Sea Tel 9711-56 IMA C/Ku Band Satellite Antenna
Installation Manual

EAR Controlled - ECCN EAR99

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Sea Tel Marine Stabilized Antenna systems are assembled in the United States of America.

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Sea Tel is an ISO 9001:2015 registered company. Certificate Number 13690 originally issued March 14, 2011 and was renewed/reissued on March 13, 2018.

RED 2014/53/EU

Cobham SATCOM declares that the Sea Tel VSAT Maritime Satellite Earth Stations are in compliance with The **R**adio **E**quipment **D**irective 2014/53/EU. The full text of this Self Declaration of Conformity for this equipment is contained in this manual.

This Sea Tel C Band antenna will meet the spectral density, stabilization accuracy and, when properly connected to the modem, the automatic cessation of transmission requirements of the 2005 version of FCC 47 C.F.R. § 25.221. Please refer to the declaration included in this manual.

This Sea Tel Ku Band antenna will meet the spectral density, stabilization accuracy and, when properly connected to the modem, the automatic cessation of transmission requirements of the 2009 version of FCC 47 C.F.R. § 25.222. Please refer to the declaration included in this manual.

Revision History

REV	DCO#	Date	Description	By
A	00025425	May 15, 2018	Production Release	MDN

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RED Declaration of Conformity

Sea Tel Inc. declares under our sole responsibility that the products identified below are in compliance with the requirements of:

RED Directive 2014/53/EU concerning maritime Radio Equipment as described in the harmonized standards listed below and the mutual recognition of their conformity.

Product Names:

Speedcast TB1	**C Band Tx/Rx Maritime Satellite Earth Stations**
9797B	**C Band Tx/Rx Maritime Satellite Earth Stations**
9711	**C Band Tx/Rx Maritime Satellite Earth Stations**
6006	**C Band Tx/Rx Maritime satellite Earth Stations**
6009	**C Band Tx/Rx Maritime satellite Earth Stations**
6012	**C Band Tx/Rx Maritime satellite Earth Stations**

Harmonized Standards:

EMC:

EMC standard for Radio Equipment (Maritime)	**ETSI EN 301 843-1 V2.1.1 (2016-03)** (all clauses)
Marine Navigational and Radio Communications Equipment – General Requirements:	**IEC 60945:2002** (Reference Only)

Satellite Earth Stations and System (SES):

Satellite Earth Stations on board Vessels (ESVs) C Band	**ETSI EN 301 447 V2.1.1 (2016-05)**

Safety:

Safety of information technology equipment:	**IEC 60950-1:2005 +A12:2011**

Certificates of Assessment were completed and are on file at NEMKO USA Inc, San Diego, CA and BACL Labs, Santa Clara, CA.

Peter Blaney, Chief Engineer Date: Dec-07-2017

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RED Declaration of Conformity

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> **RED Directive 2014/53/EU** concerning maritime Radio Equipment as described in the harmonized standards listed below and the mutual recognition of their conformity.

Product Names:

Speedcast TB1 Ku Band Tx/Rx Maritime Satellite Earth Stations
9797 Ku Band Tx/Rx Maritime Satellite Earth Stations
9711 Ku Band Tx/Rx Maritime Satellite Earth Stations

Harmonized Standards:

EMC:

EMC standard for Radio Equipment (Maritime)	**ETSI EN 301 843-1 V2.1.1 (2016-03)**
Marine Navigational and Radio Communications Equipment – General Requirements:	**IEC 60945:2002** (Reference Only)

Satellite Earth Stations and System (SES):

Satellite Earth Stations on board Vessels (ESVs) Ku Band	**ETSI EN 302 340 V2.1.1 (2016-05)**

Safety:

Safety of Information Technology Equipment:	**IEC 60950-1:2005 +A12:2011**

Certificates of Assessment were completed and are on file at NEMKO USA Inc, San Diego, CA and BACL Labs, Santa Clara, CA.

Sea Tel, Inc
Concord, CA

07-Dec-2017

Peter Blaney, Chief Engineer — Date

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FCC Declaration of Conformity

1. Sea Tel, Inc. designs, develops, manufactures and services marine stabilized antenna systems for satellite communication at sea. These products are in turn used by our customers as part of their C-band Earth Station on Vessels (ESV) networks.
2. FCC regulation 47 C.F.R. § 25.221 defines the provisions for blanket licensing of ESV antennas operating in the C Band. This declaration covers the requirements for meeting § 25.221 (a)(1) by the demonstrations outlined in paragraphs (b)(1)(i) and (b)(1)(iii). The requirements for meeting § 25.221 (a)(3)-(a)(7) are left to the applicant. The paragraph numbers in this declaration refer to the 2009 version of FCC 47 C.F.R. § 25.221.
3. Sea Tel hereby declares that the antennas listed below will meet the off-axis EIRP spectral density requirements of § 25.221 (a)(1)(i) with and N value of 1, when the following Input Power spectral density limitations are met:

   1.5 Meter C Band, Models 6006, 6009, and 6012 are limited to -10 dBW/4kHz
   2.4 Meter C Band, Models 9797, 9707 and 9711 are limited to -7 dBW/4kHz

4. Sea Tel hereby declares that the antennas referenced in paragraph 3 above, will maintain a stabilization pointing accuracy of better than 0.2 degrees under specified ship motion conditions, thus meeting the requirements of § 25.221 (a)(1)(ii)(A).
5. Sea Tel hereby declares that the antennas referenced in paragraph 3 above, will automatically cease transmission within 100 milliseconds if the pointing error should exceed 0.5 degrees and will not resume transmission until the error drops below 0.2 degrees, thus meeting the requirements of § 25.221 (a)(1)(iii).
6. Sea Tel maintains all relevant test data, which is available upon request, to verify these declarations.

4/16/2013

Peter Blaney, Chief Engineer Date
Cobham – SATCOM
Sea Tel Products.

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FCC Declaration of Conformity

1. Sea Tel, Inc. designs, develops, manufactures and services marine stabilized antenna systems for satellite communication at sea. These products are in turn used by our customers as part of their Ku-band Earth Station on Vessels (ESV) networks.

2. FCC regulation 47 C.F.R. § 25.222 defines the provisions for blanket licensing of ESV antennas operating in the Ku Band. This declaration covers the requirements for meeting § 25.222 (a)(1) by the demonstrations outlined in paragraphs (b)(1)(i) and (b)(1)(iii). The requirements for meeting § 25.222 (a)(3)-(a)(7) are left to the applicant. The paragraph numbers in this declaration refer to the 2009 version of FCC 47 C.F.R. § 25.222.

3. Sea Tel hereby declares that the antennas listed below will meet the off-axis EIRP spectral density requirements of § 25.222 (a)(1)(i) with an N value of 1, when the following Input Power spectral density limitations are met:

*0.6 Meter Ku Band, Models 2406 and USAT-24 are limited to	-21.6 dBW/4kHz
*0.75 Meter Ku Band, Models 3011 and USAT-30 are limited to	-21.6 dBW/4kHz
0.9 Meter Ku Band, Model 3612 is limited to	-20.3 dBW/4kHz
1.0 Meter Ku Band, Models 4003/4006/4009/4010 are limited to	-16.3 dBW/4kHz
1.0 Meter Ku Band Model 4012 is limited to	-16.6 dBW/4kHz
1.2 Meter Ku Band, Models 4996/5009/5010/5012 are limited to	-14.0 dBW/4kHz
1.5 Meter Ku Band, Models 6006/6009/6012 are limited to	-14.0 dBW/4kHz
2.4 Meter Ku Band, Models 9797/9711/ 9711IMA are limited to	-14.0 dBW/4kHz

4. Sea Tel hereby declares that the antennas referenced in paragraph 3 above, will maintain a stabilization pointing accuracy of better than 0.2 degrees under specified ship motion conditions, thus meeting the requirements of § 25.222 (a)(1)(ii)(A). Those antennas marked with * will maintain a stabilization pointing accuracy of better than 0.3 degrees. The Input Power spectral density limits for these antenna have been adjusted to meet the requirements of§ 25.222 (a)(1)(ii)(B).

5. Sea Tel hereby declares that the antennas referenced in paragraph 3 above, will automatically cease transmission within 100 milliseconds if the pointing error should exceed 0.5 degrees and will not resume transmission until the error drops below 0.2 degrees, thus meeting the requirements of § 25.222 (a)(1)(iii).

6. Sea Tel maintains all relevant test data, which is available upon request, to verify these declarations.

Peter Blaney, Chief Engineer
Sea Tel, Inc
Concord, CA

1. Safety

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Sea Tel Inc (dba Cobham SATCOM) assumes no liability for the customer's failure to comply with these requirements.

Service

User access to the interior of the antenna control unit (ACU) is prohibited. Only a technician authorized by Cobham SATCOM may perform service - failure to comply with this rule will void the warranty. Access to the interior of the Above Deck Equipment (ADE) is allowed. Inspection of certain components as described in the Scheduled Inspections Manual may be accomplished by an engineer onboard. Maintenance of the ACU, or the ADE, may only be performed by a technician authorized by Cobham SATCOM.

Do not service or adjust alone

Do not attempt internal service or adjustments unless another person, capable of rendering first aid resuscitation, is present.

Grounding, cables and connections

To minimize shock hazard and to protect against lightning, the equipment chassis and cabinet must be connected to an electrical ground. The Above & Below Decks Equipments must be grounded to the ship. For further grounding information refer to the Installation chapter of this manual.

Do not extend the cables beyond the lengths specified for the equipment. The cable between the ACU and Above Deck Unit can be extended if it complies with the specified data concerning cable losses etc.

All coaxial cables are to be shielded and should not be affected by magnetic fields. However, try to avoid running cables parallel to high power and AC/RF wiring as it might cause malfunction of the equipment.

Power supply

AC Power to the ADE is provided by a separate, breakered, power cable.

Do not operate in an explosive atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep away from live circuits

Operating personnel must not remove equipment covers. Component replacement and internal adjustment must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

SAFETY: INTERNAL BATTERY

The main PCB inside the LMXP, and inside the TICU, each contain a lithium battery. These batteries should last for many years but if replacement is required, use caution. These batteries are only to be replaced by a technician authorized by Cobham SATCOM to perform such service.

	***CAUTION*** - RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

Failure to comply with the rules above will void the warranty!

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2. Introduction

WARNING: *RF Radiation Hazard - This stabilized antenna system is designed to be used with transmit/receive equipment manufactured by others. Refer to the documentation supplied by the manufacturer which will describe potential hazards, including exposure to RF radiation, associated with the improper use of the transmit/receive equipment. Note that the transmit/receive equipment will operate independently of the stabilized antenna system.*

The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.

2.1. General System Description

Your system includes a fully stabilized antenna that has been designed and manufactured so as to be inherently reliable, easy to maintain, and simple to operate. The equipment essentially permits unattended operation except for start-ups or when changing to different transponders, or satellites.

2.2. Purpose

This shipboard Transmit-Receive (TXRX) system provides you with two-way satellite voice/data broadband communications while underway on an ocean-going vessel. This can be used to provide a wide variety of telephone, fax and high speed data applications. Your antenna system can transmit to and receive from any desired C-band satellite which has adequate signal coverage in your current geographic area. This input will be distributed to your satellite modem and then to all of your other below decks computer, fax and telephone equipment.

2.3. Other Inputs to the System

Multi-conductor cables from Ship's Gyro Compass, GPS, phone, fax and computer equipment may be connected in the system.

2.4. System Components

This TXRX system consists of two major groups of equipment: an above-decks group and a below-decks group. Each group is comprised of, but is not limited to, the items listed below. All equipment comprising the Above Decks is incorporated inside the radome assembly and is integrated into a single operational entity. For inputs, this system requires only an unobstructed line-of-sight view to the satellite, Gyro Compass input and AC electrical power.

For more information about these components, refer to the Basic System Information section of this manual.

A. Above-Decks Equipment (ADE) Group

1. Stabilized antenna pedestal
2. Antenna Reflector
3. C-Band Feed Assembly with LNB(s)
4. C-Band RF Equipment which may include C-Band High Power Amplifier(s)
5. Ku-Band Feed Assembly with LNB(s)
6. Ku-Band RF Equipment which may include C-Band High Power Amplifier(s)
7. Radome Assembly

B. Below-Decks Equipment Group

1. Media Xchange Point (MXP)
2. Splitter with desired number of outputs (one output to the ACU and one output to the Satellite Modem are required).

3. Satellite Modem and other below decks equipment required for the desired communications purposes.
4. Spectrum Analyzer (Optional)
5. Control, RF and Other cable connections

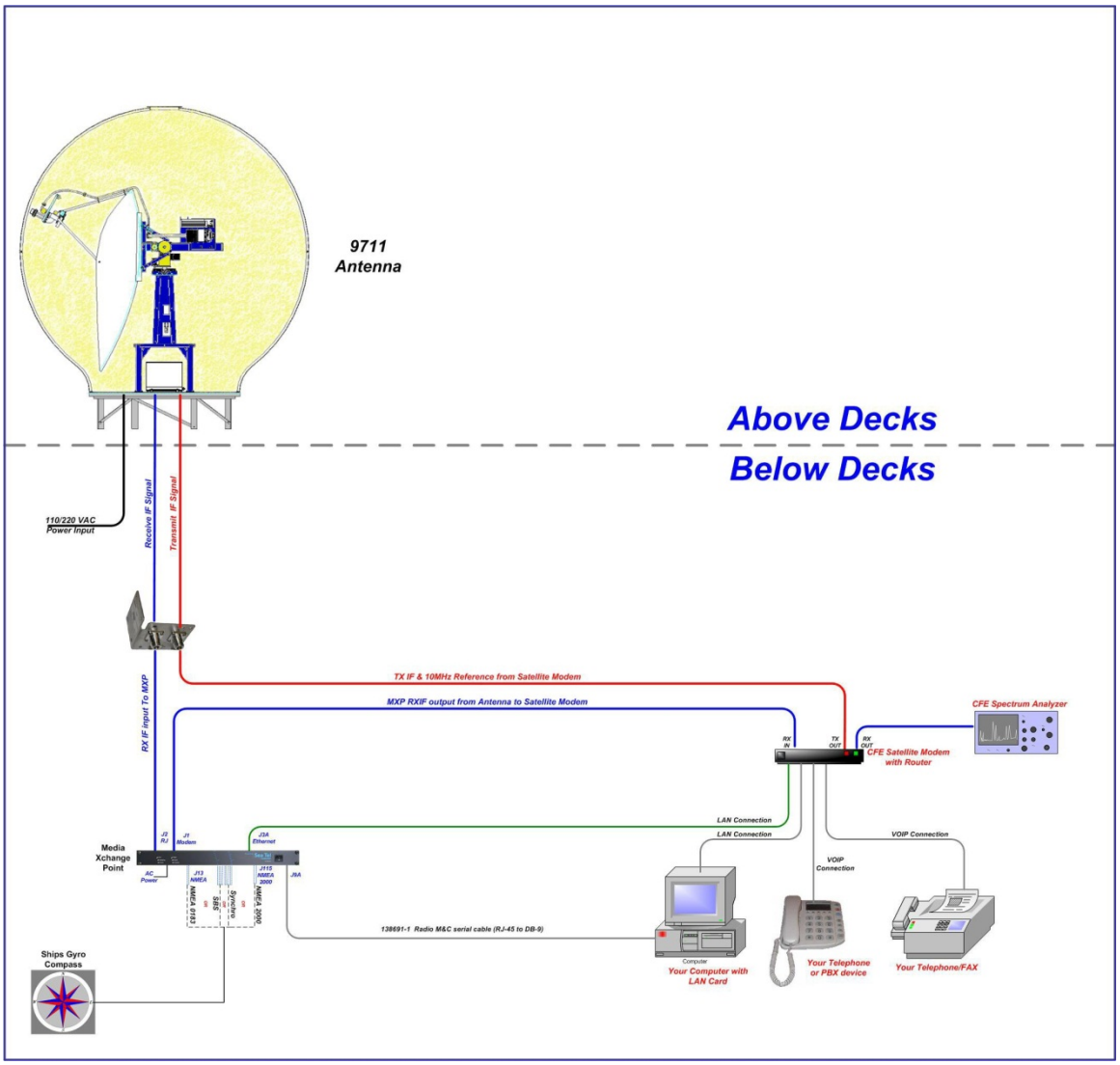


Figure 1 -1 Series 11 TXRX Simplified Block Diagram

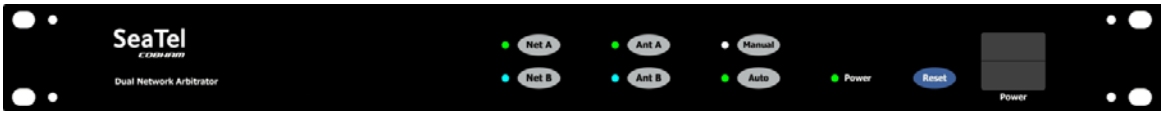
2.5. Dual Antenna Configuration

Sometimes, due to very large blockage conditions, you may need to install a dual antenna configuration to provide uninterrupted services. Two full antenna systems are installed and the MXP control outputs are connected to an arbitrator switch panel which then is connected to the below decks equipment. NOTE: The RXIF from EACH antenna MUST be connected to the RF IN on the rear panel of its respective MXP then RFOUT is connected to the RXIF input of the Dual Antenna Arbitrator. This connection scheme is required for MXP "A" to be able to control Antenna "A" (and ONLY Antenna "A") AND MXP "B" to be able to control Antenna "B" (and ONLY Antenna "B").

You will program the blockage zone(s) for each of the two antennas (refer to Setup – Blockage Zones). The blockage output from the each of the MXPs is connected to the arbitrator panel to control it. The blockage output terminal of each MXP provides a "blocked" output to the arbitrator its respective antenna is within a blockage zone programmed into that MXP. When not blocked the SW2 terminal output(s) will signal an "unblocked" state..

When one antenna is blocked, its blockage output will command the arbitrator panel to switch services to the modem from that antenna to the other antenna. The arbitrator panel provides a logic latch to prevent excess switching when the ship heading is yawing, therefore, causing if the antenna to be repeatedly blocked – unblocked – blocked.

2.6. Dual Network Arbitrator



Demand for greater bandwidth throughputs has led to service offerings that include access to multiple networks from the vessel. To facilitate this a dual network (two modems) configuration is required.

This can be a single antenna – dual network configuration which allows the ship to access either of two networks. One antenna system is installed and its' ACU control output is connected to a dual network arbitrator switch panel which is also connected to two satellite modems, and other below decks equipment if provided.

A dual antenna – dual network configuration allows the ship to access to two networks simultaneously. Two full antenna systems are installed and the two ACU control outputs are connected to a dual network arbitrator switch panel which is also connected to two satellite modems, and other below decks equipment if provided.

Refer to the appropriate installation chapter for the model of the Sea Tel antenna systems that you will be installing.

You will program the blockage zone(s) and optimize all other settings for best "on-satellite" performance for each of the two Sea Tel antennas.

The following signals pass through the arbitrator to/from the ACUs and the Satellite Modem(s):

- TX IF signal to the selected antenna from the selected Satellite Modem. 10 MHz reference is also passed when provided by the modem.
- RX IF from the selected antenna to the selected Satellite Modem.
- Blockage control output from each ACU provides status of the antenna (available or blocked) to the arbitrator.
- GPS position - output from each antenna to the arbitrator. A setting in the in the arbitrator determines which GPS signal gets routed to the satellite modem(s).
- Receive Lock signal from the selected Satellite Modem(s) is routed to both ACUs to enable each of the antennas to track the appropriate satellite/beam.

In single network mode, when one antenna is blocked, its blockage output will command the arbitrator panel to switch services from that antenna to the other antenna. The arbitrator panel provides a logic latch to prevent excess switching when the ship heading is yawing, therefore, causing either antenna to be repeatedly blocked – unblocked – blocked.

In dual network mode, if one antenna becomes blocked there is no available antenna to switch to, so that network will be out of service until the antenna is no longer blocked.

2.7. Automatic Beam Switching (ABS)

ABS is a method of communicating remotely via an overhead channel, or locally from the modem, to reconfigure the ACU(s) to use a different beam on the same satellite or to use a different satellite. The modems include commands which allow remotely setting all of the necessary parameters and to command the targeting of the desired satellite

2.8. OpenAMIP™, ROAM or VACP

These each have standardized language incorporated into their (iDirect, Comtech & STM) modems which communicates automatic beam switching settings from their options file to the Sea Tel ACU(s). This provides the network a means of controlling automatic beam switching by the settings in the options file in the remote modem.

2.9. FCC Compliance

This antenna system, with current software, contain FCC compliant supervisory software to continuously monitor the pedestal pointing error. This supervisory software will trip an error flag, which will automatically cease transmission within 100 milliseconds, if the pointing error should exceed 0.5 degrees. Transmission will not resume until the pointing error drops below 0.2 degrees.

To be compliant with these FCC requirements, the "Transmit Mute" output of the Sea Tel below decks controller must be connected to the "Mute Input" of the satellite modem via serial or via an Ethernet connection to the modem.

2.10. Cyber Security Caution

Sea Tel Antenna systems are not intended to be connected directly to the Internet. They must be connected behind a dedicated network security device such as a firewall. In addition, we highly recommended that you change default passwords. This is an extremely important consideration that must be taken into account as part of commissioning procedures as attackers with malicious intent (after easily obtaining default passwords and identify internet-connected systems) can be rendered a system inoperable.

For clarification purposes, the factory default Passwords/Configurations are only intended for initial production testing/verification purposes and it is an assumed responsibility of the installing partner to change and record the login credentials and is shared only with persons whom are directly responsible for operation/maintenance of the system. Instructions on how to change passwords may be located within the system manual.

