

GENERAL DYNAMICS

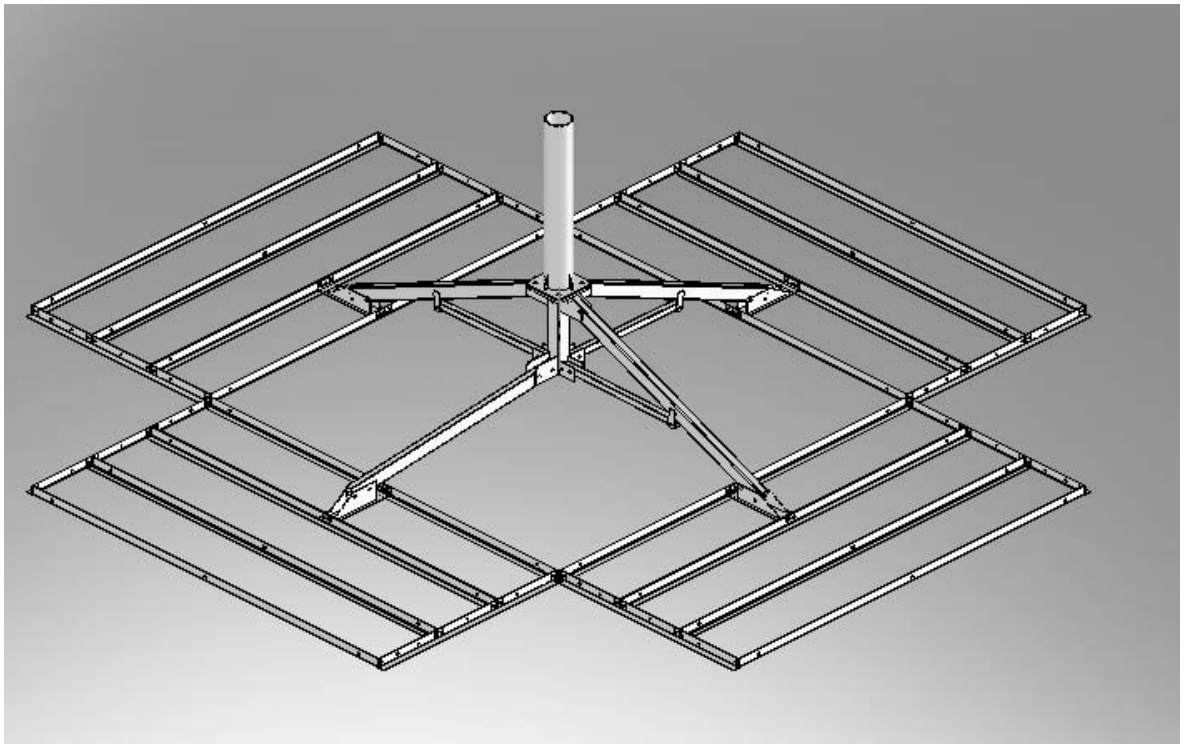
C4 Systems

4096-749

May 21, 2007

INSTALLATION MANUAL

Non Penetrating Mast Mount for 2.4M Antennas



GENERAL DYNAMICS

PRODELIN CORPORATION

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Non-Penetrating Mast Mount Assembly Instructions

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ASSEMBLY MANUAL

NON-PENETRATING MAST MOUNT

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SECTION I**1.0 GENERAL INFORMATION**

1. Prior to installation, verify that the installation site roof material and supporting structure have been investigated and found capable of withstanding all loads imposed by the proposed antenna system. Confirm that the anchors, and/or safety cables, if required, have been found to be adequate to resist the reactions from the antenna system and that the installation will be in accordance with all applicable local, state, and federal requirements.
2. All antenna installations should be grounded to meet all applicable codes.
3. Rubber pads are provided to protect the roof surface.
4. All necessary hardware is provided.
5. For calculating ballast requirements, refer to chart in section 3.
6. All metal parts are galvanized to help prevent corrosion.

