	243	29	+55
45	75	229	31	+51
45	80	219	33	+47
45	85	209	35	+43
45	90	195	37	+39
45	95	159	38	+34
45	100	173	38	+29
45	105	161	38	+24
45	110	152	38	+19
45	115	144	37	+14
45	120	137	36	+10
45	125	130	34	+ 6
50	70	240	25	+51
50	75	233	27	+47
50	80	221	29	+44
50	85	207	30	+41
50	90	195	31	+37
50	95	184	32	+33
50	100	172	33	+29
50	105	159	33	+24
50	110	152	32	+20
50	115	145	32	+16
50	120	137	31	+12
50	125	131	29	+ 9

**Legend:** LAT. = Latitude Degrees North  
LONG = Longitude Degrees West  
AZ = Azimuth Heading, Direct Compass Reading (**Magnetic Deviation is included in Charts**)  
EL = Elevation in Degrees, Direct Reading  
POL. = Polarization of Feed Scale Setting in degrees for Vertical Polarity, Horizontal Polarity is 90° from values shown in charts.



ADDENDUM TO  
800029201 & 800035001  
NON-PENETRATING MOUNT SYSTEMS  
INSTALLING GROUND LUG &  
GROUNDING NPM



### GROUNDING THE NPM FRAME

Perform the following steps and ground the NPM assembly in accordance with current National Electrical Code and local codes.

1. Install the ground lug onto the NPM frame base using the self-tapping hex head screw as shown.
2. Install  $\frac{5}{16}$ " tooth washer between M8x Hex Head Bolt and Frame as shown.
3. Insert one end of the ground wire through the ground lug (see above illustration).
4. Tighten the ground lug clamp screw until the ground wire is secure.
5. Refer to the National Electric Code (NEC) Section 810 and local electric codes for the specific instructions on grounding the remaining end of the ground wire.

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GS2 SATELLITE 105° W				
LAT.	LONG.	AZ	EL	POL.
25	80	228	50	+42
25	85	219	53	+36
25	90	207	56	+29
25	95	195	59	+20
25	100	182	60	+11
30	80	223	46	+36
30	85	214	49	+31
30	90	203	51	+24
30	95	191	53	+17
30	100	180	55	+ 9
30	105	169	55	0
30	110	157	55	- 8
30	115	146	53	-17
35	75	231	38	+35
35	80	223	41	+31
35	85	212	44	+26
35	90	201	46	+20
35	95	187	48	+14
35	100	177	49	+ 7
35	105	165	49	0
35	110	156	49	- 7
35	115	146	48	-14
35	120	137	46	-20
40	70	237	32	+34
40	75	230	34	+31
40	80	222	37	+27
40	85	212	39	+22
40	90	200	41	+17
40	95	187	43	+12
40	100	179	43	+ 6
40	105	168	44	0
40	110	155	44	- 6
40	115	146	43	-11
40	120	138	41	-17
40	125	131	39	-22
45	70	245	28	+30
45	75	231	30	+27
45	80	221	33	+23
45	85	211	35	+19
45	90	198	36	+15
45	95	187	37	+10
45	100	176	38	+ 5
45	105	164	38	0
45	110	155	38	- 5
45	115	147	37	-10
45	120	139	36	-14
45	125	133	35	-19
50	70	242	24	+26
50	75	235	26	+23
50	80	223	28	+20
50	85	209	30	+16
50	90	197	31	+12
50	95	187	32	+ 8
50	100	175	33	+ 4
50	105	162	33	0
50	110	155	33	- 4
50	115	147	32	- 8
50	120	140	31	-12
50	125	134	30	-16

C2 (ANIK) SATELLITE 110° W				
LAT.	LONG.	AZ	EL	POL.
25	80	234	46	+47
25	85	226	50	+42
25	90	216	53	+36
25	95	204	56	+29
25	100	193	59	+21
30	80	229	42	+41
30	85	221	46	+36
30	90	211	49	+31
30	95	200	51	+24
30	100	189	53	+17
30	105	179	54	+ 9
30	110	167	55	0
30	115	155	55	- 8
35	75	237	35	+39
35	80	229	38	+36
35	85	219	41	+31
35	90	208	44	+26
35	95	199	46	-20
35	100	187	48	+14
35	105	177	49	+ 7
35	110	165	49	0
35	115	154	49	- 7
35	120	145	48	-14
40	70	243	28	+37
40	75	235	32	+34
40	80	229	34	+31
40	85	218	37	+27
40	90	207	39	+22
40	95	195	41	+17
40	100	185	43	+12
40	105	176	44	+ 6
40	110	163	44	0
40	115	153	44	- 6
40	120	146	43	-11
40	125	137	41	-17
45	70	250	25	+33
45	75	237	28	+30
45	80	227	30	+27
45	85	217	33	+23
45	90	210	35	+17
45	95	194	36	+15
45	100	183	37	+10
45	105	171	38	+ 5
45	110	162	38	0
45	115	154	38	- 5
45	120	146	37	-10
45	125	139	36	-14
50	70	248	21	+28
50	75	240	24	+26
50	80	229	26	+23
50	85	215	28	+20
50	90	203	30	+16
50	95	193	31	+12
50	100	181	32	+ 8
50	105	168	33	+ 4
50	110	161	33	0
50	115	154	33	- 4
50	120	146	32	- 8
50	125	140	31	-12

G7 SATELLITE 91° W				
LAT.	LONG.	AZ	EL	POL.
25	80	205	58	+22
25	85	192	60	+13
25	90	177	61	+ 2
25	95	163	60	- 9
25	100	150	59	-19
30	80	201	53	+18
30	85	190	54	+10
30	90	177	55	+ 2
30	95	164	55	- 7
30	100	152	54	-15
30	105	143	52	-23
30	110	132	49	-29
30	115	123	46	-35
35	75	213	46	+21
35	80	203	48	+15
35	85	190	50	+ 8
35	90	178	49	+ 1
35	95	167	49	- 6
35	100	155	48	-13
35	105	144	47	-19
35	110	134	45	-25
35	115	125	42	-30
35	120	118	39	-35
40	70	220	39	+23
40	75	212	41	+18
40	80	205	42	+13
40	85	191	43	+ 7
40	90	178	44	+ 1
40	95	166	44	- 5
40	100	156	43	-11
40	105	147	42	-16
40	110	135	40	-21
40	115	126	38	-26
40	120	120	35	-30
40	125	114	32	-34
45	70	229	34	+20
45	75	220	36	+15
45	80	203	37	+11
45	85	193	38	+ 6
45	90	178	38	+ 1
45	95	167	38	- 4
45	100	156	37	- 9
45	105	145	36	-14
45	110	136	35	-18
45	115	129	33	-22
45	120	122	31	-26
45	125	116	28	-29
50	70	227	29	+17
50	75	219	31	+13
50	80	206	32	+ 9
50	85	192	32	+ 5
50	90	179	33	+ 1
50	95	169	33	- 3
50	100	156	32	- 7
50	105	144	31	-11
50	110	137	30	-15
50	115	130	28	-19
50	120	123	26	-22
50	125	116	24	-25

**Legend:** LAT. = Latitude Degrees North  
LONG = Longitude Degrees West  
AZ = Azimuth Heading, Direct Compass Reading (**Magnetic Deviation is Included in Charts**)  
EL = Elevation in Degrees, Direct Reading  
POL. = Polarization of Feed Scale Setting in degrees for Vertical Polarity, Horizontal Polarity is 90° from values shown in charts.