3. Site Survey

There are three objective of the site survey. The first is to find the best place to mount the antenna and the BDE. The second is to identify the length and routing of the cables and any other items or materials that are required to install the system. The third is to identify any other issues that must be resolved before or during the installation.

3.1. Site Selection Aboard The Ship

The radome assembly should be installed at a location aboard ship where:

- The antenna has a clear line-of-sight to view as much of the sky (horizon to zenith at all bearings) as is practical.
- X-Band (3cm) Navigational Radars:
  - The ADE should be mounted more than 0.6 meters/2 feet from 2kW (24 km) radars
  - The ADE should be mounted more than 2 meters/8 feet from 10kW (72 km) radars
  - The ADE should be mounted more than 4 meters/12 feet from 160kW (250km) radars
- S-Band (10cm) Navigational Radars:
  - If the ADE is/has C-Band it should be mounted more than 4 meters/12 feet from the S-band Radar.
- The ADE should not be mounted on the same plane as the ship's radar, so that it is not directly in the radar beam path.
- The ADE should be mounted more than 2.5 meters/8 feet from any high power MF/HF antennas (<400W).
- The ADE should be mounted more than 4 meters/12 feet from any high power MF/HF antennas (1000W).
- The ADE should also be mounted more than 4 meters/12 feet from any short range (VHF/UHF) antennae.
- The ADE should be mounted more than 2.5 meters/8 feet away from any L-band satellite antenna.
- The ADE should be mounted more than 3 meters/10 feet away from any magnetic compass installations.
- The ADE should be mounted more than 2.5 meters/8 feet away from any GPS receiver antennae.
- Another consideration for any satellite antenna mounting is multi-path signals (reflection of the satellite signal off of nearby surfaces arriving out of phase with the direct signal from the satellite) to the antenna. This is particularly a problem for the onboard GPS, and/or the GPS based satellite compass.
- The ADE and the BDE should be positioned as close to one another as possible. This is necessary to reduce the losses associated with long cable runs.
- This mounting platform must also be robust enough to withstand the forces exerted by full rated wind load on the radome.
- The mounting location is robust enough that it will not flex or sway in ships motion and be sufficiently well re-enforced to prevent flex and vibration forces from being exerted on the antenna and radome.
- If the radome is to be mounted on a raised pedestal, it ***MUST*** have adequate size, wall thickness and gussets to prevent flexing or swaying in ships motion. In simple terms it must be robust.

If these conditions cannot be entirely satisfied, the site selection will inevitably be a "best" compromise between the various considerations.

3.2. Antenna Shadowing (Blockage) and RF Interference

At the transmission frequencies of this satellite antenna system, any substantial structures in the way of the beam path will cause significant degradation of the signal. Care should be taken to locate the ADE so that it has direct line-of-sight with the satellite without any structures in the beam path through the full 360 degree ships turn. Wire rope stays, lifelines, small diameter handrails and other accessories may pass through the beam path in limited numbers; however, even these relatively insignificant shadows can produce measurable signal loss at these frequencies.

3.3. Mounting Foundation

3.3.1. Mounting on Deck or Deckhouse

While mounting the ADE on a mast is a common solution to elevate the ADE far enough above the various obstructions, sometimes the best mounting position is on a deck or deckhouse top. These installations are inherently stiffer than a mast installation as the design of the deck/deckhouse structure is prescribed by the ship's classification society. In the deck/deckhouse design rules, the minimum plating and stiffener guidelines are chosen to preclude high local vibration amplitudes.

Most installations will have a base frame with multiple attachment points around the perimeter of the base frame to mount the ADE onto a deck or deckhouse structure of the ship. The base frame may be mounted using the supplied legs & braces to raise the ADE above the deck for radome hatch access. The base frame may be directly attached to the deck, in which case the access panel in the floor of the base frame cannot be utilized. In this case, the installation must allow acces through a door in one of the side panels or an access opening directly under the hacth. Some care must be taken to ensure the mounting pedestal is properly aligned with the stiffeners under the deck plating.

Alternately, a specifically designed and stiffened mast may be used to mount the base frame above the deck; although, this should only be attempted if sufficient deck space high on the ship is not available.

3.3.2. ADE Mounting Considerations

Mounting the radome directly on the deck, or platform prevents access to the hatch in the base of the radome unless an opening is designed into the mounting surface to allow such entry. If there is no access to the hatch the only way to service the antenna is to remove the radome top.

Ladder rungs must be provided on all mounting stanchions greater than 3-4 feet tall to allow footing for personnel safety when entering the hatch of the radome.

The recommended cable passage is through the bottom (near center) of the radome base, down through the ADE support pedestal (if used), through the deck and into the interior of the ship.

3.3.3. Sizing of the support pedestal

The following should be taken into account when choosing the height of a mounting support stand:

1. The height of the pedestal should be kept as short as possible, taking into account recommendations given in other Sea Tel Guidelines.
2. The minimum height of the pedestal above a flat deck or platform to allow access into the radome for maintenance should be 0.6 meters (24 inches).
3. The connection of the ADE mounting plate to the stanchion and the connection of the pedestal to the ship should be properly braced with triangular gussets (see graphic above). Care should be taken to align the pedestal gussets to the ship's stiffeners as much as possible. Doublers or other reinforcing plates should be considered to distribute the forces when under-deck stiffeners are inadequate.
4. The diameter of the pedestal stanchion shall not be smaller than 100 millimeters (4 inches). Where the ADE base diameter exceeds 1.5 meters (60 inches), additional stanchions (quantity greater than 3) should be placed rather than a single large stanchion.
5. Shear and bending should be taken into account in sizing the ADE mounting plate and associated gussets.
6. Shear and bending must be taken into account when sizing the pedestal to ship connection.

7. All welding should be full penetration welds –V-groove welds with additional fillet welds – with throats equivalent to the thickness of the thinnest base material.
8. For an ADE mounted greater than 0.6 meters (24 inches) above the ship's structure, at least one (1) foot rung should be added. Additional rungs should be added for every 0.3 meter (12 inches) of pedestal height above the ship's structure.
9. For an ADE mounted greater than 3 meters (9 feet) above the ship's structure, a fully enclosing cage should be included in way of the access ladder, starting 2.3 meters (7 feet) above the ship's structure.

3.4. Mounting Height and Fore-Aft Location

Installations with mast or deck vibrations at frequencies between 2 and 15 Hertz have been identified by Sea Tel as causing problems with the isolation systems of the ADE. Preventing problems prior to installation due to these vibrations is one of the primary considerations in choosing where to mount the antenna.

In some installations, though, the combination of mounting height, fore-aft location and ship motion can impart significant accelerations on the entire ADE. Installations where the ADE is situated high on the ship – usually at the top of a mast – places the ADE is a position where the low frequency ship motion in roll and/or pitch creates two accelerations – tangential and radial. These accelerations vary in a periodic function, out-of-phase from the ship response to the wave motions.

Radial acceleration is the acceleration acting on the mass of the ADE pulling away from the center of the axis (roll or pitch). In this sense, it would be a force trying to 'pull' the ADE away from the ship. We normally are not too concerned with radial acceleration, since it must become far greater than gravity to have a detrimental effect on the ADE.

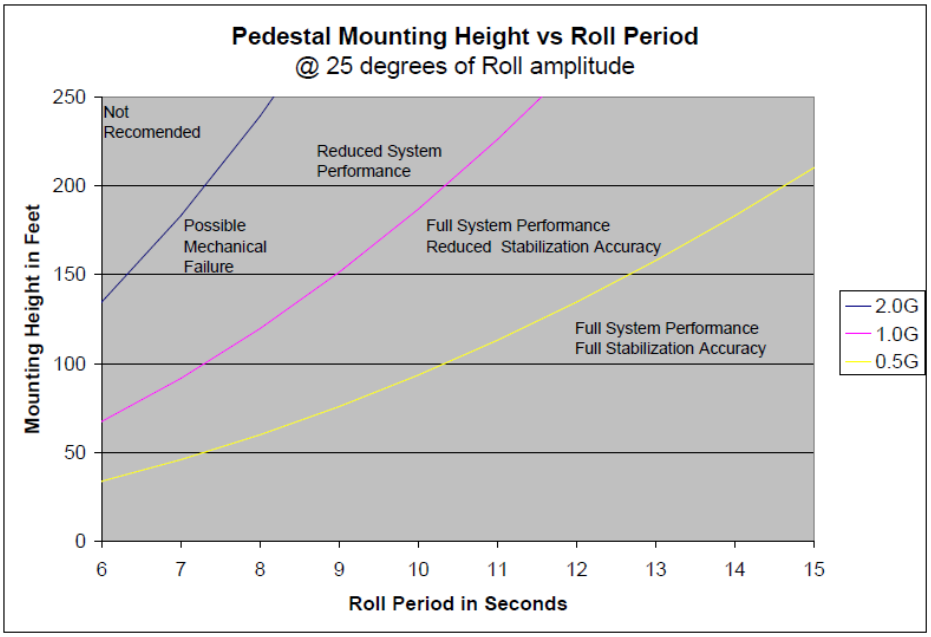
Tangential acceleration is the acceleration acting on the mass of the ADE pulling across the center of the axis (roll or pitch). This acceleration becomes a force trying to pull the ADE to the side. The tangential acceleration has an effect on both the strength of the ADE pedestal and the tracking accuracy of the control algorithm.

The effect of tangential acceleration is felt by the structure of the ADE before it truly affects the tracking accuracy. For instance, Sea Tel normally accepts that a tracking error of 0.1 degrees RMS at 0.5 G to be within acceptable error margins. A 0.5 G tangential acceleration on the ADE means that ½ of the weight of the ADE is acting sideways on the pedestal structure.

The higher up you mount the antenna above the pivot point of the ship the higher the tangential acceleration (g-force) exerted on the antenna will be (see chart below). When the g-force exerted on the antenna is light, antenna stabilization and overall performance will not be affected.

If the g-force exerted on the antenna is high enough (> 1 G), antenna stabilization and overall performance will be affected.

If the g-force exerted on the antenna is excessive (1-2 Gs), the antenna will not maintain stabilization and may even be physically damaged by the g-force.



3.5. Mast Configurations

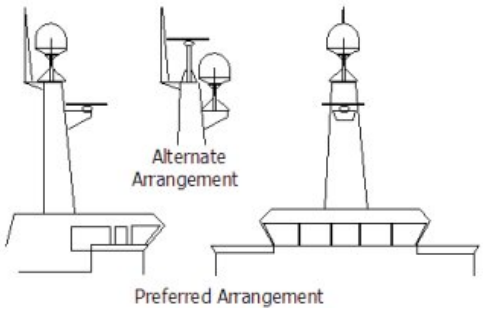
Sea Tel recommends the ADE be mounted on the ship in a location which has both a clear line-of-sight to the target satellites in all potential azimuth/elevation ranges and sufficient support against vibration excitement. If possible, mounting the ADE pedestal directly to ship deckhouse structures or other box stiffened structures is preferred. However, in many cases, this imposes limits on the clear line-of-sight the antenna system has.

Often the solution for providing the full azimuth/elevation range the antenna needs is to mount the ADE on the ship's mast. Unfortunately, masts do not consider equipment masses in design and often have harmonic frequencies of their own.

For these large systems, the mast for the ADE should be designed specifically for the ADE. Other equipment may be mounted alongside, but the mast should be configured to accept the mass, loads and resonance of the ADE primarily. The following sections describe various mast configurations and some considerations for mast design.

3.5.1. Vertical Masts

Vertical masts are a very ancient and common mast design. In essence, it is the mast derived from the sailing mast and adapted for mounting the ever-increasing array of antennae which ships need to communicate with the world. This drawing of a vertical mast shows the preferred mounting of the ADE center-line above the plane of the radar. Alternatively the ADE is mounted below the plane of the radar signal

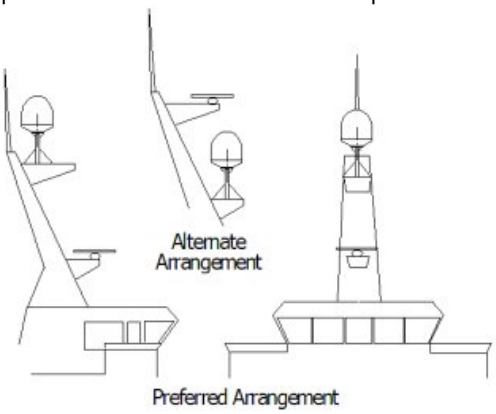


Vertical masts are most commonly found on cargo ships – they are simple, inelegant and functional. They are also fairly stiff against torsional reaction and lateral vibrations, as long as the ADE is mounted on a stiff pedestal near the vertical centerline of the mast. If centerline mounting is impractical or otherwise prohibited, the mast platform the ADE is mounted on should be checked for torsional vibration about the centerline of the mast and the orthogonal centerline of the platform.

If the estimated natural frequency of the mast or platform is less than 35 Hertz, the mast or platform should be stiffened by the addition of deeper gussets under the platform or behind the mast.

3.5.2. Raked Masts

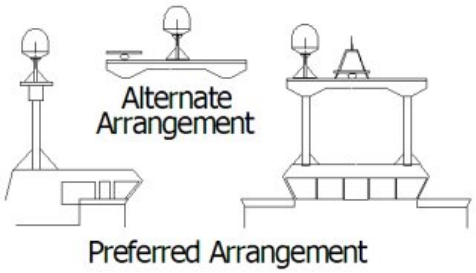
Raked masts are found on vessels where the style or appearance of the entire vessel is important. Again, the inclined mast is a direct descendant from the masts of sailing ships – as ship owners wanted their vessels to look more unique and less utilitarian, they 'raked' the masts aft to make the vessel appear capable of speed. This drawing shows a raked mast, again with the preferred ADE mounting above the radar and alternate with the ADE below the radar.



Raked masts pose special problems in both evaluating the mast for stiffness and mounting of antennae. As can be seen in the drawing, all antennae must be mounted on platforms or other horizontal structures in order to maintain the vertical orientation of the antenna centerline. This implies a secondary member which has a different natural frequency than the raked mast's natural frequency. In order to reduce the mass of these platforms, they tend to be less stiff than the main box structure of the raked mast. Thus, they will have lower natural frequencies than the raked mast itself. Unfortunately, the vibratory forces will act through the stiff structure of the raked mast and excite these lighter platforms, to the detriment of the antenna.

3.5.3. Girder Masts

Girder masts are large platforms atop a pair of columns. Just like girder constructions in buildings, they are relatively stiff athwart ship – in their primary axis – but less stiff longitudinally and torsionally. An example of a girder mast is shown in this drawing, with the preferred ADE mounting outboard and above the radar directly on one of the columns and alternate with the ADE centered on the girder above the plane of the radar.



The greatest weakness of girder masts is in torsion – where the girder beam twists about its vertical centerline axis. As with all mast designs discussed so far, mounting the antenna in line with the vertical support structure will reduce the vibration tendencies. Mounting the antenna directly above the girder columns provides ample support to the antenna pedestal and locates the antenna weight where it will influence the natural frequency of the mast the least.

3.5.4. Truss Mast

Truss masts are a variant on the girder mast concept. Rather than a pair of columns supporting a girder beam, the construction is a framework of tubular members supporting a platform on which the antennae and other equipment are mounted. A typical truss mast is shown in this photograph.

Like a girder mast, truss masts are especially stiff in the athwart ship direction. Unlike a girder mast, the truss can be made to be nearly as stiff in the longitudinal direction. Truss masts are particularly difficult to estimate the natural frequency – since a correct modeling includes both the truss structure of the supports and the plate/diaphragm structure of the platform. In general, the following guidelines apply when determining the adequate support for mounting an antenna on a truss mast:

1. Antenna ADE pedestal gussets should align with platform stiffeners which are at least 200

millimeters in depth and 10 millimeters in thickness.

2. When possible, the antenna ADE pedestal column should align with a vertical truss support.
3. For every 100 kilograms of ADE weight over 250 kilograms, the depth of the platform stiffeners should be increased by 50 millimeters and thickness by 2 millimeters.

Sea Tel does not have a recommended arrangement for a truss mast – the variability of truss mast designs means that each installation needs to be evaluated separately.

3.6. Safe Access to the ADE

Safe access to the ADE should be provided. Provisions of the ship's Safety Management System with regard to men aloft should be reviewed and agreed with all personnel prior to the installation. Installations greater than 3 meters above the deck (or where the access starts at a deck less than 1 meter in width) without cages around the access ladder shall be provided with means to latch a safety harness to a fixed horizontal bar or ring.

The access hatch for the ADE shall be oriented aft, or inboard, when practical. In any case, the orientation of the ADE access hatch shall comply with the SMS guidelines onboard the ship. Nets and other safety rigging under the ADE during servicing should be rigged to catch falling tools, components or fasteners.

3.7. Below Decks Equipment Location

The Antenna Control Unit, Terminal Mounting Strip and Base Modem Panel are all standard 19" rack mount, therefore, preferred installation of these items is in such a rack. The ACU mounts from the front of the rack. The Terminal Mounting Strip and Base Modem Panel mount on the rear of the rack.

The Satellite Modem, router, VIOP adapter(s), telephone equipment, fax machine, computers and any other associated equipment should be properly mounted for shipboard use.

Plans to allow access to the rear of the ACU should be considered.

3.8. Cables

During the site survey, walk the path where the cables will be installed. Pay particular attention to how cables will be installed; such as what obstacles they will be routed around, difficulties that will be encountered and the overall length of the cables. The ADE should be installed using good electrical practice. Sea Tel recommends referring to IEC 60092-352 for specific guidance in choosing cables and installing cables onboard a ship. Within these guidelines, Sea Tel will provide some very general information regarding the electrical installation.

In general, all cable shall be protected from chaffing and secured to a cableway. Cable runs on open deck or down a mast shall be in metal conduit suitable for marine use. The conduit shall be blown through with dry air prior to passing cable to ensure all debris has been cleared out of the conduit and again after passing the cable to ensure no trapped moisture exists. The ends of the conduit shall be sealed with cable glands (preferred), mastic or low VOC silicon sealant after the cables have been passed through.

Cables passing through bulkheads or decks shall be routed through approved weather tight glands.

3.8.1. ADE/BDE Coaxial Cables

The first concern with the coaxial cables installed between the ADE & BDE is length. This length is used to determine the loss of the various possible coax, Heliax or fiber-optic cables that might be used. You should always provide the lowest loss cables to provide the strongest signal level into the satellite modem.

Be sure that the shield(s) of the coaxes are not in contact with the ships ground.

The coaxes must be of adequate conductor cross-sectional surface area for the length of the cable run and that the loop resistance of the cable run is less than 2.0 ohms. Copper clad iron center conductor cables should never be used.

Signal cable shall be continuous from the connection within the ADE radome, through the structure of the ship to the BDE. Splices, adapters or dummy connections will degrade the signal level and are discouraged.

Be careful of sharp bends that kink and damage the cable. Use a proper tubing bender for Heliax bends.

Penetrations in watertight bulkheads are very expensive, single cable, welded penetrations that must be pressure tested.

Always use good quality connectors that are designed to fit properly on the cables you are using. Poor quality connectors have higher loss, can allow noise into the cable, are easily damaged or fail prematurely.

In as much as is possible, don't lay the coaxes on power cables. Don't lay the coaxes on, or directly beside, the cables from a second Sea Tel antenna, Inmarsat antenna and/or GPS antenna that are also passing L-band frequencies. Don't lay the coaxes on, or directly beside, radar cables that may inject pulse repetition noise –as error bits - into your cables.

3.8.2. Antenna Power Cable

Be cautious of length of the run, for voltage loss issues, and assure that the gauge of the wires is adequate for the current that is expected to be drawn (plus margin). Antenna power is recommended (but not required) to be from a UPS, generally the same one that supplies power to the below decks equipment.

Power cables shall comply with the provisions of IEC 60092-350 and -351 as practical. Power cables may be routed through the same conduit as the signal cable from the junction box to the base of the ADE. Power cables shall pass through separate radome penetrations from the signal cable.

The power cable shall be continuous from the UPS (or closest circuit breaker) to the ADE connections within the radome. The power circuits shall be arranged so that 'active,' 'common' and 'neutral' (ground) legs are all made or broken simultaneously. All circuit legs shall be carried in the same cable jacket.

3.8.3. Air Conditioner Power Cable

If your system includes a marine air conditioner, run an AC power cable to it from a breaker, preferably from a different phase of the electrical system than that which supplies power to the ADE & BDE. Be EXTREMELY cautious of length of the run for voltage loss and gauge of the wires for the current that is expected to be drawn.

Power cable shall comply with the provisions of IEC 60092-350 and -351 in so far as practicable. Power cable may be routed through the same conduit as the signal cable from the junction box to the base of the ADE. Power cables shall pass through separate radome penetrations from the signal cable.

The power cable shall be continuous from the closest circuit breaker to the ADE connections within the radome. The power circuits shall be arranged so that 'active,' 'common' and 'neutral' (ground) legs are all made or broken simultaneously. All circuit legs shall be carried in the same cable jacket.

3.8.4. ACU Power Cable/Outlet

The AC power for the ACU and the ADE is not required to be from a UPS (same one that supplies power to the ADE), but it is recommended.

Power cable shall comply with the provisions of IEC 60092-350 and -351 in so far as practicable.

3.8.5. Gyro Compass Cable

Use good quality shielded cables (twisted pairs, individually foil wrapped, outer foil with braid overall is best). You only need 2-wire for NMEA signal, 4-wire for Step-By-Step and 5-wire for Synchro … always use shielded cable. Be cautious of length and gauge of the run for voltage loss issues.

3.9. Grounding

Refer to the Installation chapter for grounding/bonding information.

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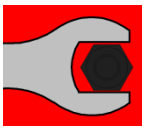
4. Installation in 144" Radome

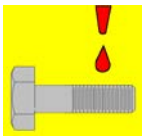
This section contains instructions for unpacking, final assembly and installation of the equipment. ***It is highly recommended that final assembly and installation of the Antenna system be performed by trained technicians.*** Read this complete chapter before starting.