1.1 UNPACKING & INSPECTION

1. **UNPACKING & INSPECTING**
The mount should be unpacked and inspected at the earliest date to ensure that all material has been received and is in good condition. A complete packing list for each major component is supplied.
2. **FREIGHT DAMAGE**
Any damage to materials while in transit should be immediately directed to the freight carrier. He will instruct you on the matters regarding any freight damage claims.
3. **MATERIAL - MISSING OR DAMAGED**
Any questions regarding missing or damaged materials that is not due to freight carrier should be directed to Prodelin's Customer Service Department at:

General Dynamics
1500 Prodelin Drive
Newton NC 28658
USA
(828) 464-4141

1.2 SUGGESTED TOOL LIST

1. The following tools are suggested for site preparation.
 - Shovel (for ground installation)
 - Broom
2. The following tools are suggested for the NPMM installation.
 - Ratchet
 - Sockets: 9/16", 3/4", 15/16"
 - Wrenches, combination: 9/16", 3/4", 15/16"
 - Tape measure

SECTION II

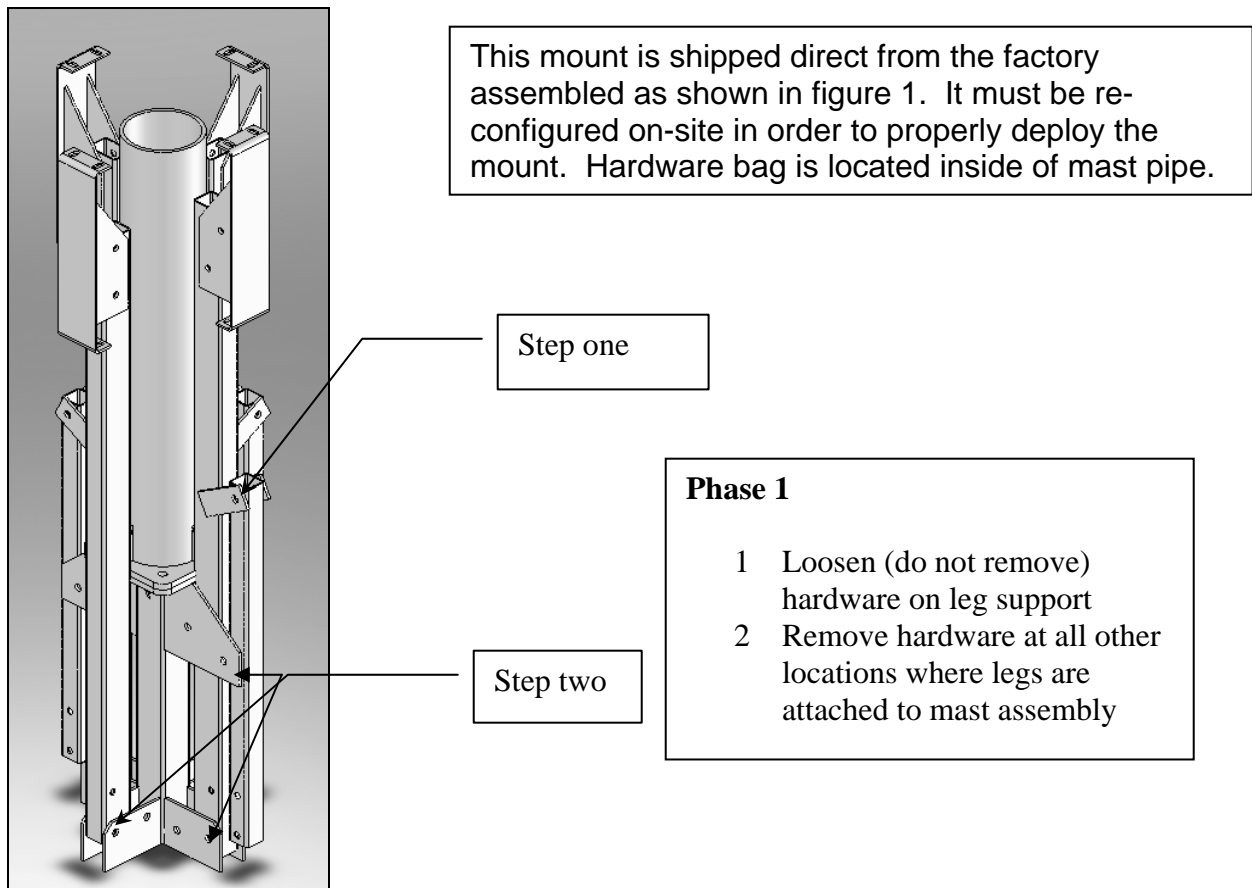
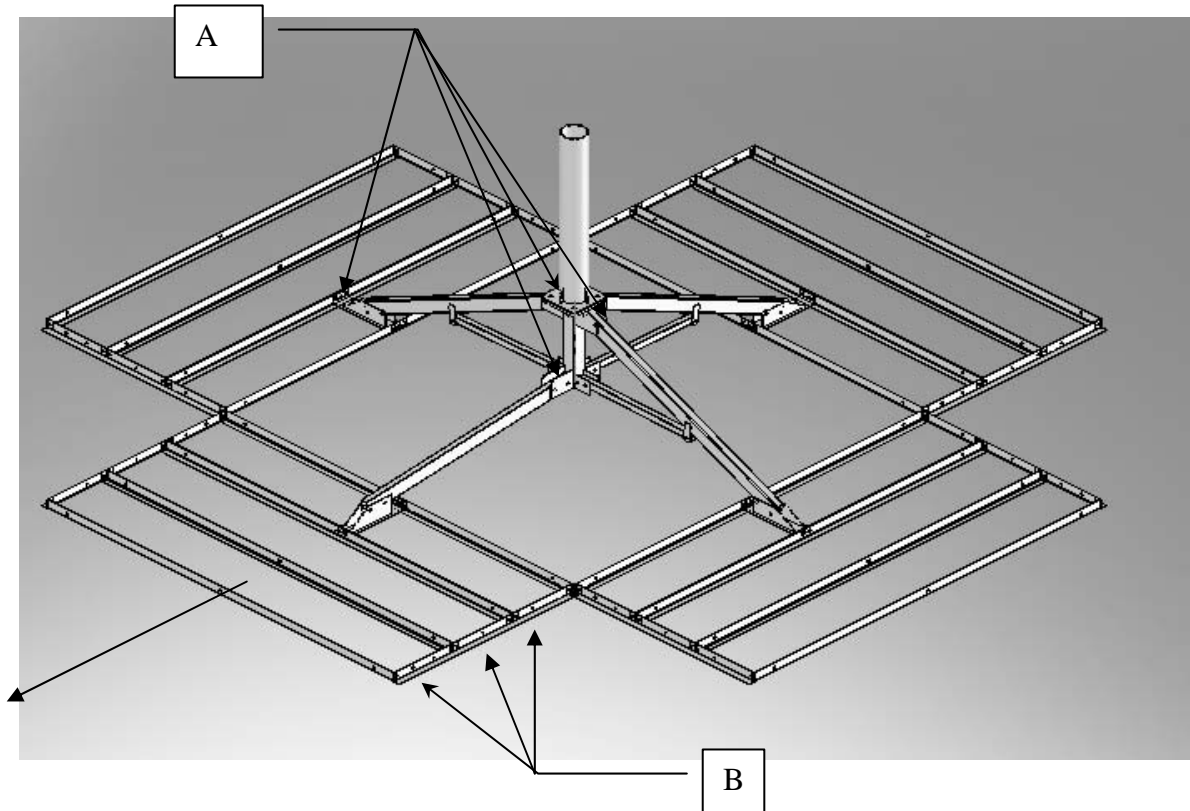


Figure 1



Azimuth heading.