**SBS 3 & 6 SATELLITE 95° W**

**TELSTAR 401 SATELLITE 97° W**

**G4 SATELLITE 99° W**

LAT.	LONG.	AZ	EL	POL.
25	80	212	56	+29
25	85	201	59	+20
25	90	287	60	+11
25	95	172	61	0
25	100	158	60	-11
30	80	208	51	+24
30	85	197	53	+17
30	90	185	55	+ 9
30	95	172	55	0
30	100	160	55	- 9
30	105	150	53	-17
30	110	149	51	-24
30	115	129	49	-31
35	75	218	44	+26
35	80	209	46	+20
35	85	197	48	+14
35	90	185	49	+ 7
35	95	174	49	0
35	100	161	49	- 7
35	105	151	48	-14
35	110	140	46	-20
35	115	131	44	-26
35	120	123	41	-31
40	70	226	37	+27
40	75	218	39	+22
40	80	209	41	+17
40	85	197	43	+12
40	90	185	44	+ 6
40	95	172	44	0
40	100	162	44	- 6
40	105	153	43	-12
40	110	140	41	-17
40	115	132	39	-22
40	120	125	37	-27
40	125	118	34	-31
45	70	233	33	+23
45	75	219	35	+19
45	80	209	36	+14
45	85	198	37	+10
45	90	184	38	+ 5
45	95	173	38	0
45	100	162	38	- 5
45	105	150	37	-10
45	110	141	36	-14
45	115	134	35	-19
45	120	127	33	-23
45	125	121	30	-26
50	70	231	28	+19
50	75	223	30	+16
50	80	211	31	+12
50	85	197	32	+ 8
50	90	185	33	+ 4
50	95	174	33	0
50	100	162	33	- 4
50	105	149	32	- 8
50	110	142	31	-12
50	115	135	30	-16
50	120	128	28	-19
50	125	122	26	-23

LAT.	LONG.	AZ	EL	POL.
25	80	216	55	+32
25	85	205	58	+24
25	90	191	60	+15
25	95	176	61	+ 4
25	100	163	61	- 6
30	80	211	50	+27
30	85	201	53	+20
30	90	189	54	+12
30	95	176	55	+ 3
30	100	164	55	- 5
30	105	153	54	-14
30	110	142	52	-21
30	115	132	50	-28
35	75	221	43	+28
35	80	212	46	+23
35	85	200	47	+17
35	90	188	49	+10
35	95	177	49	+ 3
35	100	165	49	- 4
35	105	154	48	-11
35	110	143	47	-18
35	115	130	45	-28
35	120	126	43	-29
40	70	228	36	+29
40	75	220	39	+24
40	80	231	41	+19
40	85	200	42	+14
40	90	187	43	+ 8
40	95	175	44	+ 2
40	100	165	44	- 4
40	105	156	43	- 9
40	110	143	42	-15
40	115	134	40	-20
40	120	128	38	-25
40	125	120	36	-29
45	70	236	32	+25
45	75	222	34	+21
45	80	211	35	+16
45	85	200	37	+12
45	90	187	38	+ 7
45	95	175	38	+ 2
45	100	165	38	- 3
45	105	153	38	- 8
45	110	144	37	-13
45	115	136	35	-17
45	120	129	33	-22
45	125	123	31	-25
50	70	234	27	+21
50	75	226	29	+18
50	80	214	30	+14
50	85	200	32	+10
50	90	187	32	+ 6
50	95	177	33	+ 2
50	100	164	33	- 3
50	105	152	32	- 7
50	110	144	31	-11
50	115	137	30	-15
50	120	130	29	-18
50	125	124	27	-22

LAT.	LONG.	AZ	EL	POL.
25	80	219	54	+35
25	85	209	57	+27
25	90	196	60	+19
25	95	181	60	+ 9
25	100	168	61	- 2
30	80	215	49	+29
30	85	205	52	+23
30	90	193	54	+15
30	95	188	55	+ 7
30	100	168	55	- 2
30	105	157	54	-10
30	110	146	53	-18
30	115	135	51	-25
35	75	224	42	+30
35	80	215	45	+25
35	85	204	47	+19
35	90	191	48	+13
35	95	181	49	+ 6
35	100	177	49	- 1
35	105	158	50	- 8
35	110	146	48	-15
35	115	136	46	-21
35	120	128	44	-27
40	70	231	35	+30
40	75	223	38	+26
40	80	214	40	+21
40	85	203	42	+16
40	90	191	43	+11
40	95	178	44	+ 5
40	100	168	44	- 1
40	105	159	43	- 7
40	110	146	42	-13
40	115	137	41	-18
40	120	130	40	-23
40	125	123	37	-27
45	70	238	31	+26
45	75	224	33	+22
45	80	214	35	+18
45	85	203	36	+14
45	90	190	37	+ 9
45	95	179	38	+ 4
45	100	168	38	- 1
45	105	156	38	- 6
45	110	147	37	-11
45	115	139	36	-15
45	120	132	34	-20
45	125	125	32	-23
50	70	236	26	+22
50	75	228	28	+19
50	80	226	30	+15
50	85	202	31	+11
50	90	190	32	+ 7
50	95	179	33	+ 3
50	100	157	33	- 1
50	105	154	32	- 5
50	110	147	32	- 9
50	115	140	31	-13
50	120	132	29	-17
50	125	127	28	-20

**Legend:** LAT. = Latitude Degrees North  
 LONG = Longitude Degrees West  
 AZ = Azimuth Heading, Direct Compass Reading (**Magnetic Deviation is Included in Charts**)  
 EL = Elevation in Degrees, Direct Reading  
 POL. = Polarization of Feed Scale Setting in degrees for Vertical Polarity, Horizontal Polarity is 90° from values shown in charts.