4.1. *General Cautions & Warnings*



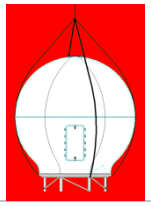
WARNING: *Assure that all nut and bolt assemblies are tightened according to the tightening torque values listed below:*

SAE Bolt Size	Inch Pounds	Metric Bolt Size	Kg-cm
1/4-20	75	M6	75.3
5/16-18	132	M8	150
3/8-16	236	M10	270
1/2-13	517	M12	430

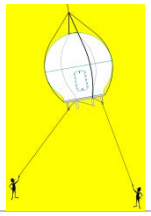


NOTE: *All nuts and bolts should be assembled using the appropriate Loctite thread-locker product number for the thread size of the hardware.*

Loctite #	Description
222	Low strength for small fasteners.
242	Medium strength
638	High strength for Motor Shafts & Sprockets.
2760	Permanent strength for up to 1" diameter fasteners.
290	Wicking, High strength for fasteners which are already assembled.



WARNING: *Hoisting with other than a webbed four-part sling may result in catastrophic crushing of the radome. Refer to the specifications and drawings for the fully assembled weight of your model antenna/radome and assure that equipment used to lift/hoist this system is rated accordingly.*



CAUTION: *The antenna/radome assembly is very light for its size and is subject to large swaying motions if hoisted under windy conditions. Always ensure that tag lines, attached to the radome base frame, are attended while the antenna assembly is being hoisted to its assigned location aboard ship.*

4.2. *Preparation*

Read this entire assembly procedure ***before*** beginning.

Refer to the System Block diagram, General Assembly, Base Frame Assembly, Radome Assembly and Radome Installation Arrangement drawings for your system.

We recommend that you place the crates in the area that you have chosen to assemble each of these major components. It is recommended that you do not unpack the crates until you are ready to sub-assemble and install the equipment.

Assure that you have a large, flat, level, open area to sub-assemble the general assembly and the upper & lower sections of the radome. This area should be clean and free of debris. The site should also provide protection from wind, rain and other adverse weather.

A hoist, or small crane, is needed to assemble these sub-assemblies to form the final ADE Assembly.

As an example, you might sub-assemble everything on the pier where the ship will tie up, then use the crane to put the sub-assemblies together and lift the whole ADE up to the mounting location on the ship.

You can change order of these steps; however, in the end the objective is to have a well sealed radome with flanges that well aligned and are clean of excess caulking.

4.3. Separate the Base Frame & Radome Crates

The Baseframe Crate is banded together with the Radome crate for shipment.

	**CAUTION:** The baseframe crate weighs 650 lbs. Do NOT attempt to move it or lay it down by hand. Use a forklift to lay the crate down and move it, as described below.

1. This is the Base Frame & Radome crates banded together. **ASSURE that these crates are NOT on inclined ground, so that the baseframe does not tip over when the banding is removed.**

Radome Crate

Baseframe Crate

2. Pass a web lifting strap through the hole in the top of the center beam of the base frame pallet. This strap will be used to lower the baseframe crate down.
3. Using tin snips, cut the metal banding.

CAUTION: The baseframe crate weighs 650 lbs. Do NOT attempt to move it or lay it down by hand. Use a forklift to lay the crate down and move it, as described in the following steps. 4. Attach the lifting hook from a crane, or other suitable lifting apparatus, to the lifting strap. Lift only enough to slightly tension the lifting strap.	
5. Slowly pull the top of the crate to tip it away from the radome crate.	
6. Continue to pull and lower the base frame crate down to the ground.	
7. Move the Radome crate to the desired location where the radome top will be assembled.	

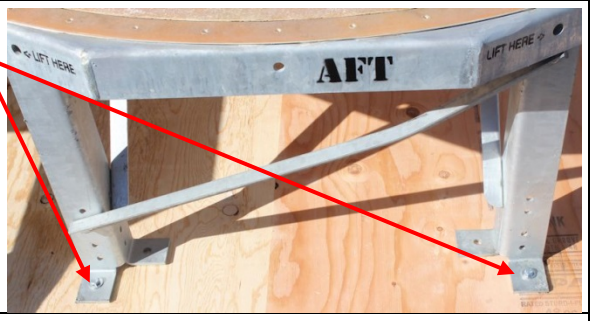
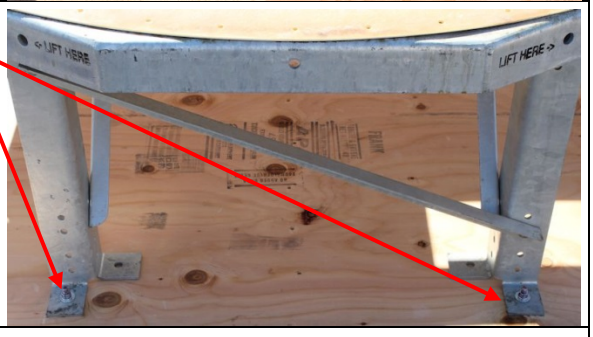
4.4. *Assembling the Above Decks Equipment (ADE)*

	**CAUTION:** To prevent items from being lost or misplaced, do not unpack the crates until you are ready to assemble and install the equipment contained within them.

4.4.1. Base Frame

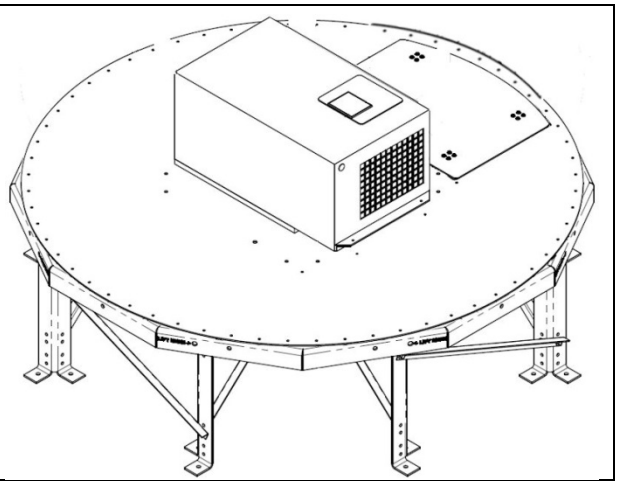
To open and prepare the Base Frame use the following procedure.

1. Remove the screws around 3 sides of the perimeter of the base of the crate. Leave this side (with the Opening) in place →	
2. Lift the top of the crate off of the pallet.	
3. Move the top of the crate away from the work area.	
4. You can assemble the ADE with the base frame bolted to the pallet, or remove it from the pallet.	

5. To remove the base frame from the pallet, remove the 4 lag bolts from the FORE & AFT legs.	
6. Remove the 4 lag bolts from the PORT & STARBOARD legs (bolts are up through the pallet with flat, lock & nut on top of the foot). 7. Discard this hardware.	
8. Move the base frame to the location where you will be assembling the ADE. Make sure you have at least 6 feet of clear working space all the way around the base frame.	

4.4.2. Marine Air Conditioner

If your order included a marine air conditioner:

1. If your order included a marine air conditioner, open its' crate. 2. Install it onto the center of the base pan, properly oriented with the cutouts in the fiberglass base pan. 3. Apply Loctite to and Install the mounting bolts provided with the air conditioner. 4. Tighten to torque spec.	

4.4.3. Pedestal & Reflector

We recommend that you place the Pedestal & Reflector Crate in a location where you will be able to lift these components onto the base frame.

To assemble the General Assembly (GA), the following hardware kit is provided:

67-149076-A KIT, GA ASSEMBLY, 9711 IMA

- 67-149074 KIT, INSTALL, SWITCHABLE C-BAND FEED

Qty Part Number Description

1 ea	117319-4	LOCTITE PRODUCTS, 242 THREADLOCKER, .5 ML
8 ea	114593-162	SCREW, SOCKET HD, 10-32 x 3/8, SS.
8 ea	114581-011	WASHER, LOCK, #10, SS.
8 ea	114580-011	WASHER, FLAT, #10, SS.

- 134174-2 HARDWARE KIT, WR-137, C BAND WAVEGUIDE (FULL)

Qty	Part Number	Description
1 ea	117218-2	GASKET, WR-137, (CPRG FULL)
8 ea	114593-168	SCREW, SOCKET HD, 10-32 x 7/8, SS.
16 ea	114580-011	WASHER, FLAT, #10, SS.
8 ea	114581-011	WASHER, LOCK, #10, SS.
8 ea	114583-011	NUT, HEX, 10-32, SS.

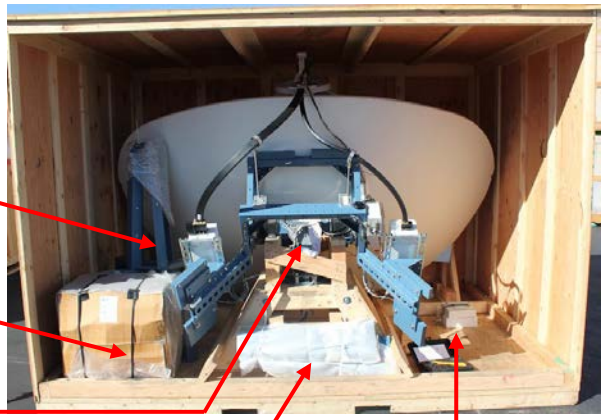
- 136984-2 HARDWARE KIT, LOWER ISOLATION PLATE TO TOP OF AZ POST

Qty	Part Number	Description
4 ea	114586-623	SCREW, HEX HD, 3/8-16 x 1, SS.
8 ea	114580-038	WASHER, FLAT, 3/8, SS. (7/8 OD X 13/32ID) .075 THK
4 ea	114583-031	NUT, HEX, 3/8-16, SS.

- 67-149075 KIT, INSTALL, MOUNTING SPIDER TO BASE FRAME

Qty	Part Number	Description
1 ea	117319-30	LOCTITE PRODUCTS, 2760 THREADLOCKER, 10ML
8 ea	114586-607	SCREW, HEX HD, 5/16-24 x 1-1/2, SS.
8 ea	114580-038	WASHER,FLAT,3/8,SS. (7/8 OD X 13/32ID) .075 THK
8 ea	114580-031	WASHER, FLAT, 3/8, SS.
8 ea	114583-031	NUT, HEX, 3/8-16, SS.

1. Remove the screws around perimeter of the removable panel of the crate.



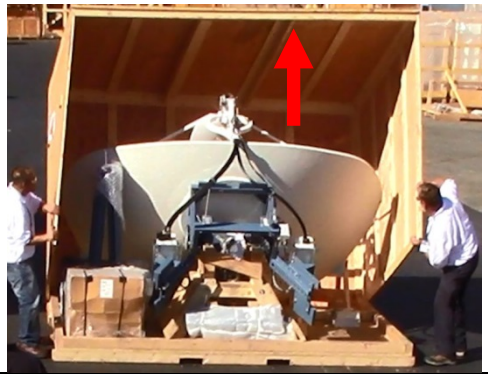
AZ Post & Spider

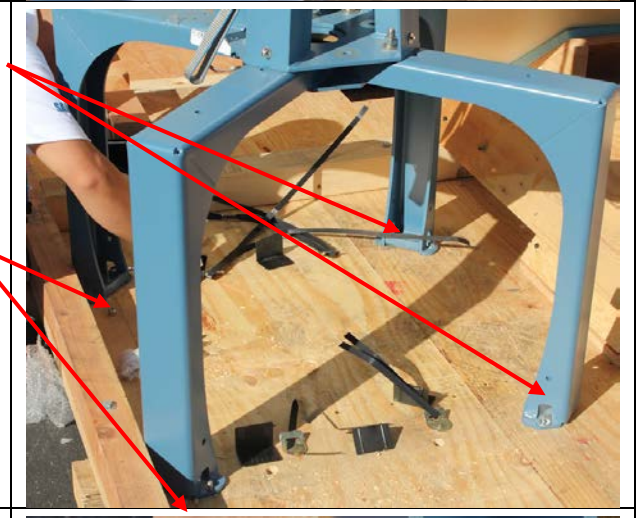
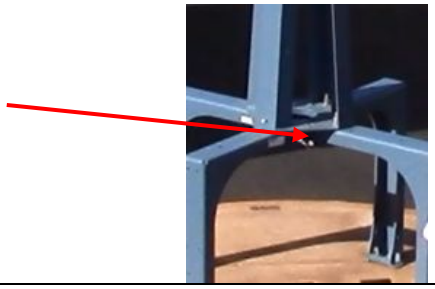
C-Band Feed, Antenna Control Unit and below decks kit boxes.

Upper Pedestal & reflector

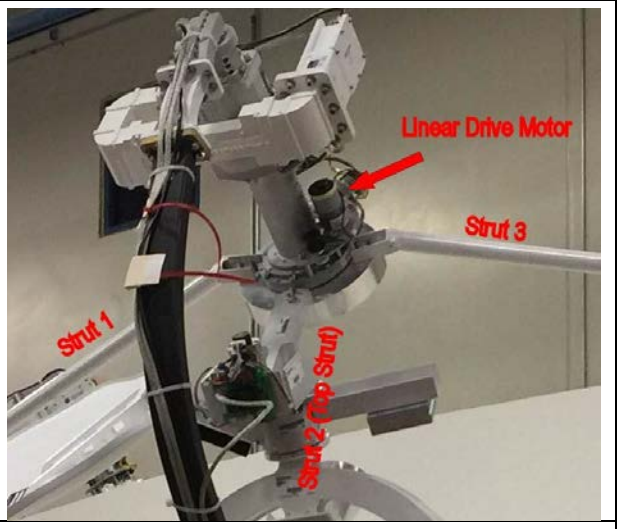
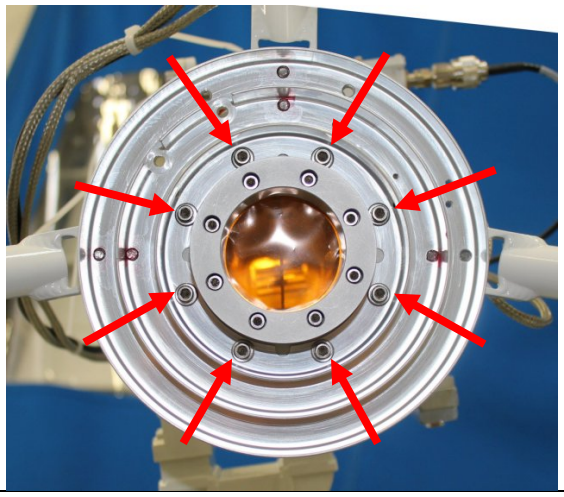
Pedestal Shrouds

Counter-weight & Hardware kits

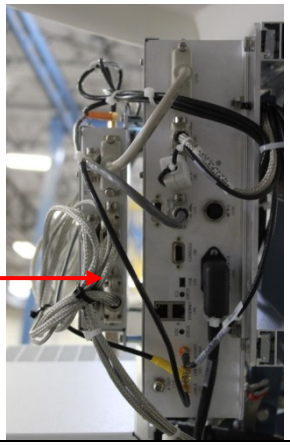
2. Remove the screws around perimeter of the 3 remaining sides at the base of the crate. 3. To avoid damaging the feed or waveguide, tilt the open end of the top of the crate up.	
4. Continue to tilt the top of the crate up off the pallet and lay it on its' back. 5. Move the top of the crate away from the work area.	
6. Cut the bands from and remove the C-band feed, Antenna Control Unit and below decks kit boxes. 7. Move the Antenna Control Unit and below decks kit boxes to a location where they will be protected until you are ready to install the below decks equipment.	
8. Cut the bands from and remove the Louvered panels. 9. Set these aside in a protected location until you are ready to install them.	

10. Cut the bands from and remove the counter-weight and hardware boxes. 11. Set the counter-weight box aside in a protected location until you are ready to rebalance the antenna.	
12. Remove the 4 lag bolts from the spider legs that are farthest from the edge of the pallet. 13. Bolts with Nyloc nuts are up through the pallet and spider legs that are closest to the edge of the pallet.	
14. Using an open end wrench on the underside of the pallet and a wrench or socket from the top, remove the 4 Nyloc nuts on the bolts that are up through the pallet and spider legs. 15. Discard all of this shipping hardware.	
16. There is a ground strap installed on the the Az Post/Spider. When the Az Post/Spider is installed on the base frame this ground strap should be orientated FORWARD (opposite the base hatch.	

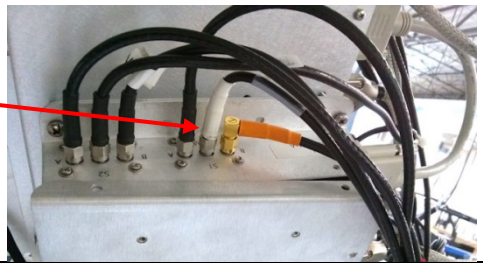
17. Open the GA Assembly Hardware Kit. 18. Set the Az Post/Spider on base frame (ground strap forward) and align the mounting holes in the feet of the spider to the holes in the base pan. 19. Apply Loctite to the 8 spider mounting bolts. 20. Install all 8 of the bolts up through the base frame, base pan and foot of the spider with a flat washer and hex nut on top. 21. Using an open end wrench on the underside of the base frame and a wrench or socket from the top, tighten the 8 hex nuts to torque spec.	
22. Unbolt the reflector brace from the frame and remove it from in front of the lower section of the reflector. 23. Discard this hardware.	
24. Open C-Band feed box. 25. There is an ailgnment pin in the feed that mates into a hole in the scalar plate so that ht efeed cannot be installed incorrectly. 26. Orient and seat the C-Band feed into the scalar plate.	

27. Mount the feed assembly with the Linear drive motor at Strut 3.	
28. Apply Loctite 242 to, install and tighten the eight screws, lock washer & flat washer (see red arrows) through the front of the scalar plate and into the end of the drop-in feed assembly.	
29. Rotate the flexible waveguide and harness up over the top strut/Ku-Band feed. 30. Attach flexible waveguide section to the rigid waveguide section using the 8 screws, flat washer through the adjoined flanges. 31. Install flat washer, lock washer and hex nut on each srcew and tighten all 8 hex nuts to torque spec. 32. Install cable ties on the feed harness to following the cable path around the back of the reflector to the ICU & QOR Switch.	

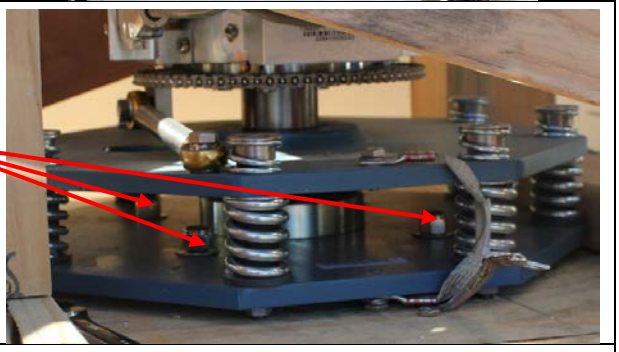
33. Route the C-Band feed harness along the rigid waveguide, around the back/top of the reflector to the right side where the ICU and QOR Switch Box are located.
34. Connect the C-Band feed harness to QOR switch box J4 connector and tighten the retainer screws.



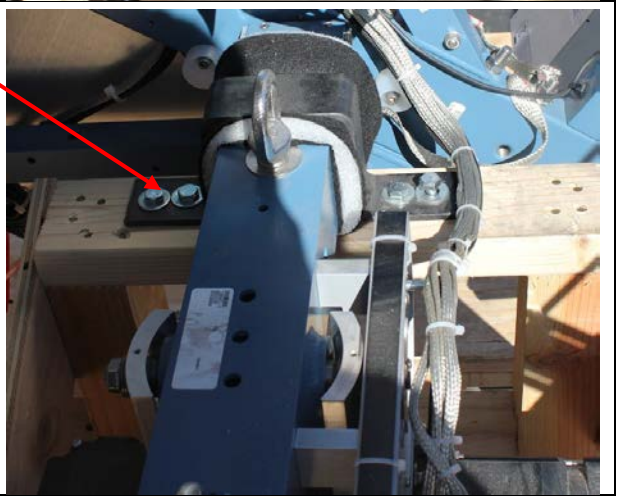
35. Connect the C-Band LNB coax to S1A on the top of the QOR switch box.



36. Remove the 4 nylock nuts from the bolts that pass up through the wood and lower isolation plate.
37. Discard this hardware.



38. Remove the 4 bolts in the U-bracket that restrains the Right side (shown) of the cross-level beam.
39. Remove the 4 bolts in the U-bracket that restrains the Left side (hidden in foreground) of the cross-level beam.
40. Remove the foam padding from both sides of the cross-level beam.
41. Discard this hardware.



42. Pass lifting straps through eyes in the top of the cross-level beam. These starps must be long enough to clear the top of the waveguides (as seen in the next picture). 43. Attach these 2 straps to a crane or orther suitable lifting mechanism.	
44. Slowly & carefully lift the pedestal & reflector assembly up, guiding the spring and cables, up out of the wooden frame.	
45. Hold the pedestal & reflector assembly above the top of the AZ Post. 46. Feed the cables down through the top of the Az post.	

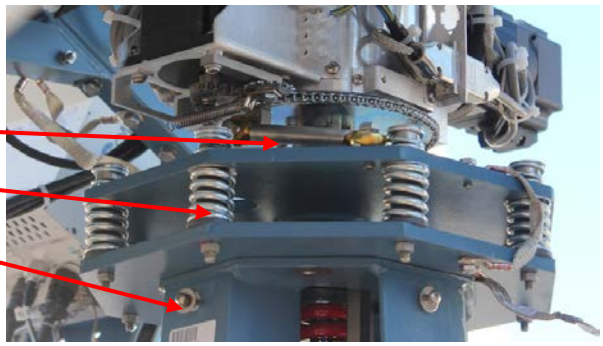
47. Carefully guide the cables & isolation spring down through the top of the Az post as the pedestal & reflector assembly is lowered.