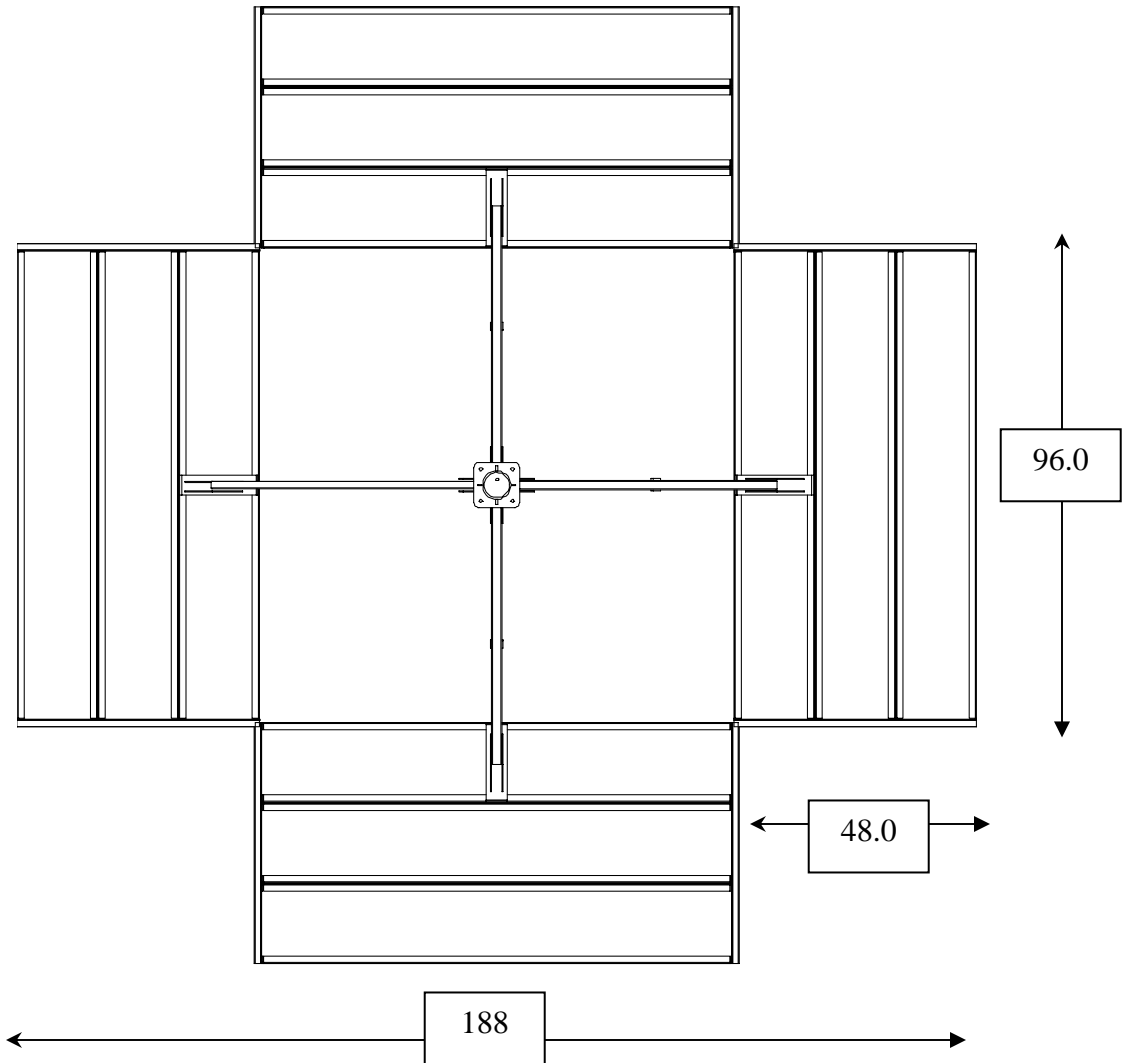
Figure 2

Phase 2

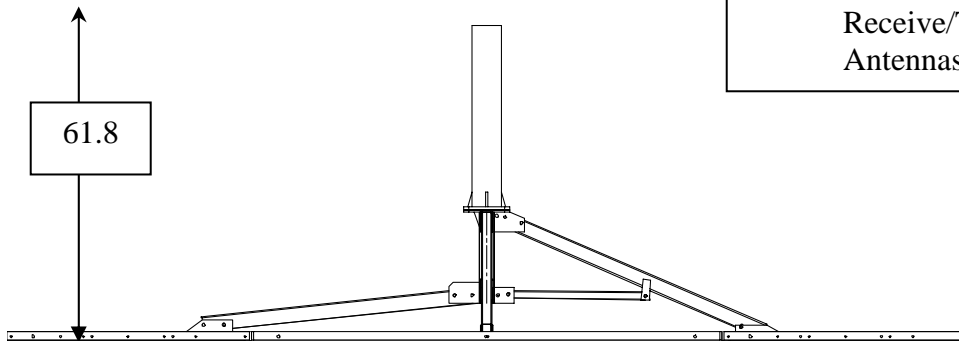
Do not tighten hardware until step 4.

- 1 Re-assemble mount as shown in figure 2 using 1/2" hardware at locations marked "A".
- 2 Assemble ballast trays as shown in figure 2 using 3/8" hardware at locations marked "B".
- 3 Attach feet to ballast trays using 3/8" hardware. (Marked "B".)
- 4 Tighten all hardware.

Mount should be positioned such that the "drop leg" is aimed in the same direction as the azimuth heading of the antenna. It will allow clearance for the reflector at low look angles.



- Pad area: 16 sq ft.
- Finish: Hot dip galvanized
- Suitable for Ku and C-Band Receive/Transmit 2.4M Antennas



SECTION III**3.1 EXPOSURE:**

1. Exposure B is urban or suburban areas, wooded areas, or other terrain with numerous, closely spaced obstructions having the size of single family dwellings or larger. Obstructions must extend 1500 feet in all directions from the antenna.
2. Exposure C is open terrain with widely scattered obstructions having heights generally less than 30 feet. Includes flat open country and grass lands.

3.2 BALLAST:

1. Ballast tables are based on an overturning design with a 1.5 safety factor. Values shown provide sliding resistance to the wind speed shown with a 1.0 safety factor when used with a rubber friction pad (coefficient of friction = .64).