# .90m BALLAST REQUIREMENTS AND LOCATIONS

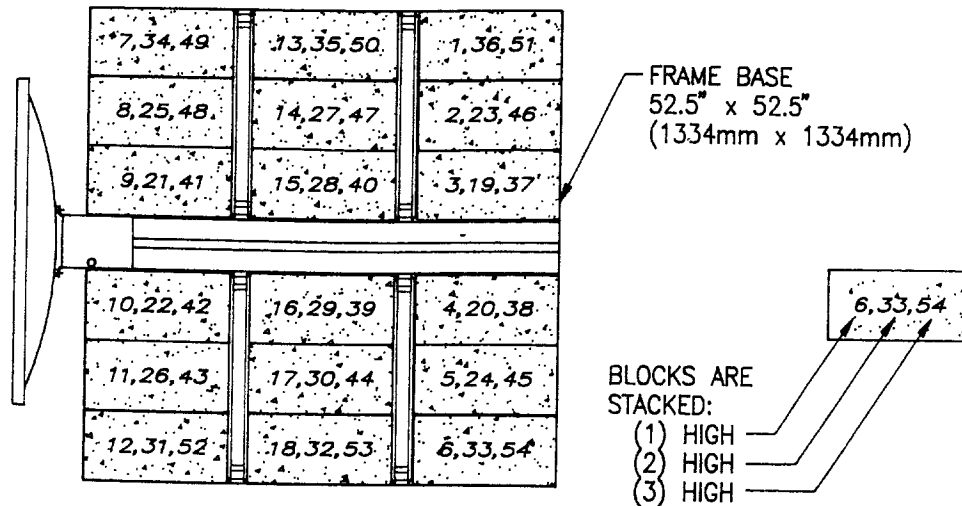


TABLE 1  
WIND SPEED  
TETHERED  
(PER NOTE 3)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	EXPOSURE	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:		
					15 FT.	30 FT.	60 FT.
18	1 THRU 18	652	33.9	B	119	108	96
				C	91	85	79
24	1 THRU 24	844	43.9	B	136	123	110
				C	104	96	89
30	1 THRU 30	1036	53.9	B	—	136	121
				C	115	107	99
36	1 THRU 36	1228	63.9	B	—	—	132
				C	125	116	108
42	1 THRU 42	1420	73.9	B	—	—	—
				C	135	125	116
48	1 THRU 48	1612	83.8	B	—	—	—
				C	—	133	125

**NOTES:**

- 1 - BALLAST CONSISTS OF 8" x 16" x 4" NOMINAL CONCRETE CAP BLOCKS WEIGHT OF 32 LBS EACH PLUS 76 LBS FOR WEIGHT OF ANTENNA AND MOUNT.
- 2 - BALLAST CALCULATED TO MEET UNIFORM BUILDING CODE EXPOSURE B OR C.
- 3 - BALLAST BASED ON OVERTURNING REQUIREMENTS AND AZIMUTH SETTING PER INSTRUCTIONS ON PAGE 10. TO INSURE AGAINST SLIDING TETHER AS SHOWN IN DETAIL ON PAGE 16.
- 4 - WHEN TABLE 2, PAGE 16, IS USED, IT IS REQUIRED THAT A 3/8" CERAMAR FOAM PAD (PART NUMBER PPM-53X53) BE ATTACHED TO THE BOTTOM OF THE BASE FRAME WITH 3M SUPER 77 SPRAY ADHESIVE. THE FOAM PAD WILL PROVIDE THE COEFFICIENT OF FRICTION SHOWN AND PROTECT THE ROOF FROM PUNCTURE. WIND SPEED IN TABLE 2 BASED ON WORST CASE FRICTION COEFFICIENT AND 1.5 SLIDING AND OVERTURNING STABILITY.

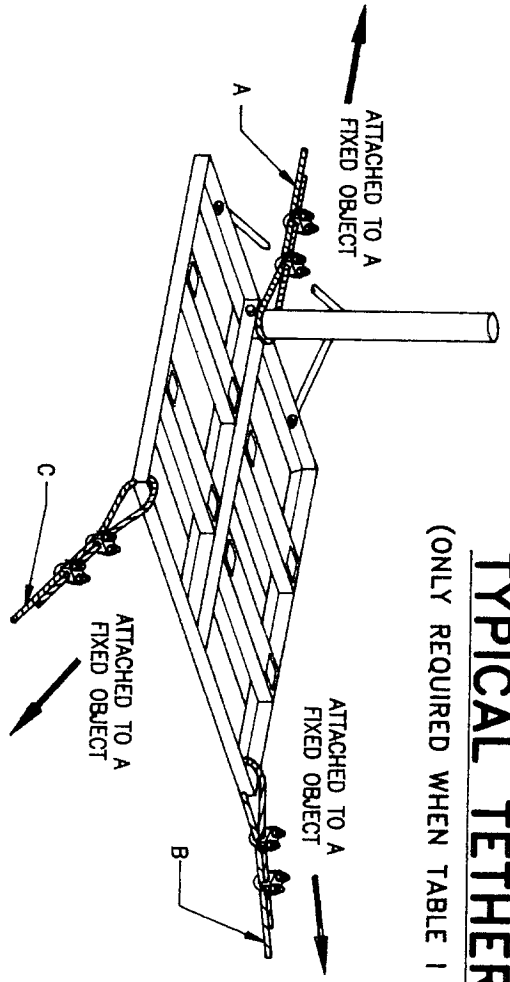
# .90m BALLAST REQUIREMENTS AND LOCATIONS

TABLE 2  
WIND SPEED  
UNTETHERED  
(PER NOTE 4 ON PRECEDING PAGE)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	EXPOSURE	ROOFING MATERIAL:			BUILT-UP ROOF			BUILT-UP ROOF			BUILT-UP ROOF			
					BUILT-UP ROOF TAR & ROCK FRICTION COEFFICIENT: .55 W/FOAM PAD	MODIFIED BITUMEN FRICTION COEFFICIENT: .47 W/FOAM PAD	BUILT-UP ROOF HYPALON OR EDPM FRICTION COEFFICIENT: .40 W/FOAM PAD	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.
30	1 THRU 30	1036	53.9	B	15 FT.	30 FT.	60 FT.	125	112	127	115	103	96	87	78		
								106	98	91	97	90	84	74	68	63	
								C	-	-	125	-	-	111	100	90	
36	1 THRU 36	1228	63.9	C	15 FT.	30 FT.	60 FT.	118	110	102	104	97	90	85	79	73	
								B	-	-	-	-	-	-	-	-	-
								B	-	-	130	116	124	112	100		
42	1 THRU 42	1420	73.9	B	15 FT.	30 FT.	60 FT.	129	120	111	110	102	95	88	82		
								C	-	-	-	-	-	-	-	-	
								B	-	-	123	100	124	112	100		
48	1 THRU 48	1612	83.9	C	15 FT.	30 FT.	60 FT.	129	120	116	108	100	104	97	90		
								B	-	-	-	-	-	-	-	-	
								B	-	-	134	110	124	112	100		
54	1 THRU 54	1804	93.8	C	15 FT.	30 FT.	60 FT.	-	-	127	118	110	112	104	97		
								B	-	-	-	-	-	-	-	-	
								B	-	-	134	110	124	112	100		