48. Hold the pedestal & reflector assembly just above the top of the AZ Post.

Rod End Assembly

Isolation Assembly

Left side of AZ Post



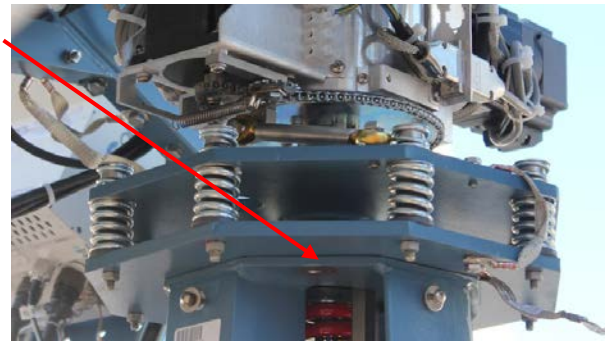
49. Rotate the isolation section of the pedestal to align the rod end assembly to be to the port side (left as viewed if you are standing AFT of the pedestal) of the AZ Post.

50. Align the 4 mounting holes in the lower isolation plate to the holes in the top of the AZ Post.

51. Lower the pedestal & reflector assembly to be on the top of the AZ Post,

52. Apply Loctite to and install the 4 mounting bolts up through the top of the AZ Post & lower isolation plate.

53. Install 4 flat washers & hex nuts on the bolts and tighten to torque spec.



54. Locate the louvered panel which has the breaker box mounted in it (this is the AFT panel). 55. Set it in place at the AFT section of the AZ Post. 56. Connect power to breaker by mating the power plugs. 57. Attach the Ground wire to the burnished threaded hole is the AZ Post leg. 58. Mount the panel using hardware provided (leave all screws lose at this time).	
59. Connect TXIF and RXIF coax cables to the coax interconnect bracket inside the legs of the AZ post. 60. Install the 3 other louvered panels using hardware provided. 61. Tighten all panel mounting hardware. 62. Install ratchet straps (provided in the antenna stow kit) by hooking into the elevation beams and the spider. 63. Tighten straps to restrain movement of the antenna.	

The pedestal & reflector assembly is now installed on the base frame assembly.	

4.4.4. Open the Radome Crate

We recommend that you place the Radome Crate in the area that you have chosen to assemble the Radome onto the base frame.

1. This is the Radome crate. 2. Remove the **clips** around the removable crate wall to expose the contents.	

<table>
<tr>
<td>Radome Panels

Radome hardware kit

Silicon Adhesive

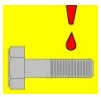
Radome Cap</td>
<td>  </td>
</tr>
<tr>
<td>3. Use diagonal cutters, or shears, to cut the bands that restrain the radome panels in the crate. Do not remove the panels at this time, they will be removed during the radome assembly (refer to the Antenna Manual, Installation chapter).</td>
<td>  </td>
</tr>
<tr>
<td>4. Remove the straps that restrain the radome cap. Leave the radome cap on the pallet with the radome panels for use during the radome assembly.
5. Use diagonal cutters, or shears, to cut the bands that restrain the Hardware kit in the crate. Leave the hardware kit on the pallet with the radome panels for use during the radome assembly.
6. Use diagonal cutters, or shears, to cut the bands that restrain the box of Silicon Adhesive in the crate. Leave the Silicon Adhesive on the pallet with the radome panels for use during the radome assembly.</td>
<td>  </td>
</tr>
</table>

4.4.5. Assembling the Lower Radome Panels

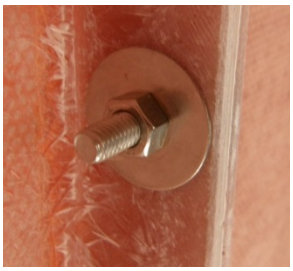
Refer to the Radome Assembly drawing for your system and the procedure below. It is best to have ***at least*** TWO people sub-assembling the radome, one working from the inside and the other outside. Sub-assemble the sections of the radome on a clean, flat location that is free of rocks and debris (i.e. concrete) to assure good horizontal alignment of the panels.

If there are a sufficient number of people available to each hold a panel while an additional person loosely installs a bolt/nut high, mid and low on each flange, the bottom half of the radome can be

assembled very quickly. With three bolts loosely holding each flange the radome will then stand as a loose bowl and the extra 5 people can leave. Loosely install the rest of the hardware in each flange.

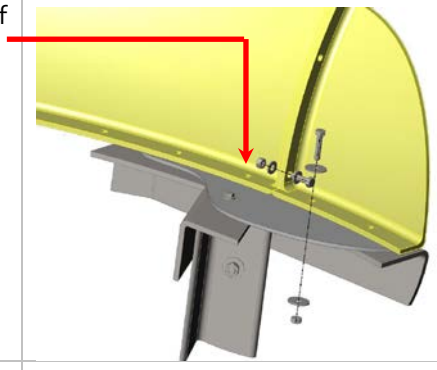


***NOTE:* Unless otherwise indicated, all nuts and bolts should be assembled with Loctite 2760 or its equivalent.**

1. On a flat surface, adjoin two panels (one should be the panel with the door in it) and loosely install hardware in all of the holes in the adjoined vertical flanges. Do NOT tighten the bolts at this time. HINT: A crate, or other object, can be put against the panels to hold them up while additional panes are adjoined.	
2. Assure good horizontal alignment of the panels. Good alignment of the bottom edge of the panels is important for good seal on the base frame and good alignment of the top provides a good seal between the lower and upper panels. 3. To provide a clean caulked seam all around the panels: apply painters' masking tape to the outside perimeter of each of the panels about ¼" from the top, bottom, left and right edges at each flange joint. The tape will be removed just before the radome caulking has had time to set.	
NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a flange with bad alignment.	 **Good flange alignment**  **Bad flange alignment**

4. Set the assembled panels on the base frame assembly and align the center of the door to be directly above the AFT marking on the base frame.
5. Loosely install bolts, fender washers and nuts to attach the panels to the base frame using the hardware provided. Do NOT tighten the bolts at this time.

NOTE: There are eight holes, directly above the legs of the baseframe, that bolts can NOT be fitted into because of the leg hardware beneath. These holes should be plugged, do NOT try to force a bolt into these holes.



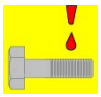
6. Continue adjoining additional panels loosely installing hardware in the mated vertical flanges and in the horizontal flange to the base pan.
7. Continue until all of the lower radome panels are in place.

8. Use small wedges to open a vertical seam wide enough to install a good bead of silicone caulk. Working from top to bottom apply Loctite to and then firmly tighten all of the bolts in that seam (smaller dual beads of caulking can be applied from outside and inside if you prefer).

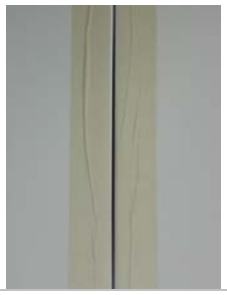
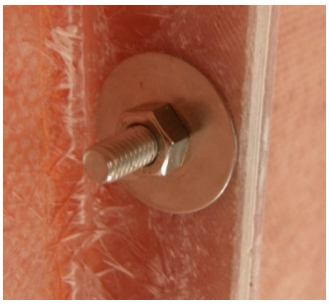
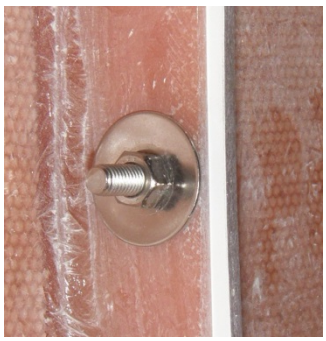
9. Clean excess caulking off of the flange area (inside and out). The empty caulking tubes can be used to clean off the excess caulk without scratching the radome finish.	
10. Repeat caulking, closing and cleaning the vertical flanges until all of the lower panel vertical seams are closed. 11. Remove the tape from the vertical seams.	
12. Insert small wedges between the lower radome panes and the base pan. 13. Start injecting caulking near one wedge. 14. When close to the wedge you are caulking toward, remove it and continue caulking toward the next wedge.	
15. Quickly continue caulking toward the next wedge until all of the wedges have been removed and caulking of the entire horizontal seam is completed. 16. Apply Loctite to and firmly tighten all of the horizontal seam bolts. 17. Clean excess caulking off inside and outside of the radome. 18. Remove tape from the horizontal edges of the lower panels.	
The bottom half of the radome is complete. Next you will assemble the top half and then install it on this lower half.	

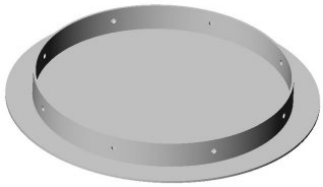
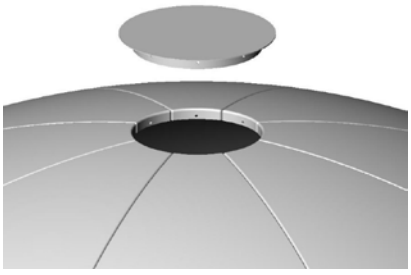
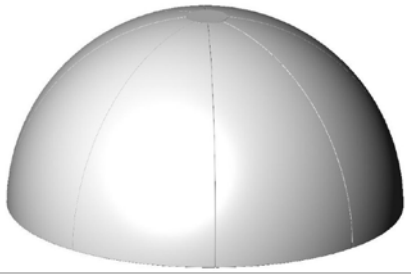
4.4.6. Sub-assemble the upper panels of the 144" Radome Assembly

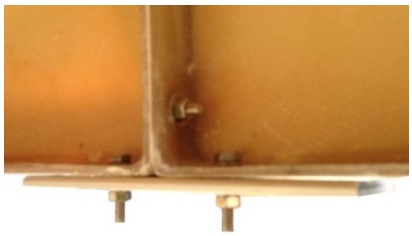
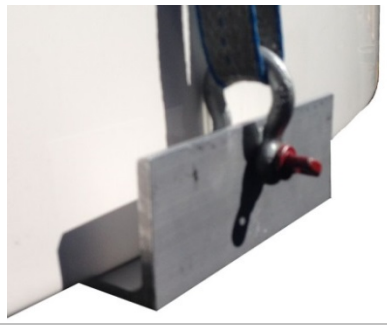
Refer to the Radome Assembly drawing for your system and the procedure below. It is best to have ***at least*** TWO people sub-assembling the radome, one working from the inside and the other outside. Sub-assemble the sections of the radome on a clean, flat location that is free of rocks and debris (ie concrete) to assure good horizontal alignment of the panels.



NOTE: **Unless otherwise indicated, all nuts and bolts should be assembled with Loctite 2760 or its equivalent.**

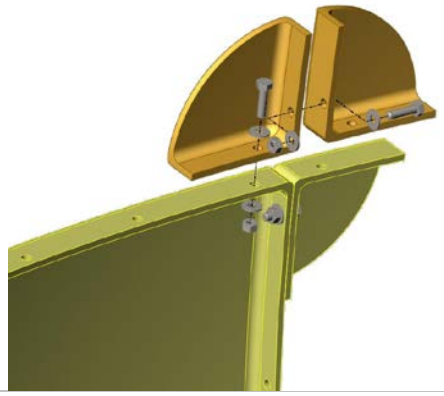
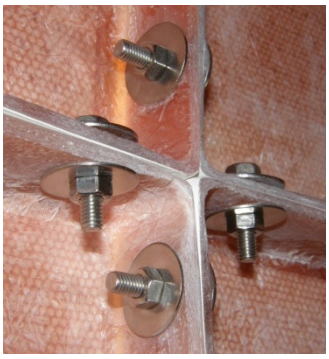
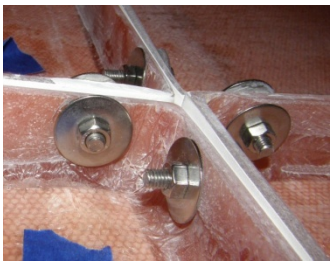
Only 2 people are required to sub-assemble the top of the radome. 1. On a flat surface, adjoin two panels and loosely install a bolt/nut high, mid and low in the adjoined flange. 2. Continue adjoining additional panels loosely installing a bolt/nut high, mid and low on each flange until all six panels have been loosely assembled to form the bottom half of the radome.	
3. The person inside now loosely installs the rest of the hardware in all of the flanges. Do NOT tighten the bolts at this time. **NOTE:** The person who is working inside installing hardware, applying Loctite, tightening hardware and cleaning the inner flanges will remain inside until the cap and lifting brackets are installed.	
4. Assure good horizontal alignment of the panels. Good alignment of the bottom edge of the panels is important for good seal between the lower and upper panels.	
5. To provide a clean caulked seam all around the panels: apply painters masking tape to the outside perimeter of each of the panels about ¼" from the top, bottom, left and right edges at each flange joint. The tape will be removed just before the radome caulking has had time to set.	
NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a flange with bad alignment.	 **Good flange alignment**  **Bad flange alignment**

6. Open each seam wide enough to install a good bead of silicone caulk. Working from top to bottom apply Loctite to and then firmly tighten all of the bolts in that seam (smaller dual beads of caulking can be applied from outside and inside if you prefer).	
7. Clean excess caulking off of the flange areas inside and outside the radome. 8. Repeat caulking, closing and cleaning the vertical flanges until all of the upper panel seams are closed. 9. Remove tape from the vertical seams.	
10. Apply a 3/8" layer of caulking to the under-side of the perimeter flange of radome cap.	
11. (Outside person) Climb onto the upper panel assembly, have someone (third person required only for this step) hand the cap to the person on top of the radome. 12. Insert the cap into the top of the radome with a twisting rotation. This will evenly spread the caulking and align the bolt holes inside the radome top (coordinate with the person inside the radome).	
13. (Inside Person) Install the radome cap using the provided hardware. CAUTION: Do NOT over tighten the hardware. Only tighten until the fiberglass STARTS to flex. 14. Apply additional caulking to fill gaps between the upper panels and the cap. 15. Clean off excess caulking.	
16. The upper section of the radome is now complete. 17. Place short pieces of 2"x4" boards under the perimeter of the radome top to raise it up off of the ground.	

Install 4 radome lifting brackets (PN 131514-2, shown here, can be purchased separately), or other lifting arrangement, to four opposite vertical flange mounting points (every other vertical flange). 18. Hold the bracket under the bottom flange and install a bolt and fender washer down through the hole on one side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket	
19. Install a second bolt and fender washer down through the hole on the other side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket **NOTE:** The excess length of the bolts serves as guide pins when setting the top half of the radome onto the bottom half. The nut on the underside serves as wedges to keep the horizontal seam open to apply caulking. 20. Repeat steps 1 & 2 to install the other 3 brackets under opposing flanges.	
21. From the outside of the radome top, install shackles and web lifting straps to the brackets.	
NOTE: Let the person who was working inside the upper half of the radome out. The upper half of the radome is now ready to lift onto the lower panels.	

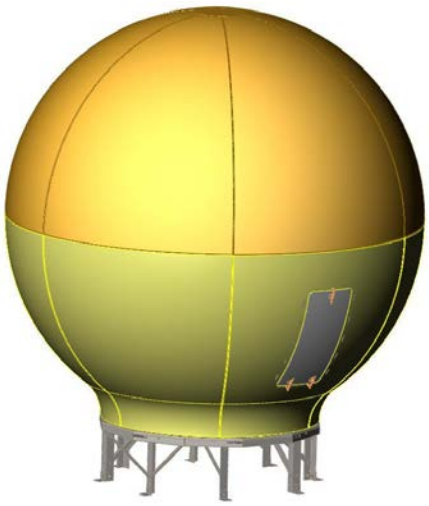
4.4.7. Close the 144" Radome Assembly

Refer to the Radome Assembly drawing for your system and the procedure below.

1. Hoist the upper section of the radome up over the reflector & feed assembly and set it down onto the lower section of the radome. NOTE: The bolts protruding down out of the lifting brackets will act like guide pins to align into the holes in the top of the riser panels. Make sure you align the vertical seams of the upper & lower sections of the radome. NOTE: The brackets themselves will act as spacers to allow the caulking to be applied in the horizontal seam between these two sections of the radome.	
2. Loosely install all of the bolts, fender washers and nuts to attach the upper panels to the using the hardware provided. Do NOT tighten the bolts at this time. 3. Start injecting caulking midway between two brackets. 4. When close to the bracket you are caulking toward, remove the bracket and install hardware in the two vacant holes where the bracket was (make sure you keep the original hardware with the bracket).	
NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a flange with bad alignment.	 **Good flange alignment**  **Bad flange alignment**

5. Continue caulking toward the next bracket, using wedges to keep the horizontal seam open if necessary.
6. Repeat steps 4 & 5 until all four brackets have been removed and caulking of the entire horizontal seam is completed.
7. Assure that all brackets & wedges have been removed, apply Loctite to and firmly tighten all of the horizontal seam bolts.
8. Clean excess caulking off inside and outside of the radome.
9. Remove tape from the horizontal edges of the lower panels.

The ADE Assembly is now complete, ready for web straps to be attached for lifting the ADE onto the ship.



4.5. Preparing to Hoist the ADE

Refer to the Base Frame Assembly drawing for your system and the procedure below.

To obtain a Sea Tel recommended lifting harness, please contact the vendor listed below for price and availability. Reference Manufacturer/Sea Tel Part Number: 119792-A 144 Inch Radome Lifting Harness:

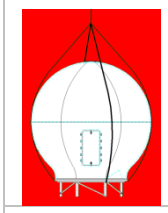
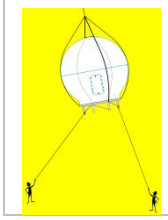
Lift-It Manufacturing Company
4780 Corona Ave.
Los Angeles, CA 90055-3808
Tel: +1 323 582 6076
www.Lift-it.com

1. If not already done, enter the ADE and stow the antenna pedestal using the Stow Kit (provided) and the instruction in the Maintenance section of the antenna manual.
2. Attach the swivel eye-bolts of the Lift-It 144" lifting harness (or eye-bolts or shackles and web straps properly rated for the weight to be lifted) to four of the 8 "Lift Here" lifting point holes around the perimeter of the Base Frame.

3. Attach appropriate length of rope tag lines to the Base Frame.
4. If not already accomplished, remove the shipping bolts that mount the base frame to the pallet.
5. Discard this hardware.

The ADE is now ready to hoist onto the ship.

4.6. Installing The ADE

	***WARNING:*** *Hoisting with other than a webbed four-part sling may result in catastrophic crushing of the radome. Refer to the specifications and drawings for the fully assembled weight of your model Antenna/Radome and assure that equipment used to lift/hoist this system is rated accordingly.*
	***CAUTION:*** *The antenna/radome assembly is very light for its size and is subject to large swaying motions if hoisted under windy conditions. Always ensure that tag lines, attached to the radome base frame, are attended while the antenna assembly is being hoisted to its assigned location aboard ship.*

4.6.1. Hoist the ADE

1. Assure that the antenna is stowed/restrained before hoisting.
2. Using the lifting harness arrangement previously described hoist the antenna assembly to its assigned location aboard ship by means of a suitably-sized crane or derrick.
3. The radome assembly should be positioned with the BOW marker aligned as close as possible to the ship centerline. Any variation from actual alignment can be compensated with the AZIMUTH TRIM adjustment in the antenna control unit, so precise alignment is not required.
4. Bolt, or weld, the feet of the base frame to the mounting surface aboard the ship.

4.6.2. Connecting the ADE

Refer to the System Block diagram, the Antenna Schematic and the general strain relief installation information in the drawings section of this manual.

Sea Tel recommends that separate, dedicated, 220 VAC Power be provided for the Marine Air Conditioner. This cable and breaker must be properly rated for the ***18 AMP Inrush/Startup current*** of this device. Do NOT combine this with the AC Power provided for the Antenna Pedestal and RF Equipment.

1. Install strain reliefs in the desired locations of the base pan where the cable will enter the radome.
2. Route each cable through a strain relief to it's connection point. We recommend that you leave a little excess service length on each cable (this can be left inside the louvered panels of the AZ Post).
3. Remove the AFT louvered panel for access to the breaker and coax interconnect bracket.
4. Connect the Pedestal & RF Equipment AC Power Cable into the breaker box in the AFT louvered panel. Conductors are to be connected as shown on the Antenna Schematic (bottom left). The other end of the AC Power cable must be connected to a suitably rated breaker or UPS.
5. If a Marine Air Conditioner is installed: Route the dedicated, AC Power cable provided for the Marine Air Conditioner to its external transformer on into the Marine Air Conditioner and terminated to the AC terminals inside.
6. Connect the ADE AC Power Cable into the breaker box in the AFT louvered panel. Conductors are to be connected as shown on the Antenna Schematic (bottom left). The other end of the AC Power cable must be connected to a suitably rated breaker or UPS.

7. Connect the TXIF coaxial cable that runs between the above decks and below decks equipment to the TX connector on the interconnect bracket inside the louvered panels of the AZ Post.
8. Connect the RXIF coaxial cable that runs between the above decks and below decks equipment to the RX connector on the interconnect bracket inside the louvered panels of the AZ Post.
9. After the cables are routed as desired, tighten the strain reliefs to provide holding compression on the cables.
10. Reinstall the AFT louvered panel to the AZ Post.

4.6.3. Remove stow Straps

Remove the stow straps from the pedestal and repackage them in the Antenna Stow Kit.

Provide this kit to the responsible person aboard the ship so it can be stored for future use.

4.6.4. ADE Final Checks

Remove all tools, parts and installation debris from inside the radome.

Remove all tools, parts and installation debris from the area around the outside of the radome.