2. Recommended ballast material is concrete cap block, nominal dimensions of 4 x 8 x 16 inches. These blocks will weigh between 25 and 30 lbs each, depending on local variation. Average weight of blocks should be determined for correct ballast amount.
3. Place ballast equally on all frames beginning at opposite corners of each side and working inward. If needed, begin a second layer on top of the first.
4. Under extreme wind conditions, the mount should be tethered with cables.
5. It is the customer's responsibility to ensure that all applicable codes and restrictions are satisfied. If in doubt, please consult a local structural engineer.

Ballast table (Table 3.0.1) provided on following page.

TABLE 3.0-1 – 2.4 M CF VSAT ANTENNAS Code: ANSI/ASCE 7-88

		Building Height (ft)	0-20		20-40		0-20		20-40		0-20		20-40		0-20		20-40	
			Wind Speed		70		80		90		100		110		120		125	
		Tethered on any type roof	Total Weight Required	Exp "B"	321	400	419	523	531	661	655	817	793	988	944	1176	1024	1276
Exp "C"	543			631	710	825	898	1044	1109	1289	1342	1559	1597	1855	1733	2013		
Static Roof Load (Pounds per Square Foot)	Exp "B"		3	4	4	5	6	7	7	9	8	10	10	12	11	13		
	Exp "C"		6	7	7	9	9	11	12	13	14	16	17	19	18	21		
Net Ballast Required (lbs)	Exp "B"		0	0	0	0	0	0	0	0	0	171	127	359	207	459		
	Exp "C"		0	0	0	8	81	227	292	472	525	742	780	1038	916	1196		