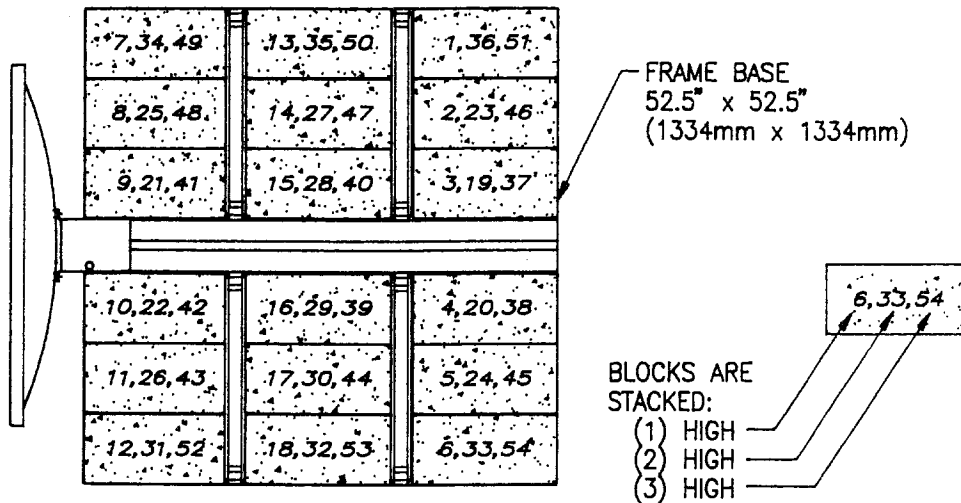
## TYPICAL TETHERING

(ONLY REQUIRED WHEN TABLE 1 IS USED)



TO SECURE AGAINST SLIDING, ATTACH THREE CABLES AS SHOWN (A, B & C), TO FIXED OBJECTS CAPABLE OF SUPPORTING 520 LBS. CABLE MUST BE 1/8" DIA. MIN. STAINLESS OR GALVANIZED STEEL, 7 x 7 OR 7 x 19, 1200 LBS. MIN. BREAKING STRENGTH.

# 1.0m BALLAST REQUIREMENTS AND LOCATIONS



**TABLE 1**  
WIND SPEED  
TETHERED  
(PER NOTE 3)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	EXPOSURE	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:		
					15 FT.	30 FT.	60 FT.
18	1 THRU 18	654	34.0	B	112	101	91
				C	86	80	74
24	1 THRU 24	846	44.0	B	128	115	103
				C	98	91	84
30	1 THRU 30	1038	54.0	B	—	128	114
				C	108	100	93
36	1 THRU 36	1230	64.0	B	—	139	124
				C	118	109	101
42	1 THRU 42	1422	74.0	B	—	—	134
				C	126	117	109
48	1 THRU 48	1614	83.9	B	—	—	—
				C	135	125	116

**NOTES:**

- 1 - BALLAST CONSISTS OF 8" x 16" x 4" NOMINAL CONCRETE CAP BLOCKS WEIGHT OF 32 LBS EACH PLUS 78 LBS FOR WEIGHT OF ANTENNA AND MOUNT.
- 2 - BALLAST CALCULATED TO MEET UNIFORM BUILDING CODE EXPOSURE B OR C.
- 3 - BALLAST BASED ON OVERTURNING REQUIREMENTS AND AZIMUTH SETTING PER INSTRUCTIONS ON PAGE 10. TO INSURE AGAINST SLIDING TETHER AS SHOWN IN DETAIL ON PAGE 18.
- 4 - WHEN TABLE 2, PAGE 18, IS USED, IT IS REQUIRED THAT A 3/8" CERAMAR FOAM PAD (PART NUMBER PPM-53X53) BE ATTACHED TO THE BOTTOM OF THE BASE FRAME WITH 3M SUPER 77 SPRAY ADHESIVE. THE FOAM PAD WILL PROVIDE THE COEFFICIENT OF FRICTION SHOWN AND PROTECT THE ROOF FROM PUNCTURE. WIND SPEED IN TABLE 2 BASED ON WORST CASE FRICTION COEFFICIENT AND 1.5 SLIDING AND SLIDING AND OVERTURNING STABILITY.

# 1.0m BALLAST REQUIREMENTS AND LOCATIONS

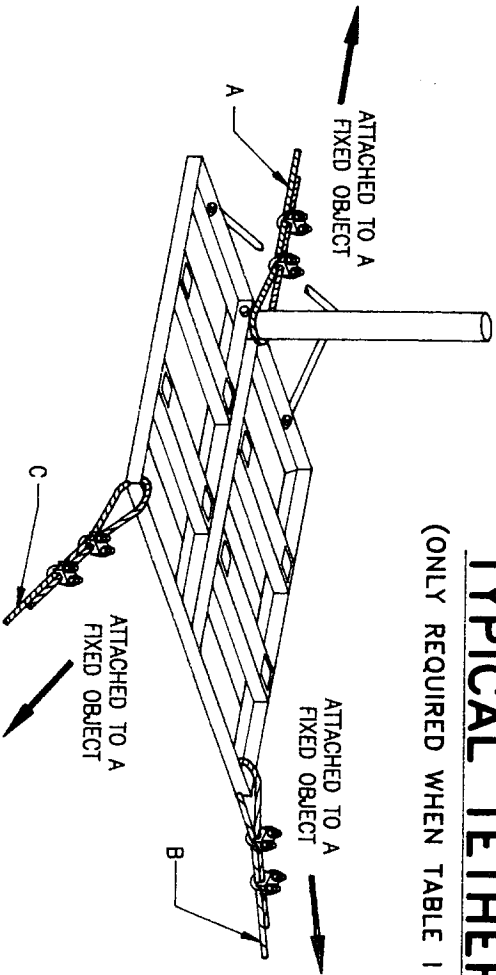
TABLE 2  
WIND SPEED  
UNTETHERED

(PER NOTE 4 ON PRECEDING PAGE)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	ROOFING MATERIAL:			EXPOSURE						
				BUILT-UP ROOF TAR & ROCK FRICTION COEFFICIENT: .55 W/FOAM PAD	BUILT-UP ROOF MODIFIED BITUMEN FRICTION COEFFICIENT: .47 W/FOAM PAD	BUILT-UP ROOF HYPALON OR EPPM FRICTION COEFFICIENT: .40 W/FOAM PAD	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:				
30	1 THRU 30	1038	54.0	B	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.
				C	130	118	105	119	108	96	90	82	73
				C	100	92	86	91	85	79	69	64	59
36	1 THRU 36	1230	64.0	B	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.
				C	111	103	96	128	115	103	104	94	84
				B	111	103	96	98	91	84	80	74	69
42	1 THRU 42	1422	74.0	B	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.
				C	121	112	104	135	122	109	116	105	94
				B	121	112	104	104	96	89	89	83	77
48	1 THRU 48	1614	83.9	B	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.
				C	131	121	112	109	101	94	128	115	103
				B	131	121	112	109	101	94	98	91	84
54	1 THRU 54	1806	94.0	B	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.	15 FT.	30 FT.	60 FT.
				C	138	128	119	120	111	103	105	98	91
				B	138	128	119	120	111	103	138	125	111

## TYPICAL TETHERING

(ONLY REQUIRED WHEN TABLE 1 IS USED)



TO SECURE AGAINST SLIDING, ATTACH THREE CABLES AS SHOWN (A, B & C), TO FIXED OBJECTS CAPABLE OF SUPPORTING 570 LBS. CABLE MUST BE 1/8" DIA. MIN. STAINLESS OR GALVANIZED STEEL, 7 x 7 OR 7 x 19, 1200 LBS. MIN. BREAKING STRENGTH.