4.7. Installing the Below Decks Equipment

Connect this equipment as shown in the System Block Diagram. Install the equipment in a standard 19 inch equipment rack or other suitable location. Optional slide rails are available for the Sea Tel MXP.

4.7.1. General Cautions & Warnings

	***CAUTION - Electrical Shock Potentials exist on the Gyro Compass output lines.*** *Assure that the Gyro Compass output is turned* ***OFF*** *when handling and connecting wiring to the MXP.*
	***CAUTION - Allow*** *only an* ***authorized dealer*** *to install or service the Sea Tel System components. Unauthorized installation or service can be dangerous and may invalidate the warranty.*

4.7.2. Connecting the BDE AC Power Cables

Connect the AC Power cables that supply power to the Below Decks Equipment (MXP, Satellite Modem, phone, fax, computer and all other equipment) to an outlet strip fed from a suitably rated breaker or UPS.

4.7.3. Media Xchange Point™ (MXP) Connections

4.7.3.1. Ships AC Mains

Connect the power cord from the rear panel of the MXP to AC voltage power source (UPS power recommended).

4.7.3.2. J1 Modem RX

Connect this RXIF Output to the satellite modem RX Input using an appropriate coaxial cable.

4.7.3.3. J2 RJ - Antenna RX

Connect this RXIF Input from the antenna to this port on the rear panel of the MXP using coaxial cable provided

4.7.3.4. J3 A/B & J4 A/B - Ethernet 4 Port 10/100 switch

Ethernet connections to computer, satellite modem LAN devices as desired.

4.7.3.5. J5 SFP Fiber Interface

SFP Gigabit Ethernet connection.

4.7.3.6. J6 Mini-USB Computer M&C Connection

Mini-USB Antenna M&C connection, if desired.

4.7.3.7. J7 USB Host

Not connected - -Future development.

4.7.3.8. J8 Console

Antenna M&C Serial connections.

4.7.3.9. J9 A/B Serial

Computer RJ-45 Serial M&C connections. A is mapped to the Radio serial M&C port of the ICU and B is mapped to the Pass through serial M&C port of the ICU.

4.7.3.10. J10C Modem

RJ-45 Serial M&C connection to Satellite Modem Console Port.

4.7.3.11. J10D OBM

RJ-45 Serial M&C connection to Out of Band Management equipment, if used.

4.7.3.12. J11 Gyro

Terminal Strip for SBS or Synchro Gyro Compass interface connections. Wiring is:

Pin 1	Synchro R1
Pin 2	Synchro R2
Pin 3	Synchro S3 / SBS A
Pin 4	Synchro S2 / SBS B
Pin 5	Synchro S1 / SBS C
Pin 6	SBS COM

4.7.3.13. J12 Aux 232

Auxiliary wired RS-232 connection. Wiring is:

Pin 1 - GND	Ground
Pin 2 - Aux IN1	Modem Lock Input 1 - See modem setup chapter.
Pin 3 - Aux IN2	Modem Lock Input 2 - See modem setup chapter.
Pin 4 - GND	Ground
Pin 5 - SW1	Blockage/Modem Mute Output 1 - See blockage & modem setup chapters.
Pin 6 - SW2	Blockage/Modem Mute Output 2 - See blockage & modem setup chapters.
Pin 7 - SW3A	Dry Contact set 2 - Dry alarm contacts used to provide (programmable) alarm output to other equipment/systems. Switched outputs have ability to use 4.7K pull up or Pull Down and can provide Current sink of 0.5 amps max. Contacts are **Normally Open** for No Alarm state and are **Closed/Shorted** when the programmed alarm state exists.
Pin 8 - SW3B	
Pin 9 - SW4A	Dry Contact set 1 - Same as dry alarm contact set 2.
Pin 10 - SW4B	

4.7.3.14. J13 NMEA 0183

NMEA 0183 I/O connections. The +12 VDC output is only intended to power a very low current consumption device, do NOT exceed **125ma MAX.** Wiring is:

Pin 1	RX+ NMEA
Pin 2	RX- NMEA
Pin 3	TX- NMEA
Pin 4	N/C
Pin 5	GND
Pin6	N/C
Pin 7	GND
Pin 8	TX+ NMEA
Pin 9	+12 VDC (**125ma MAX**)

If your NMEA 0183 Gyro Compass outputs RS-422:

- Connect its' TX+ output to J10 pin 1 (RX+)
- Connect its' TX- output to J10 pin 2 (RX-)

If your NMEA 0183 Gyro Compass outputs RS-232:

- Connect its' GND output to J10 pin 1 (RX+)
- Connect a jumper from pin 1 to J10 pin 5 (GND)
- Connect its' TXD output to J10 pin 2 (RX-)

4.7.3.15. J14 Aux 232

Antenna M&C Serial connections. The +12 VDC output is only intended to power a very low current consumption device, do NOT exceed **125ma MAX.** Wiring is:

Pin 1	N/C
Pin 2	RD
Pin 3	TD
Pin 4	N/C
Pin 5	GND
Pin6	N/C
Pin 7	RTS
Pin 8	CTS
Pin 9	+12 VDC (**125ma MAX**)

4.7.3.16. J15 NMEA 2000

Not connected - -Future development.

4.7.4. Other BDE connections

Connect this equipment as shown in the System Block Diagram. Install the equipment in a standard 19 inch equipment rack or other suitable location. Optional slide rails are available for the Sea Tel MXP.

4.8. BDE Final Checks

4.8.1. Visual/Electrical inspection

Perform a visual inspection of your work to assure that everything is connected properly and all cables/wires are secured.

4.8.2. Electrical - Double check wiring connections

Double check all your connections to assure that it is safe to energize the equipment.

4.9. Setup - Media Xchange Point™ (MXP)

Now that you have installed the hardware, you will need to setup, calibrate and commission the antenna.

You may also need to load/update the modem option file, which is not part of the scope of this manual, contact the airtime provider NOC for guidance.

At the very least, you will need to set up the antenna system for:

- Connect & configure a ships computer for accessing the MXP.
- The gyro compass signal being provided by the ship.
- The tracking receiver frequency settings for the satellite to be used (configure satellites).
- Set up / configure all satellites that the system might use as the ship travels.
- Set up Blockage zone(s) as needed.
- Acquire the desired satellite.
- Optimize targeting (Auto or manual trim).
- Arrange for commissioning & cross-pol isolation testing with the NOC.
- Conduct cross-pol isolation testing with the NOC.
- Conduct other commissioning testing with the NOC (ie P1dB compression point).
- If this is a Dual Antenna installation configuration, you will have to balance the TX levels of the two antennas while online with the NOC (refer to procedure in the Dual Antenna Arbitrator manual).
- It is strongly recommended that you down, and save, the system INI file (contains all of the system parameters). Save this file in a convenient location.

4.10. Cyber Security Caution

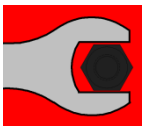
Sea Tel Antenna systems are not intended to be connected directly to the Internet. They must be connected behind a dedicated network security device such as a firewall. In addition, we highly recommended that you change default passwords. This is an extremely important consideration that must be taken into account as part of commissioning procedures as attackers with malicious intent (after easily obtaining default passwords and identify internet-connected systems) can be rendered a system inoperable.

For clarification purposes, the factory default Passwords/Configurations are only intended for initial production testing/verification purposes and it is an assumed responsibility of the installing partner to change and record the login credentials and is shared only with persons whom are directly responsible for operation/maintenance of the system. Instructions on how to change passwords may be located within the system manual.

5. Installation in 168" Radome

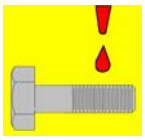
This section contains instructions for unpacking, final assembly and installation of the equipment. ***It is highly recommended that final assembly and installation of the Antenna system be performed by trained technicians.*** Read this complete chapter before starting.

5.1. General Cautions & Warnings



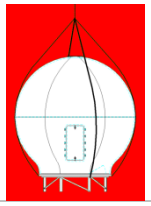
WARNING: *Assure that all nut and bolt assemblies are tightened according to the tightening torque values listed below:*

SAE Bolt Size	Inch Pounds	Metric Bolt Size	Kg-cm
1/4-20	75	M6	75.3
5/16-18	132	M8	150
3/8-16	236	M10	270
1/2-13	517	M12	430

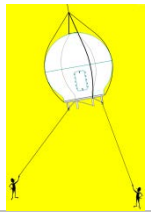


NOTE: *All nuts and bolts should be assembled using the appropriate Loctite thread-locker product number for the thread size of the hardware.*

Loctite #	Description
223	Low strength for small fasteners.
242	Medium strength
638	High strength for Motor Shafts & Sprockets.
2760	Permanent strength for up to 1" diameter fasteners.
290	Wicking, High strength for fasteners which are already assembled.



WARNING: *Hoisting with other than a webbed four-part sling may result in catastrophic crushing of the radome. Refer to the specifications and drawings for the fully assembled weight of your model antenna/radome and assure that equipment used to lift/hoist this system is rated accordingly.*



CAUTION: *The antenna/radome assembly is very light for its size and is subject to large swaying motions if hoisted under windy conditions. Always ensure that tag lines, attached to the radome base frame, are attended while the antenna assembly is being hoisted to its assigned location aboard ship.*

5.2. Preparation

Read this entire assembly procedure ***before*** beginning.

Refer to the System Block diagram, General Assembly, Base Frame Assembly, Radome Assembly and Radome Installation Arrangement drawings for your system.

We recommend that you place the crates in the area that you have chosen to assemble each of these major components. It is recommended that you do not unpack the crates until you are ready to sub-assemble and install the equipment.

Assure that you have a large, flat, level, open area to sub-assemble the general assembly and the upper & lower sections of the radome. This area should be clean and free of debris. The site should also provide protection from wind, rain and other adverse weather.

A hoist, or small crane, is needed to assemble these sub-assemblies to form the final ADE Assembly.

As an example, you might sub-assemble everything on the pier where the ship will tie up, then use the crane to put the sub-assemblies together and lift the whole ADE up to the mounting location on the ship.

You can change order of these steps; however, in the end the objective is to have a well sealed radome with flanges that well aligned and are clean of excess caulking.

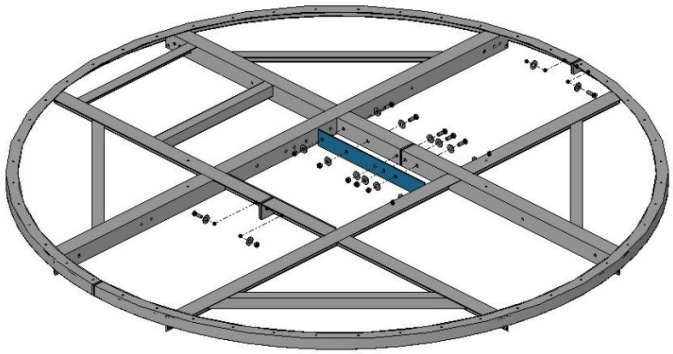
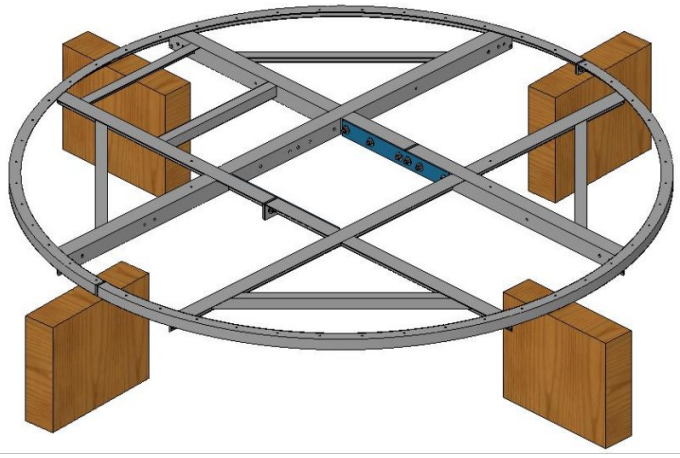
5.3. Assembling the ADE

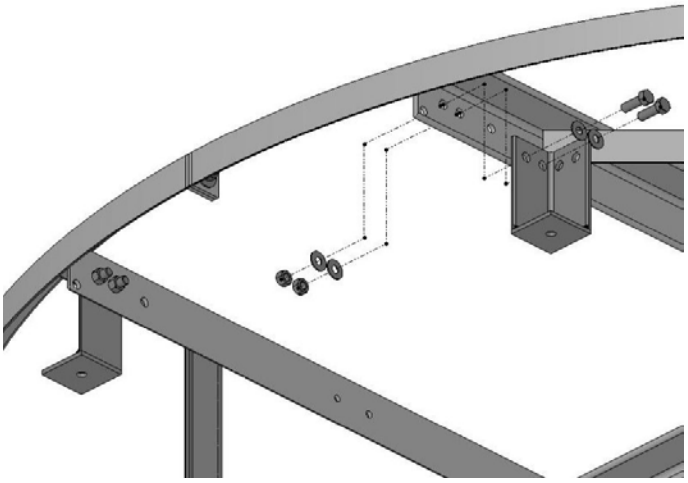
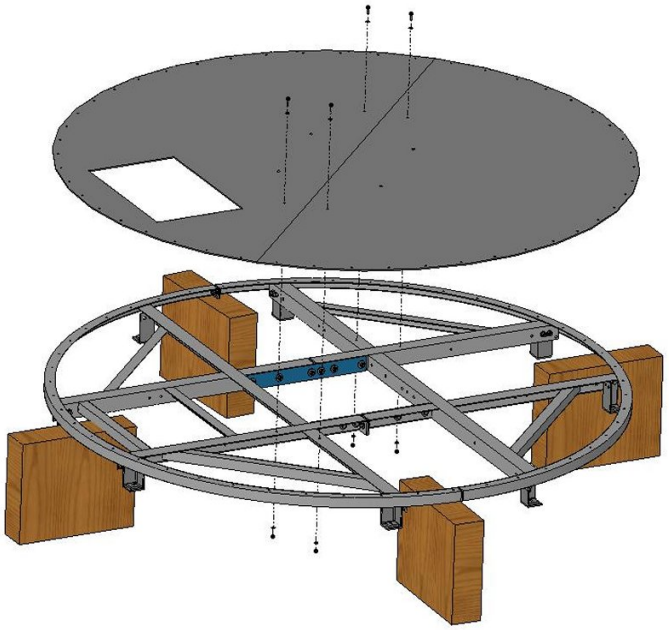
The assembly procedure described below begins by sub-assembling sections of the baseframe, radome and pedestal. Then these are assembled to form the ADE.

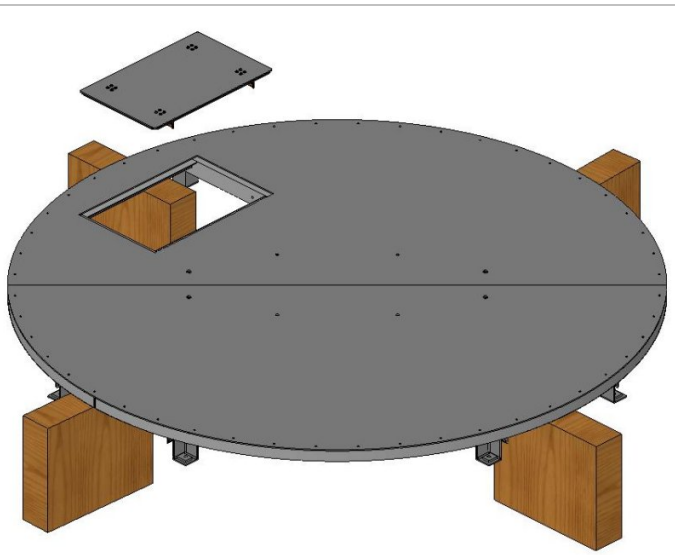
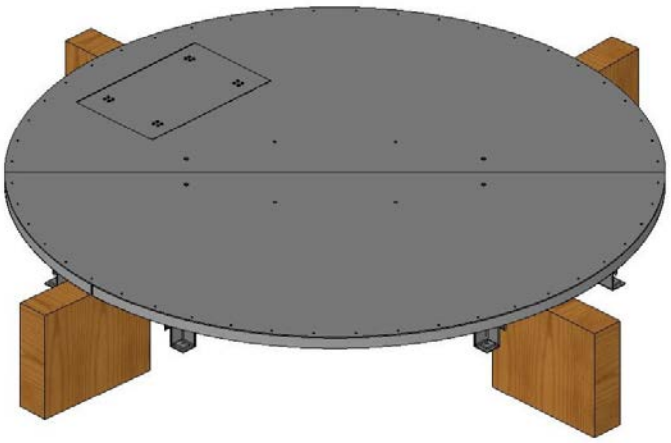
5.3.1. Sub-assemble the Base Frame Assembly

Refer to the Base Frame Assembly drawing for your system and the procedure below.

NOTE: **Unless otherwise indicated, all nuts and bolts should be assembled with Loctite 2760 or its equivalent.**

1. Assemble the two halves of the base frame using the splice plates and hardware provided. Apply Loctite and tighten hardware to specified torque.	
2. Place the radome base frame on temporary support blocks, or jack stands, at least 10 inches high.	

3. Bolt the eight 6 inch feet to the under side of the radome base frame using the hardware provided. Loosely assemble all feet before tightening any of the bolts and apply Loctite. Temporarily remove the support blocks, or jacks, and set the base frame down on the assembly surface to align the feet. Tighten all the hardware to specified torque. Raise the base frame back up onto the support blocks or jacks.	
4. Place the two base pan pieces on the base frame. Install the mounting hardware in the four pan mounting holes. 5. Align the base pan perimeter holes to the mounting holes in the base frame. **Note:** You may want to temporarily insert bolts in 8-12 equidistant holes around the perimeter of the base pans to provide good alignment throughout the perimeter hole pattern. 6. Apply Loctite to the mounting hardware and tighten. If alignment bolts were inserted around the perimeter in the previous step, remove them now.	

7. Apply a good 3/8 inch bead of silicon sealant to seal the centerline of the two adjoined halves of the base pan to keep wind, water and dirt from getting into the radome from underneath.	
8. Install the Base Hatch and clamp the latches from the under-side.	

5.3.2. Radome General Subassembly Guidance

You must sub-assemble the sections of the radome on a clean, flat location that is free of rocks & debris (ie concrete) to assure good horizontal alignment of each of the three layers of panels.

The top subassembly portion of the radome, including cap, MUST be completely assembled, assuring good horizontal alignment of the bottom of the panels and caulked before installing it on the lower half of the radome. If not, reaching all of the flanges & cap to caulk after it is on the lower section of the radome will require a ladder inside the radome and staging and/or ladder on the outside – ***this method GREATLY increases the likelihood of damaging the equipment inside, and the finish outside, of the radome.***

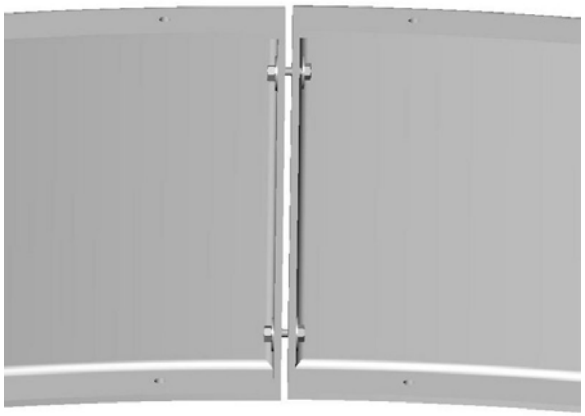
The riser panels, and the lower half of the radome can be assembled on the baseframe. You may choose to loosely assemble all of these panels, then spread & caulk the vertical seams and tighten that hardware. Then install the pedestal assembly, install the reflector assembly, install the top sub assembly of the radome, spread, caulk and tighten the horizontal seams (equator seam, lower-to-riser and riser to base.

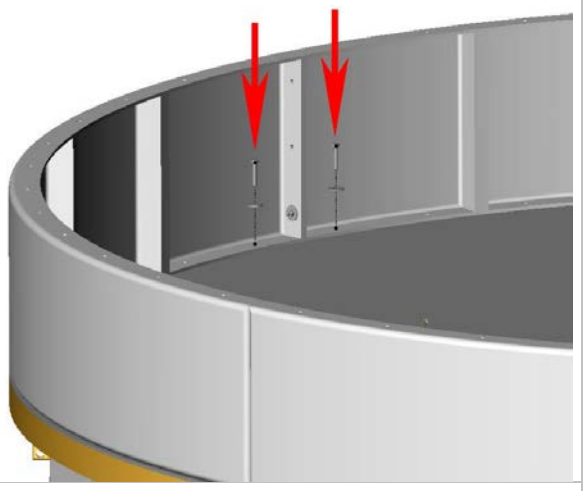
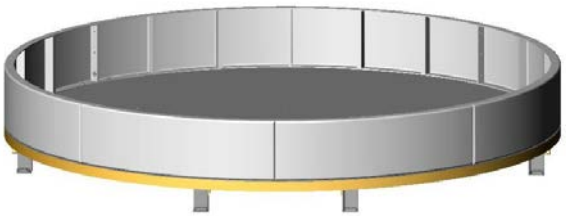
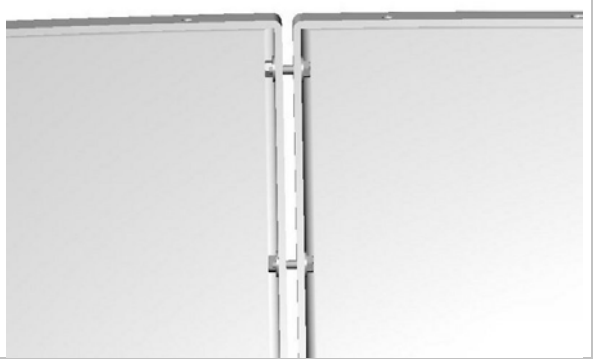
When assembling the panels, using several pin punches to help align the holes may help getting all of the hardware in all of the holes.