		Wind Speed	70		80		90		100		110		120		125	
			Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"
Untethered Built-up Roof cu=.75	Total Weight Required	Exp "B"	649	809	848	1057	1073	1337	1325	1651	1603	1998	1908	2377	2070	2580
		Exp "C"	1099	1276	1435	1667	1816	2110	2242	2605	2713	3152	3228	3751	3503	4070
	Static Roof Load (Pounds per Square Foot)	Exp "B"	7	8	9	11	11	14	14	17	17	21	20	25	22	27
		Exp "C"	11	13	15	17	19	22	23	27	28	33	34	39	36	42
	Net Ballast Required (lbs)	Exp "B"	0	0	31	240	256	520	508	834	786	1181	1091	1560	1253	1763
		Exp "C"	282	459	618	850	999	1293	1425	1788	1896	2335	2411	2934	2686	3253

		Wind Speed	70		80		90		100		110		120		125	
			Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"
Untethered Rubber Membrane Roof cu=.70	Total Weight Required	Exp "B"	696	867	909	1132	1150	1433	1420	1769	1718	2140	2044	2547	2218	2764
		Exp "C"	1177	1368	1537	1786	1946	2261	2402	2791	2906	3377	3459	4019	3753	4361
	Static Roof Load (Pounds per Square Foot)	Exp "B"	7	9	9	12	12	15	15	18	18	22	21	27	23	29
		Exp "C"	12	14	16	19	20	24	25	29	30	35	36	42	39	45
	Net Ballast Required (lbs)	Exp "B"	0	50	92	315	333	616	603	952	901	1323	1227	1730	1401	1947
		Exp "C"	360	551	720	969	1129	1444	1585	1974	2089	2560	2642	3202	2936	3544

		Wind Speed	70		80		90		100		110		120		125	
			Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"	Exp "B"	Exp "C"
Untethered Concrete Roof cu=.64	Total Weight Required	Exp "B"	761	948	994	1238	1258	1567	1553	1935	1879	2341	2236	2786	2426	3023
		Exp "C"	1287	1496	1681	1954	2128	2472	2627	3052	3179	3693	3783	4396	4105	4769
	Static Roof Load (Pounds per Square Foot)	Exp "B"	8	10	10	13	13	16	16	20	20	24	23	29	25	31
		Exp "C"	13	16	18	20	22	26	27	32	33	38	39	46	43	50
	Net Ballast Required (lbs)	Exp "B"	0	131	177	421	441	750	736	1118	1062	1524	1419	1969	1609	2206
		Exp "C"	470	679	864	1137	1311	1655	1810	2235	2362	2876	2966	3579	3288	3952

3.3 BALLAST REQUIREMENT INFORMATION

1. Ballast requirements are provided to assist in determining the applicability of the NPMM for an antenna installation. The ballast data should not be relied upon without competent local professional examination and verification of its accuracy and suitability for a specific site or application.
2. Specific antenna types may require more strength and ballast requirements and must be investigated for each installation. The load carrying requirements of the supporting surface, the mast, the antenna and the antenna's connection to the mast must also be investigated for each installation.
3. Roof pads are recommended to prevent damage to roof membranes. Pads should be placed under all ballast and under the mast pipe. When roof pads are utilized, the minimum coefficient of friction between the ballast pans and roof pad or between the roof pads and the supporting surface must be used to calculate the wind speeds resulting in sliding.
4. When adhesive, sealant or pads are utilized; they must be compatible with the supporting surface. They must also be durable and have adequate strength. Precautions should also be taken to insure that damage to the supporting surface will not occur upon wind loading. Adhesives and sealants must be capable of resisting shear; otherwise, they may act as a lubricant and decrease the effective coefficient of friction between the ballast and the supporting structure.
5. The installation, roof materials and supporting structure must be capable of withstanding all loads imposed by the antenna system. Supporting structure, anchors and/or safety cables must be sufficient to resist the reactions from the antenna system. The installation must meet all applicable, local, state and federal requirements.

Due to the many variables involved, General Dynamics does not accept responsibility for verifying the applicability of the NPMM for specific installations.

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