# 1.2m BALLAST REQUIREMENTS AND LOCATIONS

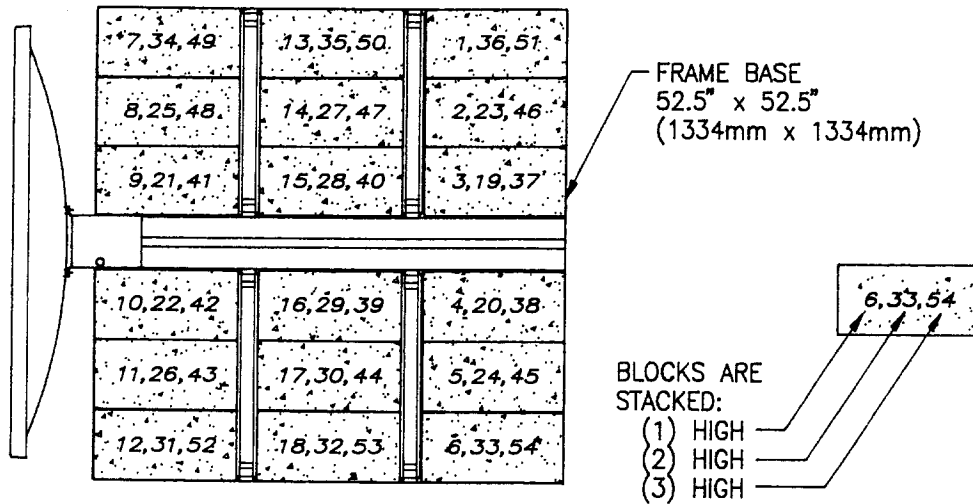


TABLE 1  
WIND SPEED  
TETHERED  
(PER NOTE 3)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	EXPOSURE	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:		
					15 FT.	30 FT.	60 FT.
18	1 THRU 18	661	34.4	B	94	85	76
				C	72	67	62
24	1 THRU 24	853	44.4	B	107	97	86
				C	82	76	70
30	1 THRU 30	1045	54.3	B	118	107	96
				C	91	84	78
36	1 THRU 36	1237	64.3	B	129	116	104
				C	99	91	85
42	1 THRU 42	1429	74.3	B	—	125	112
				C	106	98	91
48	1 THRU 48	1621	84.3	B	—	133	119
				C	113	105	97
54	1 THRU 54	1806	93.9	B	—	—	126
				C	119	111	102

NOTES:

- 1 - BALLAST CONSISTS OF 8" x 16" x 4" NOMINAL CONCRETE CAP BLOCKS WEIGHT OF 32 LBS EACH PLUS 85 LBS FOR WEIGHT OF ANTENNA AND MOUNT.
- 2 - BALLAST CALCULATED TO MEET UNIFORM BUILDING CODE EXPOSURE B OR C.
- 3 - BALLAST BASED ON OVERTURNING REQUIREMENTS AND AZIMUTH SETTING PER INSTRUCTIONS ON PAGE 10. TO INSURE AGAINST SLIDING TETHER AS SHOWN IN DETAIL ON PAGE 20.
- 4 - WHEN TABLE 2, PAGE 20, IS USED, IT IS REQUIRED THAT A 3/8" CERAMAR FOAM PAD (PART NUMBER PPM-53X53) BE ATTACHED TO THE BOTTOM OF THE BASE FRAME WITH 3M SUPER 77 SPRAY ADHESIVE. THE FOAM PAD WILL PROVIDE THE COEFFICIENT OF FRICTION SHOWN AND PROTECT THE ROOF FROM PUNCTURE. WIND SPEED IN TABLE 2 BASED ON WORST CASE FRICTION COEFFICIENT AND 1.5 SLIDING AND OVERTURNING STABILITY.