5.3.3. Sub-assemble the 168" Radome Assembly

Refer to the Radome Assembly drawing for your system and the procedure below. It is best to have ***at least*** TWO people sub-assembling the radome, one working from the inside and the other outside. Sub-assemble the sections of the radome on a clean, flat location that is free of rocks & debris (ie concrete) to assure good horizontal alignment of the panels.

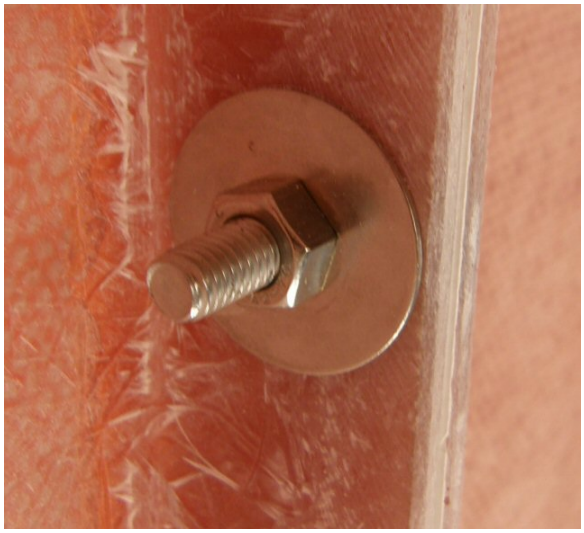
NOTE: **Unless otherwise indicated, all nuts and bolts should be assembled with Loctite 242 or its equivalent.**

1. Loosely assemble the 8 riser panels using the hardware provided. Do NOT tighten the bolts at this time. You may want to set this sub-assembly on the base pan to provide good horizontal alignment of the panels. Good alignment of the bottom edge of the panels is important for good seal on the base pan.	
2. To provide a clean caulked seam all around the panels: apply painters masking tape to the outside perimeter of each of the panels about ¼ " from the top, bottom, left and right edges at each flange joint. The tape will be removed just before the radome caulking has had time to set. Messy, smeared, caulking will make the outside of the radome look bad.	
3. Open each vertical seam wide enough to install a good bead of silicone caulk, apply loctite to and then firmly tighten all of the bolts in that seam (Smaller beads of caulking can be applied from outside and inside if you prefer). 4. Clean excess caulking off of the flange area (inside and out) as shown in step 17 below.	

5. Repeat caulking, closing and cleaning the vertical flanges until all of the riser panel seams are closed. 6. Remove the tape from the vertical seams. 7. The riser section of the radome is now complete.	
8. Set the riser panel assembly on the base pan. 9. Loosely attach the riser panel assembly to the base frame using the hardware provided. Do NOT tighten the bolts at this time. 10. Use wedges to lift the riser panel assembly up off of the base pan about ½ inch.	
11. Install a good bead of caulking between the bottom of the riser panels and the base pan, remove the wedges, apply Loctite to and then firmly tighten all of the horizontal flange bolts. 12. Clean off the excess caulking from the inside and outside of the radome base where the riser panels are attached to the base. 13. Remove the tape from the bottom edge of the outside of the riser panels.	
14. On a flat surface, loosely assemble the 8 lower panels using the hardware provided. Do NOT tighten the bolts at this time. Assure good horizontal alignment of the panels. Good alignment of the bottom edge of the panels is important for good seal on the riser panels and good alignment of the top provides a good seal between the lower and upper panels.	

15. To provide a clean caulked seam all around the panels: apply painters masking tape to the outside perimeter of each of the panels about ¼ " from the top, bottom, left and right edges at each flange joint. The tape will be removed just before the radome caulking has had time to set.

NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a picture of flanges with bad alignment.



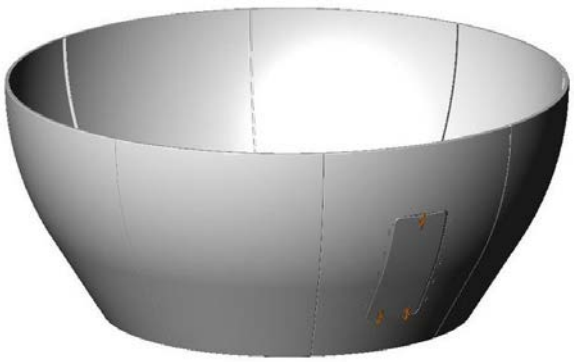
Good flange alignment

Bad flange alignment

16. Open each seam wide enough to install a good bead of silicone caulk, apply loctite to and then firmly tighten all of the bolts in that seam (Smaller beads of caulking can be applied from outside and inside if you prefer).

17. Clean excess caulking off of the flange area (inside and out). The empty Caulking tubes can be used to clean the excess caulking off without scratching the radome finish.

18. Repeat caulking, closing and cleaning the vertical flanges until all of the lower panel seams are closed.
19. Remove the tape from the vertical seams.
20. The lower section of the radome is now complete.
21. Place short pieces of 2"x4" boards under the perimeter of the lower panel assembly to raise it up off of the ground.



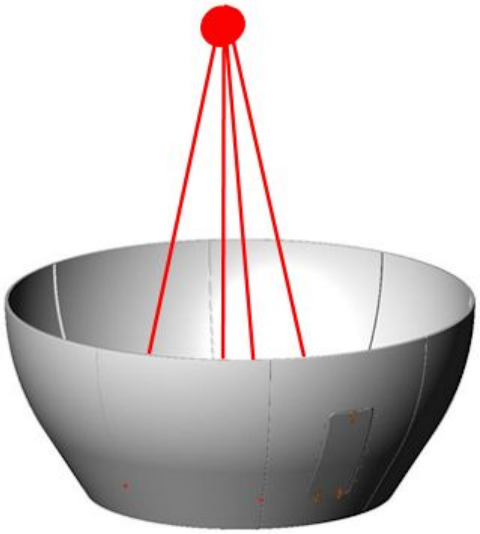
22. Attach 4 radome lifting brackets (PN 131514-2), or other lifting arrangement, to four opposite vertical flange mounting points (every other vertical flange). Orient the brackets with the shackle inside the perimeter of the bottom radome flange. Hold the bracket under the bottom flange and install a bolt and fender washer down through the hole on one side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket

23. Install a second bolt and fender washer down through the hole on the other side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket
24. Repeat steps 16 & 17 to install the other 3 brackets under opposing flanges.
25. Attach web strap lifting sling to the four shackles.
26. The lower panel assembly is now ready to lift onto the riser panels.

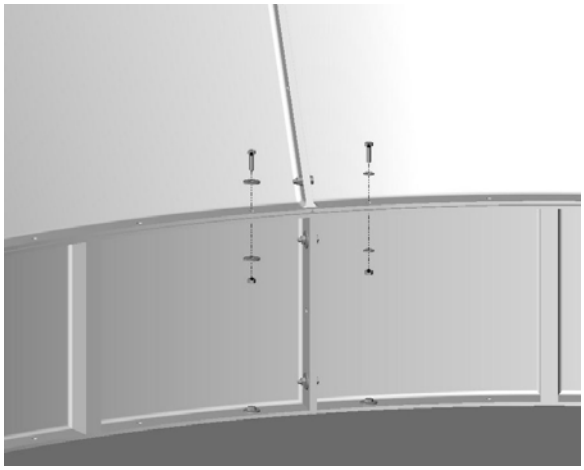
27. Hoist the lower section of the radome and set it onto the top of the riser panels.

NOTE: The bolts protruding down out of the lifting brackets will act like guide pins to align into the holes in the top of the riser panels. Make sure you align the vertical seams of the lower section of the radome and the riser section.

NOTE: The brackets themselves will act a spacers to allow the caulking to be applied in the horizontal seam between these two sections of the radome.

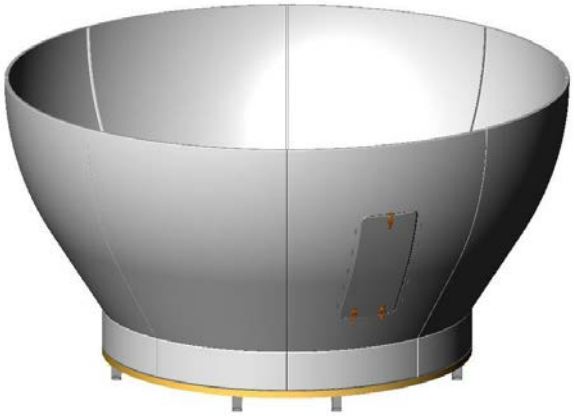


28. Install (loosely) hardware in all the holes around the perimeter of this horizontal flange, except where the lifting brackets are installed. **Leave all of this hardware loose at this time**.
29. Start injecting caulking midway between two brackets.
30. When close to the bracket you are caulking toward, remove the bracket and install hardware in the two vacant holes where the bracket was (make sure you keep the original hardware with the bracket).



31. Continue caulking toward the next bracket, using wedges to keep the horizontal seam open if necessary.
32. Repeat steps 49 & 50 until all four brackets have been removed and caulking of the entire horizontal seam is completed.

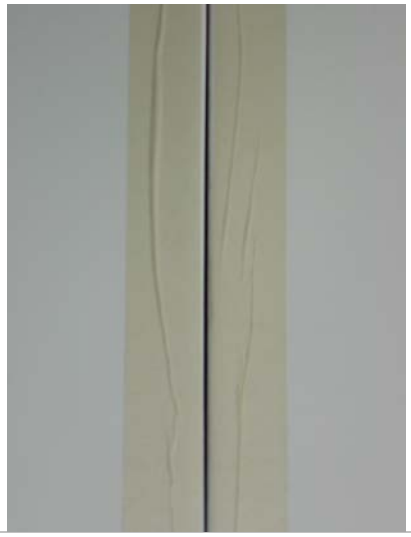
33. Assure that all brackets & wedges have been removed, apply Loctite to and firmly tighten all of the horizontal seam bolts.
34. Clean excess caulking off as shown in step 17 above.
35. Remove tape from the riser panels and the bottom edges of the lower panels.



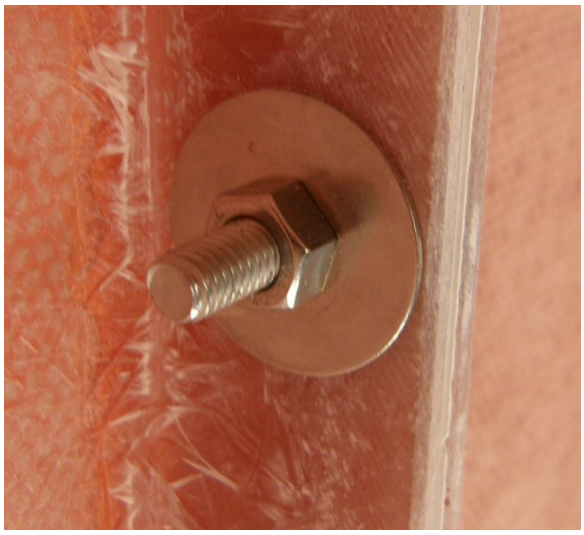
36. Loosely assemble the 8 upper panels using the hardware provided. Do NOT tighten the bolts at this time. Assure good horizontal alignment of the panels. Good alignment of the bottom edge of the upper panels is important for good seal between the upper and lower panels.

NOTE: The person who is working inside installing hardware, applying Loctite, tightening hardware and cleaning the inner flanges will remain inside until the cap and lifting brackets are installed.

37. To provide a clean caulked seam all around the panels: apply painters masking tape to the outside perimeter of each of the panels about ¼ " from the top, bottom, left and right edges at each flange joint. The tape will be removed just before the radome caulking has had time to set.



NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a picture of poor flange alignment.



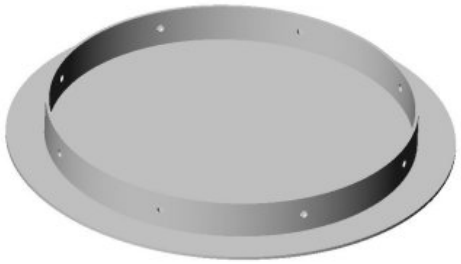
Good flange alignment

Bad flange alignment

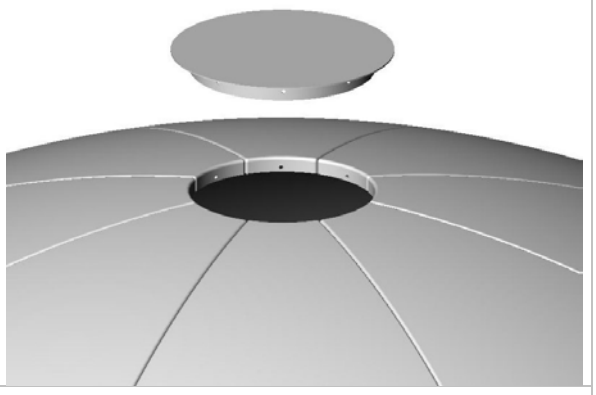
38. Open each seam wide enough to install a good bead of silicone caulk, apply Loctite to and firmly tighten all of the bolts in that seam (Smaller beads of caulking can be applied from outside and inside if you prefer).
39. Clean excess caulking off of the flange area (inside and out) like was done in step 11 above.

40. Repeat caulking, closing and cleaning the vertical flanges until all of the upper panel seams are closed.
41. Remove tape from the vertical seams.

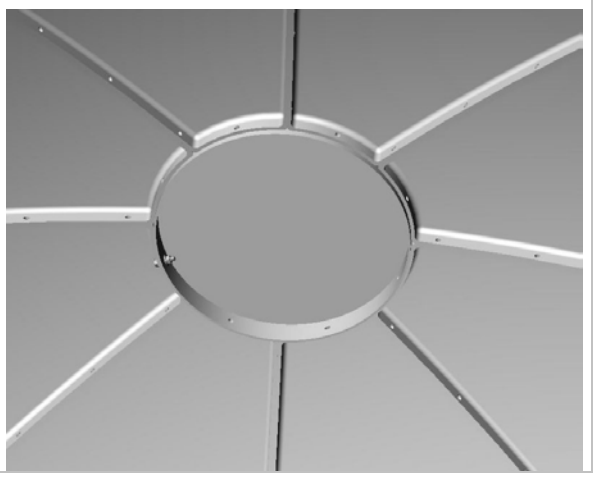
42. Apply a 3/8" layer of caulking to the under-side of the perimeter flange of radome cap.

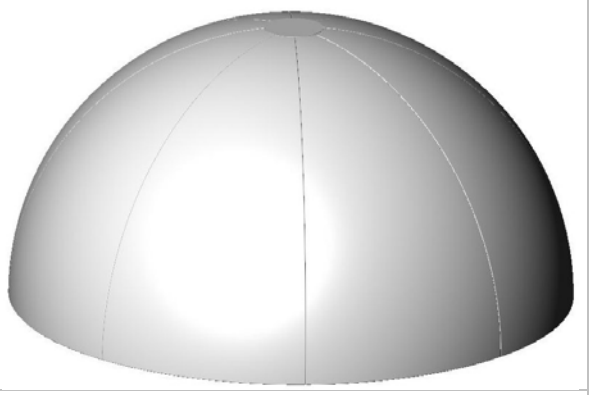


43. Climb onto the upper panel assembly, have someone hand the cap to you and insert the cap into the top of the radome with a twisting rotation. This will evenly spread the caulking and align the bolt holes inside the radome top. [Someone must be inside to align holes and insert the bolts].



44. Install the radome cap using the provided hardware. CAUTION: Do NOT over tighten the hardware. Only tighten until the fiberglass STARTS to flex.
45. Apply additional caulking to fill gaps between the upper panels and the cap.
46. Clean off excess caulking.



47. The upper section of the radome is now complete. 48. Place short pieces of 2"x4" boards under the perimeter of the radome top to raise it up off of the ground.	
49. Attach 4 radome lifting brackets (PN 131514-2), or other lifting arrangement, to four opposite vertical flange mounting points (every other vertical flange). Orient the brackets with the shackle outside the perimeter of the bottom radome flange. Hold the bracket under the bottom flange and install a bolt and fender washer down through the hole on one side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket	
50. Install a second bolt and fender washer down through the hole on the other side of the vertical seam, through the slot on that side of the bracket and tighten a nut on the underside of the bracket	
51. Repeat steps 16 & 17 to install the other 3 brackets under opposing flanges (every other vertical seam). 52. Attach web strap lifting sling to the four shackles. 53. The upper panel assembly is now ready to lift onto the lower section. **[It will be installed AFTER the pedestal and antenna assemblies have been installed inside the lower section of the radome]**	
The bottom half of the radome is complete. Next you will assemble your antenna pedestal General Assembly and install it into this portion of the radome, before putting the top half of the radome on.	

5.3.4. Installing the Marine Air Conditioner

If a marine air conditioner was purchased with your system:

1. Set the marine air conditioner on the base pan aligning the vents in the bottom of the air conditioner to the cutouts in the basepan (refer to drawing 123496).
2. Install the air conditioner, per drawing 135961, using the hardware and isolators provided in the installation kit.
3. Install the strain reliefs as required to install AC power cable to the air conditioner.

5.3.5. Pedestal & Reflector

We recommend that you place the Pedestal & Reflector Crate in a location where you will be able to lift these components onto the base frame.

To assemble the General Assembly (GA), the following hardware kit is provided:

67-149076-A KIT, GA ASSEMBLY, 9711 IMA

- 67-149074 KIT, INSTALL, SWITCHABLE C-BAND FEED

Qty	Part Number	Description
1 ea	117319-4	LOCTITE PRODUCTS, 242 THREADLOCKER, .5 ML
8 ea	114593-162	SCREW, SOCKET HD, 10-32 x 3/8, SS.
8 ea	114581-011	WASHER, LOCK, #10, SS.
8 ea	114580-011	WASHER, FLAT, #10, SS.

- 134174-2 HARDWARE KIT, WR-137, C BAND WAVEGUIDE (FULL)

Qty	Part Number	Description
1 ea	117218-2	GASKET, WR-137, (CPRG FULL)
8 ea	114593-168	SCREW, SOCKET HD, 10-32 x 7/8, SS.
16 ea	114580-011	WASHER, FLAT, #10, SS.
8 ea	114581-011	WASHER, LOCK, #10, SS.
8 ea	114583-011	NUT, HEX, 10-32, SS.

- 136984-2 HARDWARE KIT, LOWER ISOLATION PLATE TO TOP OF AZ POST

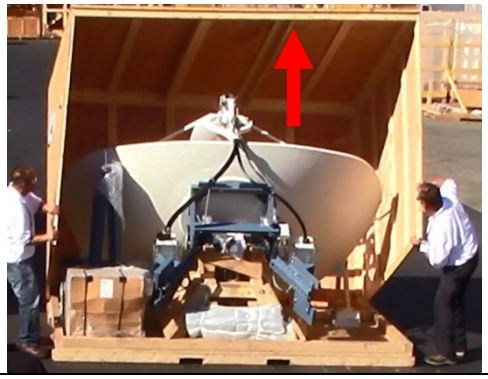
Qty	Part Number	Description
4 ea	114586-623	SCREW, HEX HD, 3/8-16 x 1, SS.
8 ea	114580-038	WASHER, FLAT, 3/8, SS. (7/8 OD X 13/32ID) .075 THK
4 ea	114583-031	NUT, HEX, 3/8-16, SS.

- 67-149075 KIT, INSTALL, MOUNTING SPIDER TO BASE FRAME

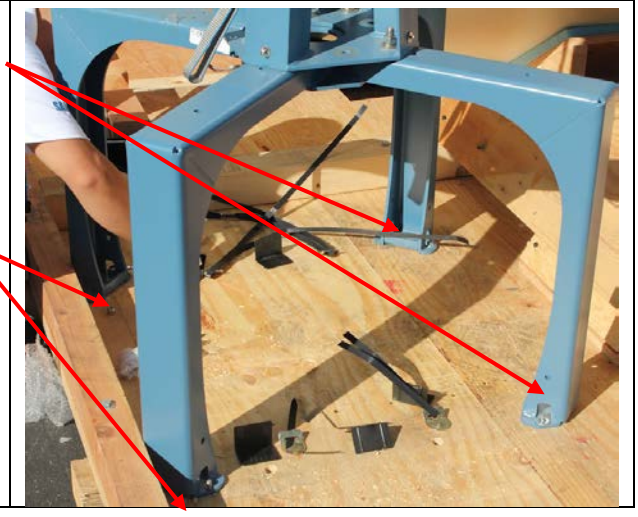
Qty	Part Number	Description
1 ea	117319-30	LOCTITE PRODUCTS, 2760 THREADLOCKER, 10ML
8 ea	114586-607	SCREW, HEX HD, 5/16-24 x 1-1/2, SS.
8 ea	114580-038	WASHER,FLAT,3/8,SS. (7/8 OD X 13/32ID) .075 THK
8 ea	114580-031	WASHER, FLAT, 3/8, SS.
8 ea	114583-031	NUT, HEX, 3/8-16, SS.

1. Remove the screws around perimeter of the removable panel of the crate.

2. Remove the screws around perimeter of the 3 remaining sides at the base of the crate.
3. To avoid damaging the feed or waveguide, tilt the open end of the top of the crate up.

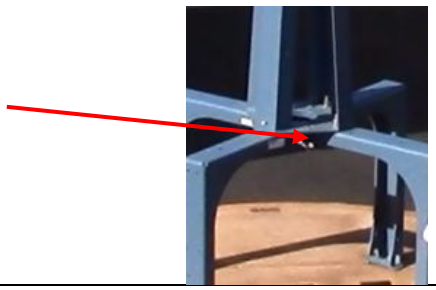


4. Continue to tilt the top of the crate up off the pallet and lay it on its' back.
5. Move the top of the crate away from the work area.