# 1.2m BALLAST REQUIREMENTS AND LOCATIONS

TABLE 2

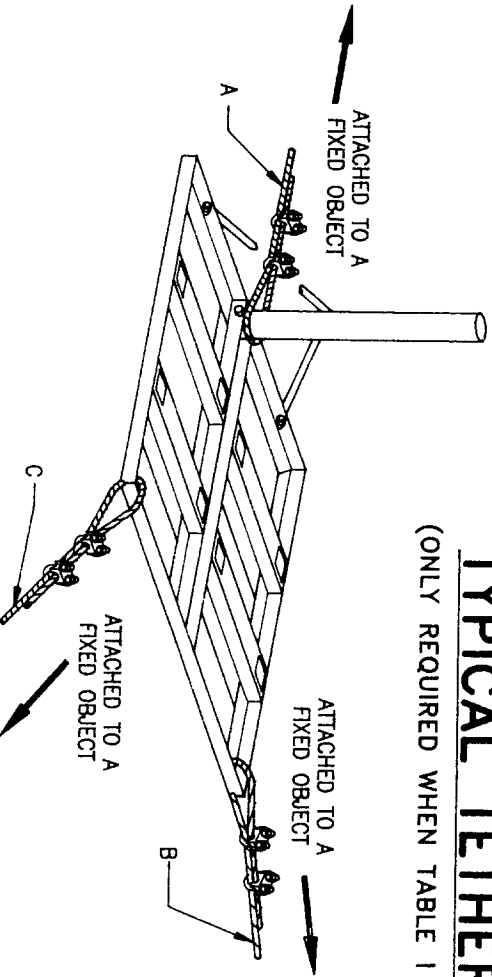
WIND SPEED  
UNTETHERED

(PER NOTE 4 ON PRECEDING PAGE)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST & ANTENNA SYSTEM	DIST. LOAD LBS./SQ. FT.	ROOFING MATERIAL: EXPOSURE	BUILT-UP ROOF TAR & ROCK FRICTION COEFFICIENT: .55 W/FOAM PAD			BUILT-UP ROOF MODIFIED BITUMEN FRICTION COEFFICIENT: .47 W/FOAM PAD			BUILT-UP ROOF HYPALON OR EDPM FRICTION COEFFICIENT: .40 W/FOAM PAD		
					ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	15 FT.	30 FT.	60 FT.	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:	15 FT.	30 FT.	60 FT.	ALLOWABLE WIND SPEED (MPH) WHEN HEIGHT FROM GROUND TO CENTER OF ANTENNA IS:
30	1 THRU 30	1045	54.3	B	109	98	88	100	90	81	75	68	61
				C	83	77	72	76	71	66	58	53	50
36	1 THRU 36	1237	64.3	B	121	109	98	107	96	86	87	79	70
				C	93	86	80	82	76	70	67	62	57
42	1 THRU 42	1429	74.3	B	132	120	107	113	102	91	97	88	79
				C	101	94	87	86	80	74	74	69	64
48	1 THRU 48	1621	84.3	B	-	129	115	119	108	96	107	96	86
				C	109	101	94	91	85	78	82	76	70
54	1 THRU 54	1806	93.9	B	-	136	122	131	118	105	115	104	93
				C	115	107	99	100	93	86	88	82	76

## TYPICAL TETHERING

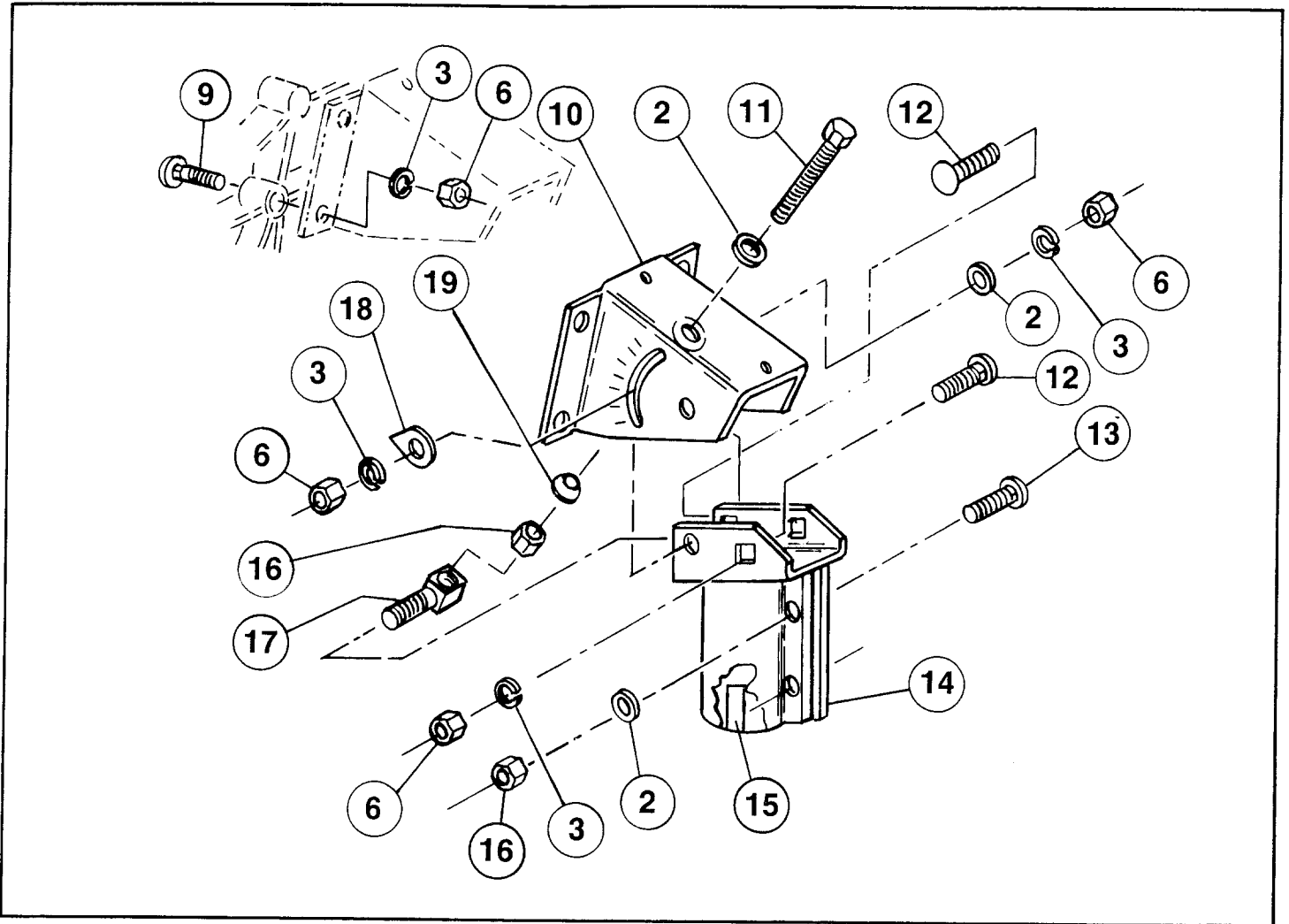
(ONLY REQUIRED WHEN TABLE 1 IS USED)



TO SECURE AGAINST SLIDING, ATTACH THREE CABLES AS SHOWN (A, B & C), TO FIXED OBJECTS CAPABLE OF SUPPORTING 650 LBS. CABLE MUST BE 1/8" DIA. MIN. STAINLESS OR GALVANIZED STEEL, 7 x 7 OR 7 x 19, 1200 LBS. MIN. BREAKING STRENGTH.

2	2503300	2	0	PN 2460800	5	44		3
3	LK WASH M8 (5/16) PN 2603300	8	7	BASE FRAME PN 2020486-02	1			
4	HH BOLT M8 x 20 PN 2050810-20	2	3	FRONT BRACE PN 2010146-08	2			