6. Cut the bands from and remove the C-band feed, Antenna Control Unit and below decks kit boxes. 7. Move the Antenna Control Unit and below decks kit boxes to a location where they will be protected until you are ready to install the below decks equipment.	
8. Cut the bands from and remove the Louvered panels. 9. Set these aside in a protected location until you are ready to install them.	
10. Cut the bands from and remove the counter-weight and hardware boxes. 11. Set the counter-weight box aside in a protected location until you are ready to rebalance the antenna.	
12. Remove the 4 lag bolts from the spider legs that are farthest from the edge of the pallet. 13. Bolts with Nyloc nuts are up through the pallet and spider legs that are closest to the edge of the pallet.	

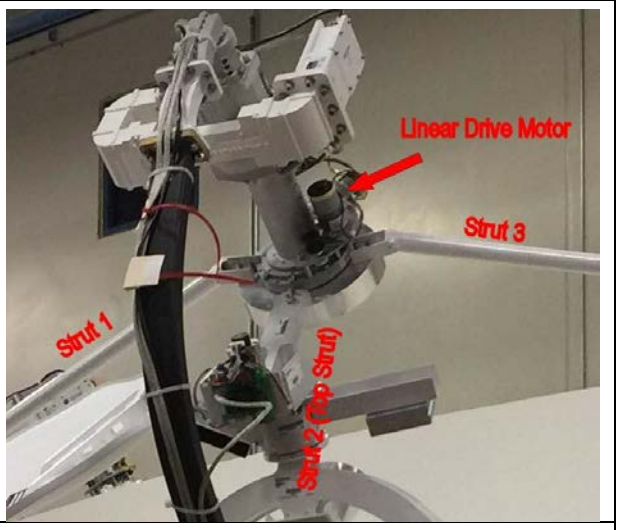
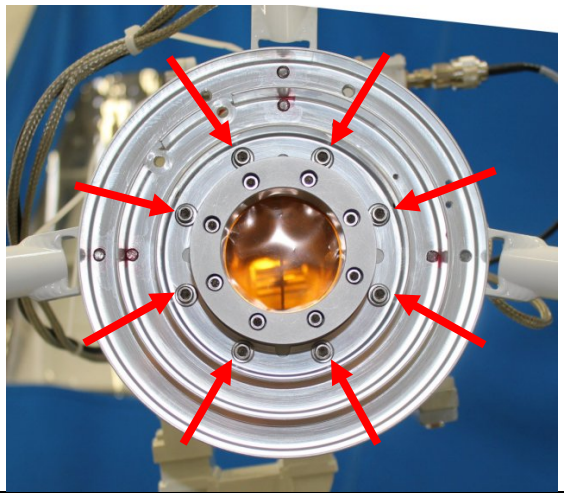
14. Using an open end wrench on the underside of the pallet and a wrench or socket from the top, remove the 4 Nyloc nuts on the bolts that are up through the pallet and spider legs.
15. Discard all of this shipping hardware.

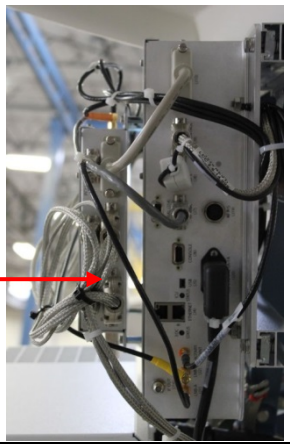
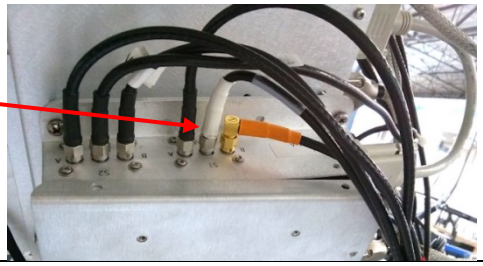
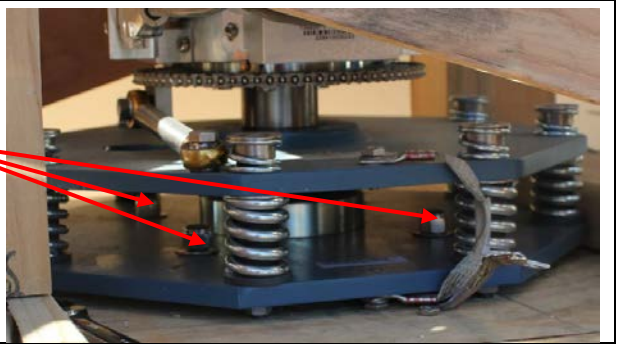
16. There is a ground strap installed on the the Az Post/Spider. When the Az Post/Spider is installed on the base frame this ground strap should be orientated FORWARD (opposite the base hatch.

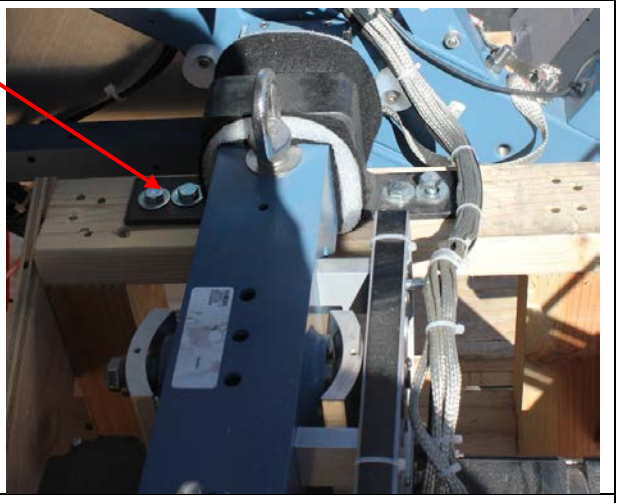


17. Open the GA Assembly Hardware Kit.
18. Set the Az Post/Spider on base frame (ground strap forward) and align the mounting holes in the feet of the spider to the holes in the base pan.
19. Apply Loctite to the 8 spider mounting bolts.
20. Install all 8 of the bolts up through the base frame, base pan and foot of the spider with a flat washer and hex nut on top.
21. Using an open end wrench on the underside of the base frame and a wrench or socket from the top, tighten the 8 hex nuts to torque spec.

22. Unbolt the reflector brace from the frame and remove it from in front of the lower section of the reflector.
23. Discard this hardware.

24. Open C-Band feed box. 25. There is an ailgnment pin in the feed that mates into a hole in the scalar plate so that ht efeed cannot be installed incorrectly. 26. Orient and seat the C-Band feed into the scalar plate.	
27. Mount the feed assembly with the Linear drive motor at Strut 3.	
28. Apply Loctite 242 to, install and tighten the eight screws, lock washer & flat washer (see red arrows) through the front of the scalar plate and into the end of the drop-in feed assembly.	

29. Rotate the flexible waveguide and harness up over the top strut/Ku-Band feed. 30. Attach flexible waveguide section to the rigid waveguide section using the 8 screws, flat washer through the adjoined flanges. 31. Install flat washer, lock washer and hex nut on each srcew and tighten all 8 hex nuts to torque spec. 32. Install cable ties on the feed harness to following the cable path around the back of the reflector to the ICU & QOR Switch.	
33. Route the C-Band feed harness along the rigid waveguide, around the back/top of the reflector to the right side where the ICU and QOR Switch Box are located. 34. Connect the C-Band feed harness to QOR switch box J4 connector and tighten the retainer screws.	
35. Connect the C-Band LNB coax to S1A on the top of the QOR switch box.	
36. Remove the 4 nylock nuts from the bolts that pass up through the wood and lower isolation plate. 37. Discard this hardware.	

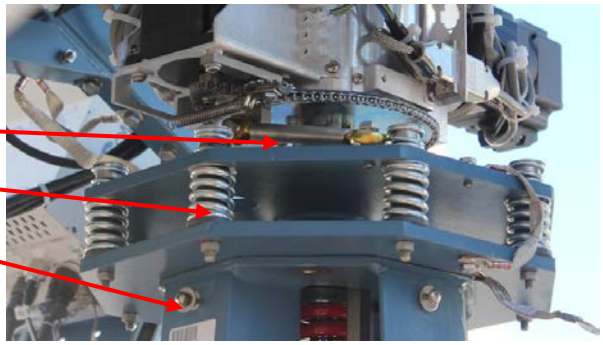
38. Remove the 4 bolts in the U-bracket that restrains the Right side (shown) of the cross-level beam. 39. Remove the 4 bolts in the U-bracket that restrains the Left side (hidden in foreground) of the cross-level beam. 40. Remove the foam padding from both sides of the cross-level beam. 41. Discard this hardware.	
42. Pass lifting straps through eyes in the top of the cross-level beam. These starps must be long enough to clear the top of the waveguides (as seen in the next picture). 43. Attach these 2 straps to a crane or orther suitable lifting mechanism.	
44. Slowly & carefully lift the pedestal & reflector assembly up, guiding the spring and cables, up out of the wooden frame.	

45. Hold the pedestal & reflector assembly above the top of the AZ Post.
46. Feed the cables down through the top of the Az post.

47. Carefully guide the cables & isolation spring down through the top of the Az post as the pedestal & reflector assembly is lowered.

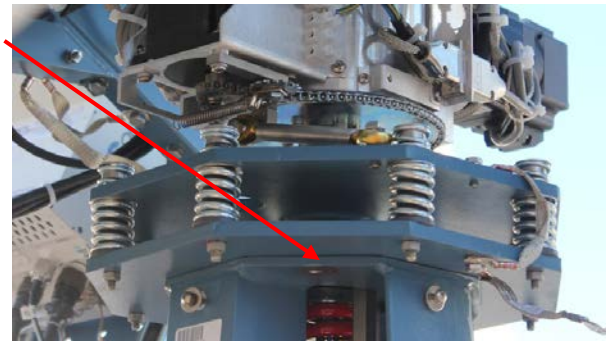
48. Hold the pedestal & reflector assembly just above the top of the AZ Post.

Rod End Assembly
Isolation Assembly
Left side of AZ Post



49. Rotate the isolation section of the pedestal to align the rod end assembly to be to the port side (left as viewed if you are standing AFT of the pedestal) of the AZ Post.

50. Align the 4 mounting holes in the lower isolation plate to the holes in the top of the AZ Post.
51. Lower the pedestal & reflector assembly to be on the top of the AZ Post,
52. Apply Loctite to and install the 4 mounting bolts up through the top of the AZ Post & lower isolation plate.
53. Install 4 flat washers & hex nuts on the bolts and tighten to torque spec.



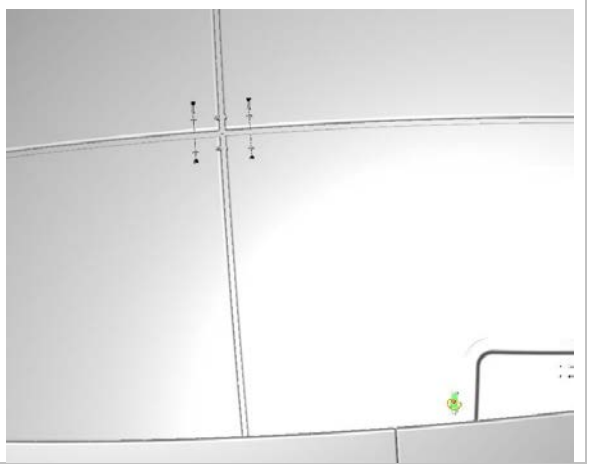
54. Locate the louvered panel which has the breaker box mounted in it (this is the AFT panel).
55. Set it in place at the AFT section of the AZ Post.
56. Connect power to breaker by mating the power plugs.
57. Attach the Ground wire to the burnished threaded hole is the AZ Post leg.
58. Mount the panel using hardware provided (leave all screws lose at this time).

59. Connect TXIF and RXIF coax cables to the coax interconnect bracket inside the legs of the AZ post.
60. Install the 3 other louvered panels using hardware provided.
61. Tighten all panel mounting hardware.
62. Install ratchet straps (provided in the antenna stow kit) by hooking into the elevation beams and the spider.
63. Tighten straps to restrain movement of the antenna.

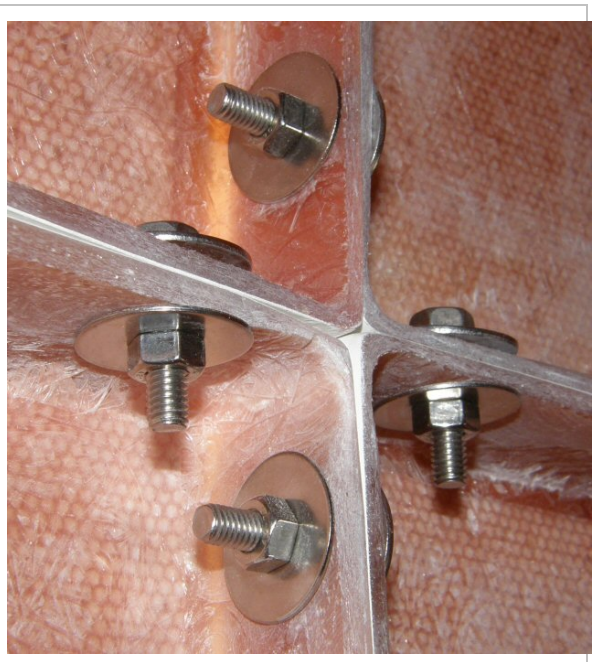
The pedestal & reflector assembly is now installed on the base frame assembly.

5.3.6. Close the 168" Radome Assembly

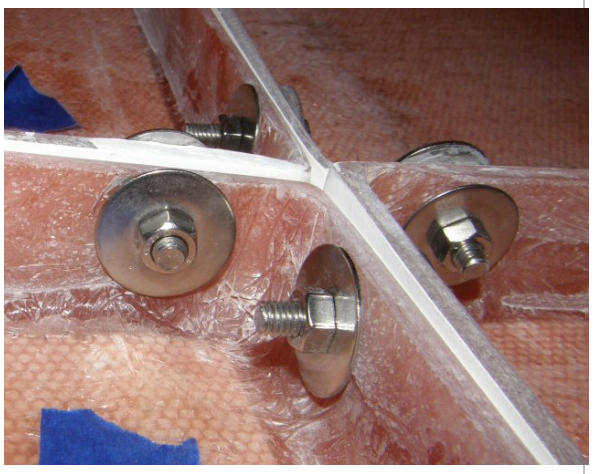
Refer to the Radome Assembly drawing for your system and the procedure below.

1. Lift Upper section up over the dish & feed assembly and set it down onto the lower section.	
2. Set the upper section onto the top of the lower panels. 3. Loosely attach the upper panels to the lower panels using the hardware provided. Do NOT tighten the bolts at this time.	

NOTE: It is extremely important to assure that the flanges are properly aligned before the bolts are tightened and kept in alignment as the hardware is aligned. This is necessary for the inside clearance and the outside aesthetic appearance of the radome. Please note this picture shown good alignment as observed from inside the radome and below a flange with bad alignment.

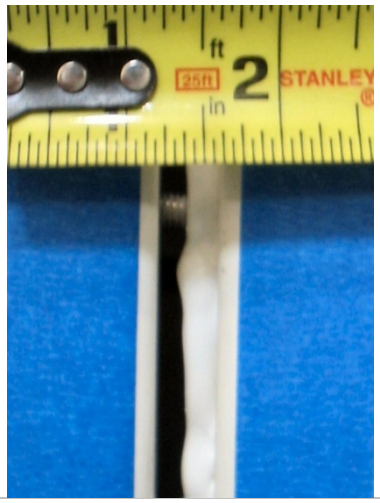


Good flange alignment

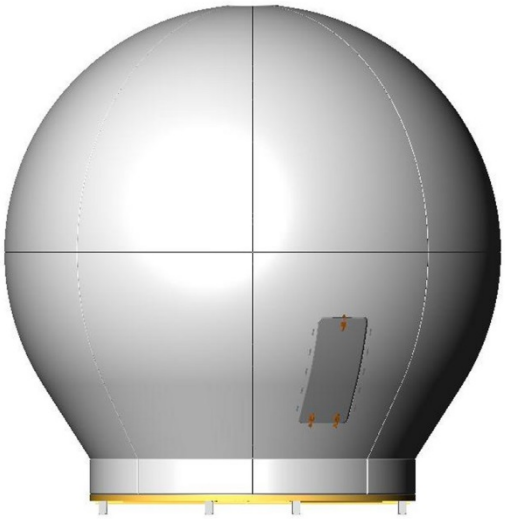


Bad flange alignment

4. Use wedges to lift the upper panels off of the lower panels about ½ inch.
5. Install a good bead of caulking between the bottom of the upper panels and the top of the lower panels, remove the wedges and radome lifting brackets, then firmly tighten all the bolts (smaller dual beads of caulking can be applied from outside and inside if you prefer).

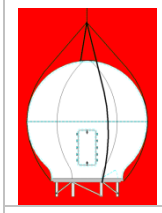


6. Remove the tape from the upper and lower panels. All tape should now be removed from the radome.
7. ***The ADE Assembly is now complete, ready for web straps to be attached for lifting the ADE onto the ship.***

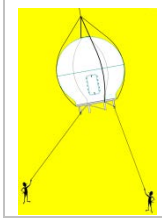


5.3.7. Prepare the 168" Radome ADE for Lift

Refer to the Base Frame Assembly drawing for your system and the procedure below.

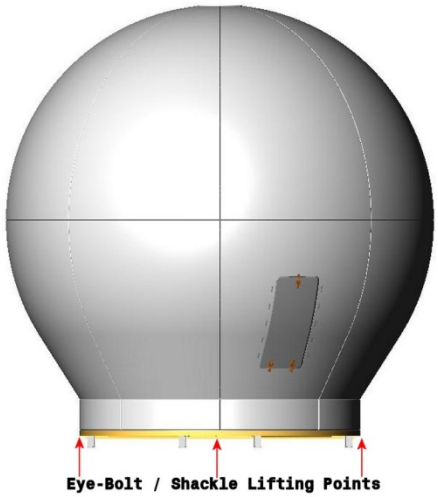


WARNING: *Hoisting without a webbed four-part sling may result in catastrophic crushing of the radome. Refer to the specifications and drawings for the fully assembled weight of your model antenna/radome and assure that equipment used to lift/hoist this system is rated accordingly.*

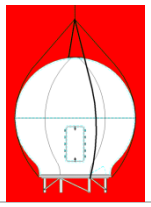
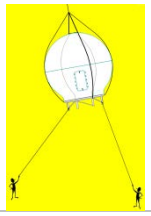


CAUTION: *The antenna/radome assembly is very light for its size and is subject to large swaying motions if hoisted under windy conditions. Always ensure that tag lines, attached to the radome base frame, are attended while the antenna assembly is being hoisted to its assigned location aboard ship.*

1. Enter the ADE and stow the antenna pedestal using the Stow Kit (provided) and the instruction in the Maintenance section of the antenna manual.
2. Attach eye-bolts or shackles (properly rated for the weight to be lifted) to four equidistant lifting point holes around the perimeter of the Base Frame.
3. Attach properly rated web lifting straps to the eye-bolts, or shackles.
4. Attach Appropriate length of rope tag lines to the Base Frame.
5. The ADE is now ready to hoist onto the ship.



5.4. *Installing The ADE*

	***WARNING:*** *Hoisting with other than a webbed four-part sling may result in catastrophic crushing of the radome. Refer to the specifications and drawings for the fully assembled weight of your model Antenna/Radome and assure that equipment used to lift/hoist this system is rated accordingly.*
	***CAUTION:*** *The antenna/radome assembly is very light for its size and is subject to large swaying motions if hoisted under windy conditions. Always ensure that tag lines, attached to the radome base frame, are attended while the antenna assembly is being hoisted to its assigned location aboard ship.*

5.4.1. Hoist the ADE

1. Assure that the antenna is stowed/restrained before hoisting.
2. Using the lifting harness arrangement previously described hoist the antenna assembly to its assigned location aboard ship by means of a suitably-sized crane or derrick.
3. The radome assembly should be positioned with the BOW marker aligned as close as possible to the ship centerline. Any variation from actual alignment can be compensated with the AZIMUTH TRIM adjustment in the antenna control unit, so precise alignment is not required.
4. Bolt, or weld, the feet of the base frame to the mounting surface aboard the ship.

5.4.2. Connecting the ADE

Refer to the System Block diagram, the Antenna Schematic and the general strain relief installation information in the drawings section of this manual.

Sea Tel recommends that separate, dedicated, 220 VAC Power be provided for the Marine Air Conditioner. This cable and breaker must be properly rated for the ***18 AMP Inrush/Startup current*** of this device. Do NOT combine this with the AC Power provided for the Antenna Pedestal and RF Equipment.

1. Install strain reliefs in the desired locations of the base pan where the cable will enter the radome.
2. Route each cable through a strain relief to it's connection point. We recommend that you leave a little excess service length on each cable (this can be left inside the louvered panels of the AZ Post).
3. Remove the AFT louvered panel for access to the breaker and coax interconnect bracket.
4. Connect the Pedestal & RF Equipment AC Power Cable into the breaker box in the AFT louvered panel. Conductors are to be connected as shown on the Antenna Schematic (bottom left). The other end of the AC Power cable must be connected to a suitably rated breaker or UPS.
5. If a Marine Air Conditioner is installed: Route the dedicated, AC Power cable provided for the Marine Air Conditioner to its external transformer on into the Marine Air Conditioner and terminated to the AC terminals inside.
6. Connect the ADE AC Power Cable into the breaker box in the AFT louvered panel. Conductors are to be connected as shown on the Antenna Schematic (bottom left). The other end of the AC Power cable must be connected to a suitably rated breaker or UPS.