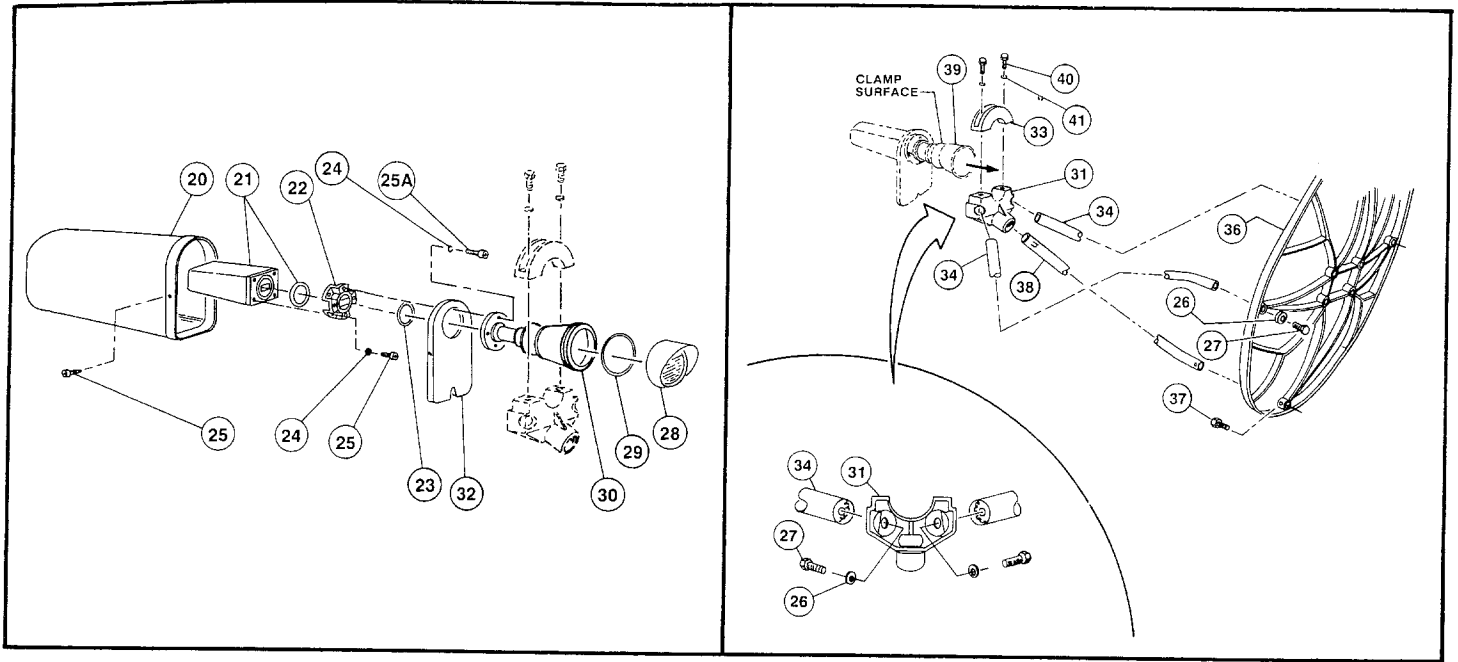
# PARTS AND HARDWARE LISTING



**FIG. 4.1 - AZ/EL CAP MOUNT, MODEL 6031**

NO.	QTY.	NO.	QTY.	NO.	QTY.	NO.	QTY.
2	4	10	1	14	1	18	1
3	6	11	1	15	1	19	1
6	6	12	4	16	3		
9	4	13	2	17	1		

# PARTS AND HARDWARE LISTING

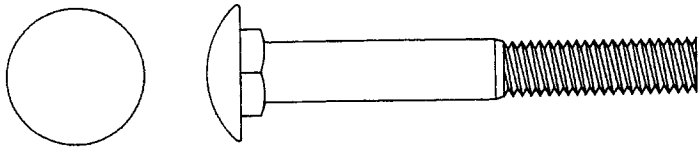


**FIG. 4.2 - ANTENNA, ANTENNA FEED AND FEED SUPPORT LEGS**

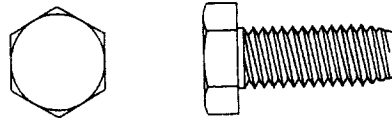
NO.	QTY.	NO.	QTY.	NO.	QTY.	NO.	QTY.
20	1	25	8	32	1	38	1
21	1	25 A	4	33	1	38	1
22	1	26	4	34	2	39	
23	1	27	4	34	2	40	2
24	4	28	1	36	1	41	2
25	6	29	1	36	1		
		30	1	37	1		
		31	1				

# HARDWARE SORTER

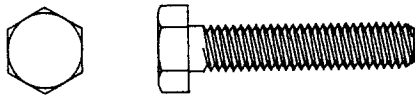
**NOTE: 10mm tools fit M6 hardware and 13mm tools fit M8 hardware.**



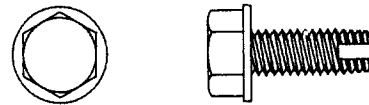
**M8 x 60mm Round Head Square Neck Bolt**  
Item 9, PN 2070022-01



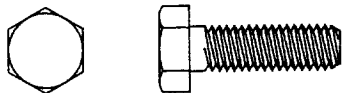
**M8 x 20mm Hex Head Bolt**  
Item 4, PN 2050810-20



**M6 x 30mm Hex Head Bolt**  
Item 27, PN 2060008



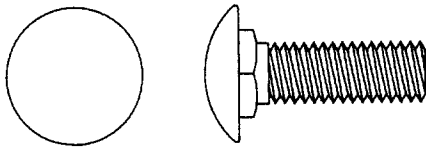
**M6 Tapping Screw**  
Item 37, PN 2060009



**M6 x 20mm Hex Head Bolt**  
Item 40, PN 2050610-20



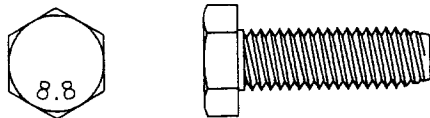
**M4 x 10mm Phillips Head Screw**  
Item 25, PN 2430070



**Bolt Short RD HD SQ NK M8 x 25**  
Item 44, PN 2070022-04



**M4 x 12mm Phillips Head Screw**  
Item 25A, PN 2430070-04



**Bolt Hex HD M8 x 25**  
Item 43, PN 2050810-25



**M8 Elastic Stop Nut**  
Item 16, PN 1380075

**Hardware illustrations are true size.  
Place actual hardware on top of illustration to identify.**



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**VSAT ANTENNA/MOUNT/LNB  
LIMITED TWELVE (12) MONTH WARRANTY**

This CHANNEL MASTER® equipment is warranted to be free from defects in material and workmanship under normal use and service. CHANNEL MASTER shall repair or replace defective equipment, at no charge, or at its option, refund the purchase price, if the equipment is returned to CHANNEL MASTER not more than twelve (12) months after shipment. Removal or replacement of equipment and its transportation shall not be at the cost of CHANNEL MASTER except CHANNEL MASTER 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, nor 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 CHANNEL MASTER has no control, Nor shall this Warranty apply to equipment which has been operated or installed other than in accordance with the instructions furnished by CHANNEL MASTER.

Claimants under this Warranty shall present their claim along with the defective equipment to CHANNEL MASTER immediately upon failure. Non-compliance with any part of this claim procedure may invalidate this warranty in whole or in part.

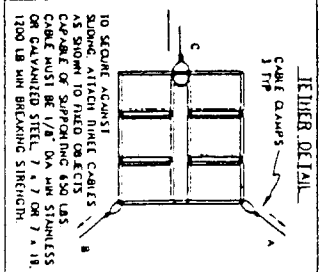
THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER AGREEMENTS AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CHANNEL MASTER DOES NOT AUTHORIZE ANY PERSON TO ASSUME FOR IT THE OBLIGATIONS CONTAINED IN THIS WARRANTY AND CHANNEL MASTER 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 CHANNEL MASTER 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 CHANNEL MASTER be liable for damages in an amount greater than the purchase price of the equipment.

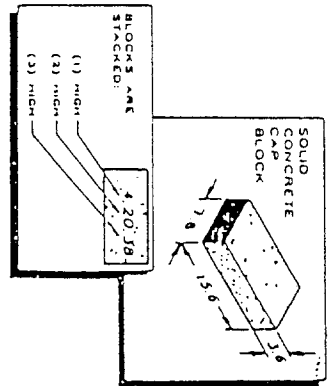
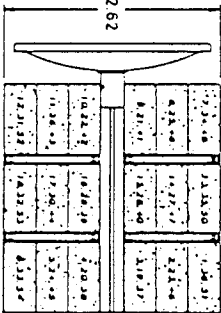
**TABLE 1**  
WIND SPEED TETHERED  
(PER NOTE 5)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST IN ANTIWIND SYSTEM	DESI LOAD (LBS./SQ FT)	ALLOWABLE WIND SPEED (mph) TO CENTER OF ANTIWIND SYSTEM
18	1 thru 18	681	31.4	93.1
24	1 thru 24	933	44.4	107.7
30	1 thru 30	1045	51.3	118.8
36	1 thru 36	1237	64.3	132.2
42	1 thru 42	1439	74.3	148.8
48	1 thru 48	1621	84.3	168.8
54	1 thru 54	1806	93.9	191.1



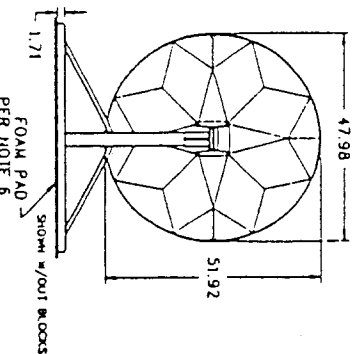
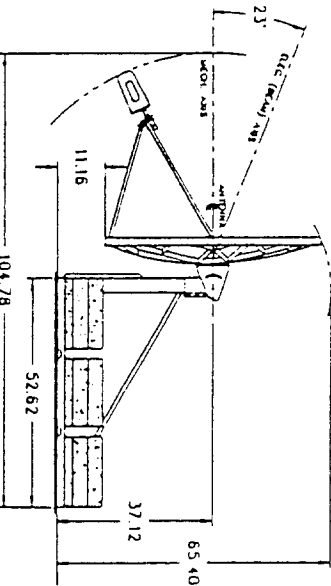
**TABLE 2**  
WIND SPEED UNTETHERED  
(PER NOTE 6)

NUMBER OF BLOCKS	LOCATION NUMBER	TOTAL WEIGHT (lbs.) OF BALLAST IN ANTIWIND SYSTEM	DESI LOAD (LBS./SQ FT)	90 FT		120 FT		150 FT	
				ALLOWABLE WIND SPEED (mph) TO CENTER OF ANTIWIND SYSTEM	W/FOAM PAD	ALLOWABLE WIND SPEED (mph) TO CENTER OF ANTIWIND SYSTEM	W/FOAM PAD	ALLOWABLE WIND SPEED (mph) TO CENTER OF ANTIWIND SYSTEM	W/FOAM PAD
30	1 thru 30	1045	51.3	108	98	100	90	100	81
36	1 thru 36	1237	64.3	121	109	107	98	108	87
42	1 thru 42	1439	74.3	132	120	107	102	112	97
48	1 thru 48	1621	84.3	141	128	115	108	119	102
54	1 thru 54	1806	93.9	148	134	122	112	121	105



**NOTES:**

- 1 - ANTENNA AND MOUNT SURVIVAL WIND VELOCITY IS 125 MPH.
- 2 - SELECT BALLAST FROM TABLE 1 OR 2 BASED ON WIND VELOCITY & HEIGHT ABOVE GROUND.
- 3 - BALLAST CONSISTS OF 8" x 15" x 4" NOMINAL CONCRETE CAP BLOCKS WEIGHT OF 32 LBS EACH PLUS 85 LBS FOR WEIGHT OF ANTENNA AND MOUNT (SEE TABLES) AND 1.3 STABILITY.
- 4 - BALLAST CALCULATED TO MEET UNIFORM BUILDING CODE EXPOSURE B OR C AGAINST SLIDING TETHER AS SHOWN IN DETAIL.
- 5 - TABLE 1 BALLAST BASED ON OVERTURNING REQUIREMENTS WITH 1.5 STABILITY, TO INSURE AGAINST SLIDING TETHER AS SHOWN IN DETAIL.
- 6 - IT IS RECOMMENDED THAT A 3/8" CERAMIC FOAM PAD (PART NUMBER PFM-32X32) BE ATTACHED TO THE BOTTOM OF THE BASE FRAME WITH 3M SUPER 77 SPRAY ADHESIVE. THE FOAM PAD WILL PROVIDE THE COEFFICIENT OF FRICTION SHOWN AND PROTECT THE ROOF FROM PUNCTURE AND OVERTURNING STABILITY.
- 7 - CLEAN ROOF OF ALL DEBRIS, GRAVEL OR OTHER LOOSE MATERIALS.
- 8 - MOUNT IS FABRICATED STEEL AND ANTENNA IS SMC (FIBERGLASS) MATERIAL.
- 9 - ROOF STRUCTURE MUST BE SUFFICIENT TO SUPPORT WEIGHT SHOWN IN TABLE.
- 10 - INSTALLATION MUST COMPLY WITH LATEST REVISION OF #0000350 INSTRUCTION AND ASSEMBLY MANUAL.



UNILET ENGINEERING SPECIFIC	DATE	1/27/91
DO NOT INCLUDE DIMENSIONS OF PLATING OR FINISHES	APPROVED BY	K. S. K...
DRAWN BY	DATE	3-9-94
UNILET	APPROVED	3-9-94
INCLINATION	DATE	3-9-94
PRIME	DATE	3-9-94

**Channel Master**  
SATELLITE RECEIVER EQUIPMENT  
SMITHFIELD, NC 27577

**1.2M NON-PENETRATING ROOF MOUNT SYSTEM BALLAST REQUIREMENTS**  
MODELS: 6922, 6A691200  
6533, W/6022 & 6031

CODE ID: 812 DATE: 8070004-00  
PD: C SCALE: NONE SHEET 1 OF 1

REVISED	DATE	APPROVED
1	3.9.94	

UNILET ENGINEERING COMPANY  
 1.2M NON-PENETRATING ROOF MOUNT SYSTEM  
 MODEL: 6922, 6A691200  
 DATE: 3-9-94  
 W/6022 & 6031  
 STAFF