7. Connect the TXIF coaxial cable that runs between the above decks and below decks equipment to the TX connector on the interconnect bracket inside the louvered panels of the AZ Post.
8. Connect the RXIF coaxial cable that runs between the above decks and below decks equipment to the RX connector on the interconnect bracket inside the louvered panels of the AZ Post.
9. After the cables are routed as desired, tighten the strain reliefs to provide holding compression on the cables.
10. Reinstall the AFT louvered panel to the AZ Post.

5.4.3. Remove stow Straps

Remove the stow straps from the pedestal and repackage them in the Antenna Stow Kit.

Provide this kit to the responsible person aboard the ship so it can be stored for future use.

5.4.4. ADE Final Checks

Remove all tools, parts and installation debris from inside the radome.

Remove all tools, parts and installation debris from the area around the outside of the radome.

5.5. Installing the Below Decks Equipment

Connect this equipment as shown in the System Block Diagram. Install the equipment in a standard 19 inch equipment rack or other suitable location. Optional slide rails are available for the Sea Tel MXP.

5.5.1. General Cautions & Warnings

	***CAUTION - Electrical Shock Potentials exist on the Gyro Compass output lines.*** *Assure that the Gyro Compass output is turned* ***OFF*** *when handling and connecting wiring to the MXP.*
	***CAUTION - Allow*** *only an* ***authorized dealer*** *to install or service the Sea Tel System components. Unauthorized installation or service can be dangerous and may invalidate the warranty.*

5.5.2. Connecting the BDE AC Power Cables

Connect the AC Power cables that supply power to the Below Decks Equipment (MXP, Satellite Modem, phone, fax, computer and all other equipment) to an outlet strip fed from a suitably rated breaker or UPS.

5.5.3. Media Xchange Point™ (MXP) Connections

5.5.3.1. Ships AC Mains

Connect the power cord from the rear panel of the MXP to AC voltage power source (UPS power recommended).

5.5.3.2. J1 Modem RX

Connect this RXIF Output to the satellite modem RX Input using an appropriate coaxial cable.

5.5.3.3. J2 RJ - Antenna RX

Connect this RXIF Input from the antenna to this port on the rear panel of the MXP using coaxial cable provided

5.5.3.4. J3 A/B & J4 A/B - Ethernet 4 Port 10/100 switch

Ethernet connections to computer, satellite modem LAN devices as desired.

5.5.3.5. J5 SFP Fiber Interface

SFP Gigabit Ethernet connection.

5.5.3.6. J6 Mini-USB Computer M&C Connection

Mini-USB Antenna M&C connection, if desired.

5.5.3.7. J7 USB Host

Not connected - -Future development.

5.5.3.8. J8 Console

Antenna M&C Serial connections.

5.5.3.9. J9 A/B Serial

Computer RJ-45 Serial M&C connections. A is mapped to the Radio serial M&C port of the ICU and B is mapped to the Pass through serial M&C port of the ICU.

5.5.3.10. J10C Modem

RJ-45 Serial M&C connection to Satellite Modem Console Port.

5.5.3.11. J10D OBM

RJ-45 Serial M&C connection to Out of Band Management equipment, if used.

5.5.3.12. J11 Gyro

Terminal Strip for SBS or Synchro Gyro Compass interface connections. Wiring is:

Pin 1	Synchro R1
Pin 2	Synchro R2
Pin 3	Synchro S3 / SBS A
Pin 4	Synchro S2 / SBS B
Pin 5	Synchro S1 / SBS C
Pin 6	SBS COM

5.5.3.13. J12 Aux 232

Auxiliary wired RS-232 connection. Wiring is:

Pin 1 - GND	Ground
Pin 2 - Aux IN1	Modem Lock Input 1 - See modem setup chapter.
Pin 3 - Aux IN2	Modem Lock Input 2 - See modem setup chapter.
Pin 4 - GND	Ground
Pin 5 - SW1	Blockage/Modem Mute Output 1 - See blockage & modem setup chapters.
Pin 6 - SW2	Blockage/Modem Mute Output 2 - See blockage & modem setup chapters.
Pin 7 - SW3A	Dry Contact set 2 - Dry alarm contacts used to provide (programmable) alarm output to other equipment/systems. Switched outputs have ability to use 4.7K pull up or Pull Down and can provide Current sink of 0.5 amps max. Contacts are **Normally Open** for No Alarm state and are **Closed/Shorted** when the programmed alarm state exists.
Pin 8 - SW3B	
Pin 9 - SW4A	Dry Contact set 1 - Same as dry alarm contact set 2.
Pin 10 - SW4B	

5.5.3.14. J13 NMEA 0183

NMEA 0183 I/O connections. The +12 VDC output is only intended to power a very low current consumption device, do NOT exceed **125ma MAX.** Wiring is:

Pin 1	RX+ NMEA
Pin 2	RX- NMEA
Pin 3	TX- NMEA
Pin 4	N/C
Pin 5	GND
Pin6	N/C
Pin 7	GND
Pin 8	TX+ NMEA
Pin 9	+12 VDC (**125ma MAX**)

If your NMEA 0183 Gyro Compass outputs RS-422:

- Connect its' TX+ output to J10 pin 1 (RX+)
- Connect its' TX- output to J10 pin 2 (RX-)

If your NMEA 0183 Gyro Compass outputs RS-232:

- Connect its' GND output to J10 pin 1 (RX+)
- Connect a jumper from pin 1 to J10 pin 5 (GND)
- Connect its' TXD output to J10 pin 2 (RX-)

5.5.3.15. J14 Aux 232

Antenna M&C Serial connections. The +12 VDC output is only intended to power a very low current consumption device, do NOT exceed **125ma MAX.** Wiring is:

Pin 1	N/C
Pin 2	RD
Pin 3	TD
Pin 4	N/C
Pin 5	GND
Pin6	N/C
Pin 7	RTS
Pin 8	CTS
Pin 9	+12 VDC (**125ma MAX**)

5.5.3.16. J15 NMEA 2000

Not connected - -Future development.

5.5.4. Other BDE connections

Connect this equipment as shown in the System Block Diagram. Install the equipment in a standard 19 inch equipment rack or other suitable location. Optional slide rails are available for the Sea Tel MXP.

5.6. BDE Final Checks

5.6.1. Visual/Electrical inspection

Perform a visual inspection of your work to assure that everything is connected properly and all cables/wires are secured.

5.6.2. Electrical - Double check wiring connections

Double check all your connections to assure that it is safe to energize the equipment.

5.7. Setup - Media Xchange Point™ (MXP)

Now that you have installed the hardware, you will need to setup, calibrate and commission the antenna.

You may also need to load/update the modem option file, which is not part of the scope of this manual, contact the airtime provider NOC for guidance.

At the very least, you will need to set up the antenna system for:

- Connect & configure a ships computer for accessing the MXP.
- The gyro compass signal being provided by the ship.
- The tracking receiver frequency settings for the satellite to be used (configure satellites).
- Set up / configure all satellites that the system might use as the ship travels.
- Set up Blockage zone(s) as needed.
- Acquire the desired satellite.
- Optimize targeting (Auto or manual trim).
- Arrange for commissioning & cross-pol isolation testing with the NOC.
- Conduct cross-pol isolation testing with the NOC.
- Conduct other commissioning testing with the NOC (ie P1dB compression point).
- If this is a Dual Antenna installation configuration, you will have to balance the TX levels of the two antennas while online with the NOC (refer to procedure in the Dual Antenna Arbitrator manual).
- It is strongly recommended that you down, and save, the system INI file (contains all of the system parameters). Save this file in a convenient location.

5.8. Cyber Security Caution

Sea Tel Antenna systems are not intended to be connected directly to the Internet. They must be connected behind a dedicated network security device such as a firewall. In addition, we highly recommended that you change default passwords. This is an extremely important consideration that must be taken into account as part of commissioning procedures as attackers with malicious intent (after easily obtaining default passwords and identify internet-connected systems) can be rendered a system inoperable.

For clarification purposes, the factory default Passwords/Configurations are only intended for initial production testing/verification purposes and it is an assumed responsibility of the installing partner to change and record the login credentials and is shared only with persons whom are directly responsible for operation/maintenance of the system. Instructions on how to change passwords may be located within the system manual.

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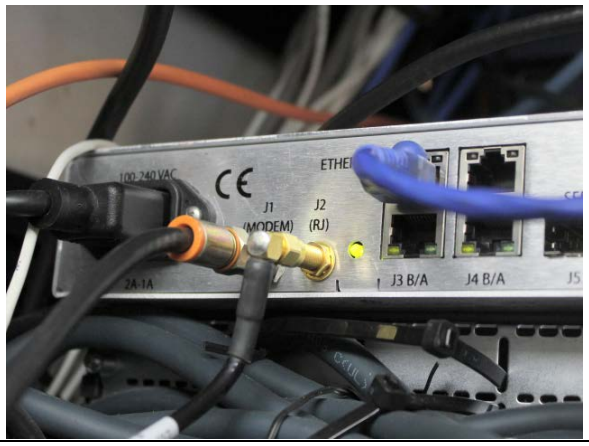
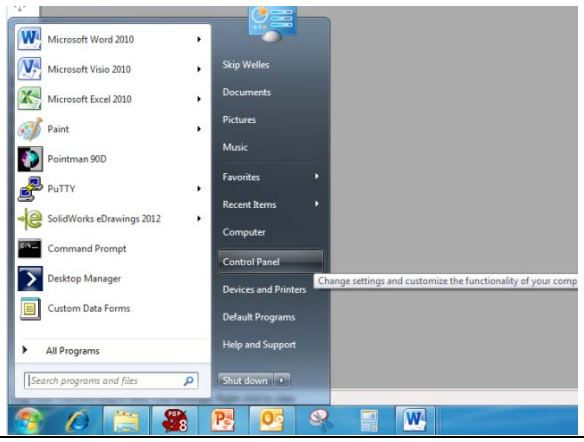
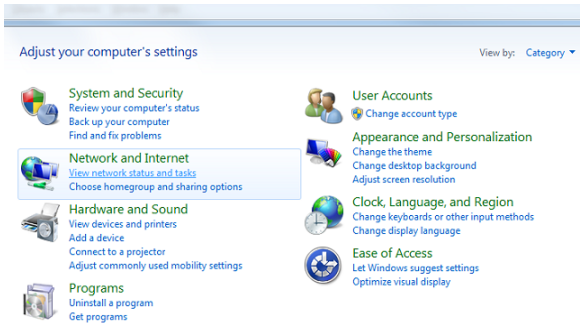
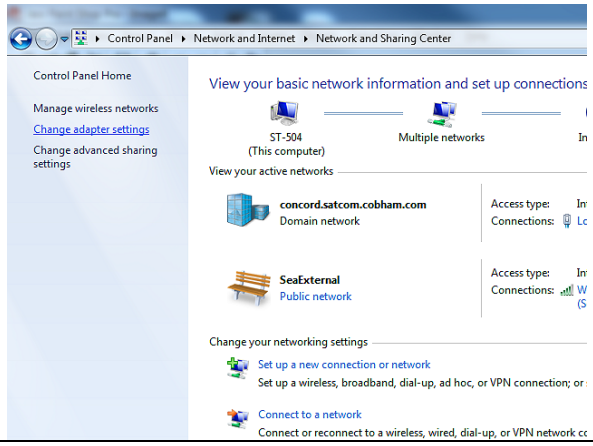
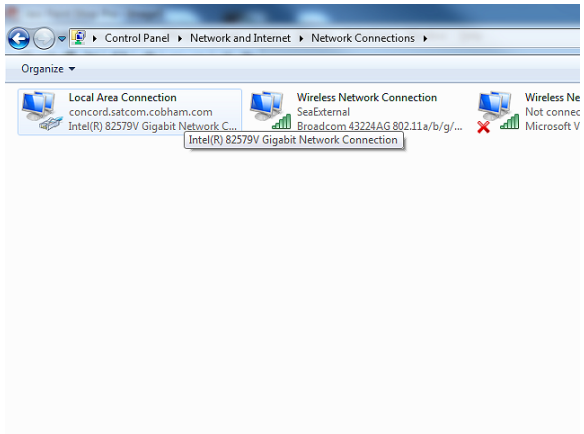
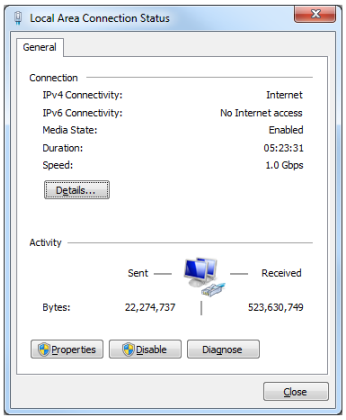
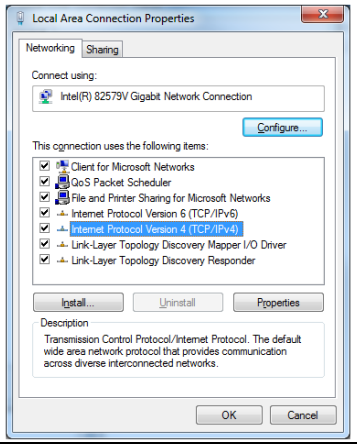
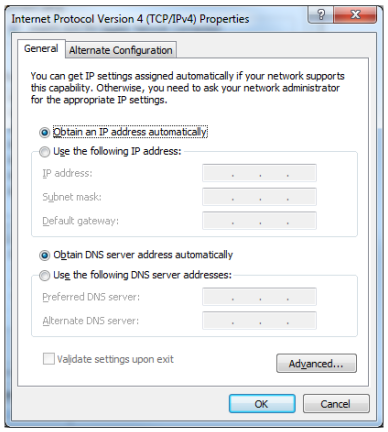
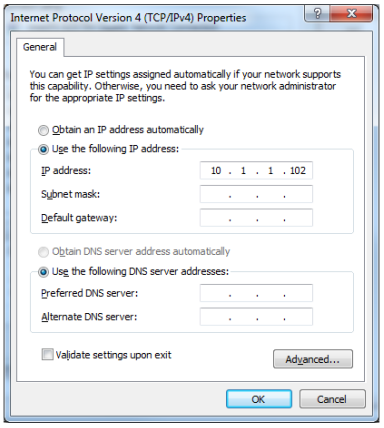
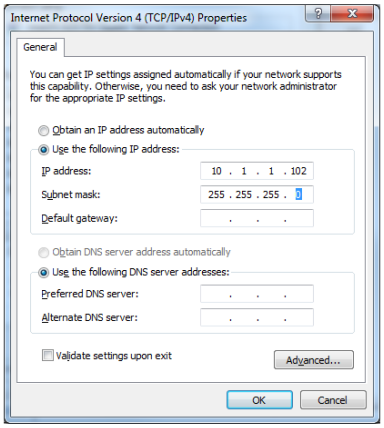
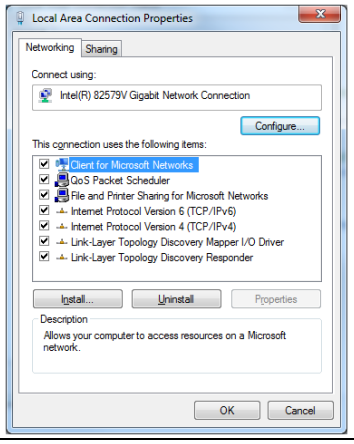
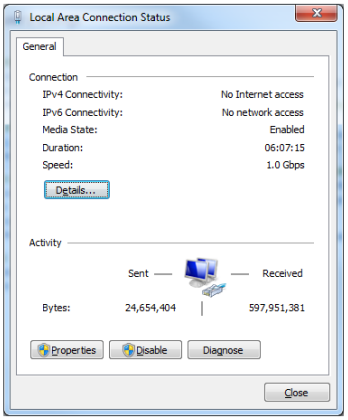
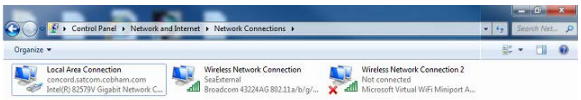
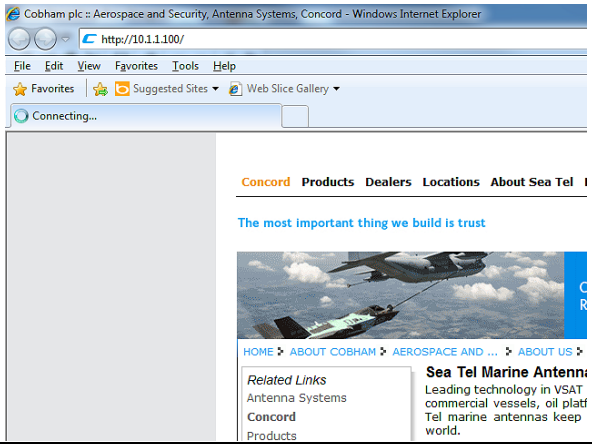
6. Configuring a Computer for the MXP

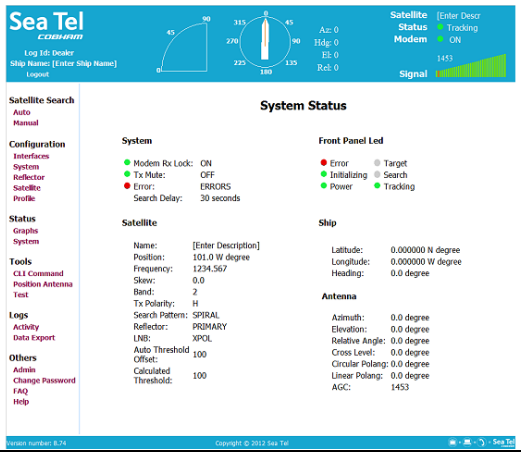
The first thing you need to do is to configure your computer so that it will display the MXP screens. Follow these instructions to accomplish that.

1. Connect a LAN cable to the back of your computer. If you are connecting into a LAN, instead of a single computer, you will need to provide a connection from your LAN router/hub/switch to the MXP.	
2. Connect the other end of the LAN cable to the back of the MXP.	
3. Power on the MXP.	
4. From your computer desktop, click the Control Panel button. NOTE: The following displayed screen captures are form Window 7 OS, Your screens may differ, refer to your PC manual for changing network adapter settings.	

5. Click on "View network status and tasks".	
6. Click "Change adapter settings".	
7. Click on "Local Area Connection."	
8. Click on "Properties".	

9. Double-Click on "Internet Protocol Version 4 (IPv4)".	
10. Click on "Use the following IP address:	
11. In the IP Address boxes, enter "10.1.1.102" (This is for the IP address of your computer). NOTE: You could use 101, 102, 103, etc. as long as it is not the same as the address of the MXP, which is "**10.1.1.100**" (default).	
12. On the second line, enter Subnet Mask of "255.255.255.0". 13. Then click the "OK" button.	

14. Back at the Local Area Connection Properties screen, click the "OK" button.	
15. Click the "Close" button.	
16. Close the Control Panel.	
17. Open your browser, and enter the URL: "10.1.1.100".	

18. At the log in screen enter the user name (Dealer, SysAdmin, or User). Contact Sea Tel Service for the password.	
19. After you log in you will see the System Status screen	

6.1. Cyber Security Caution

Sea Tel Antenna systems are not intended to be connected directly to the Internet. They must be connected behind a dedicated network security device such as a firewall. In addition, we highly recommended that you change default passwords. This is an extremely important consideration that must be taken into account as part of commissioning procedures as attackers with malicious intent (after easily obtaining default passwords and identify internet-connected systems) can be rendered a system inoperable.

For clarification purposes, the factory default Passwords/Configurations are only intended for initial production testing/verification purposes and it is an assumed responsibility of the installing partner to change and record the login credentials and is shared only with persons whom are directly responsible for operation/maintenance of the system. Instructions on how to change passwords may be located within the system manual.

7. Setup – Ship's Gyro Compass

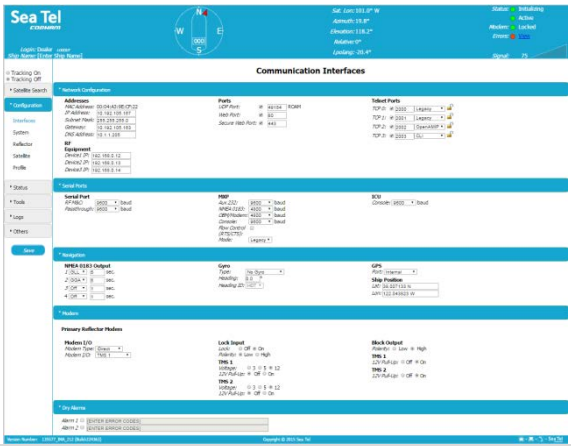
The Ships Gyro Compass connection provides true heading (heading of the ship relative to true North) input to the system. This allows the ICU to target the antenna to a "true" Azimuth position to acquire any desired satellite.

After targeting, this input keeps the antenna stabilized in Azimuth (keeps it pointed at the targeted satellite Azimuth).

7.1. Setting the Gyro Type

The GYRO TYPE parameter selects the type of gyro compass interface signal, the appropriate hardware connections, and the ratio of the expected input signal for ship turning compensation. Default GYRO TYPE parameter for all systems is Step-By-Step so that the ICU will properly follow for Step-By-Step or NMEA gyro signals.

If the Ships Gyro Compass output is Synchro, or there is NO Gyro Compass, the GYRO TYPE parameter must be set correctly to properly read and follow the Ships Gyro Compass signal that is being provided. To manually update the Gyro Type parameter:

1. Go to the Communications Interface screen. 2. Click the Gyro Type drop down menu..	
3. Select the correct Gyro type.	
4. Click Save, located on the navigation bar in the left area of the screen.	

7.2. If there is NO Ships Gyro Compass

Without heading input to the system the MXP will NOT be able to easily target, or stay stabilized ON, a "true" azimuth pointing angle. This will make satellite acquisition much more difficult and the true azimuth value that any given satellite should be at will not be displayed correctly.

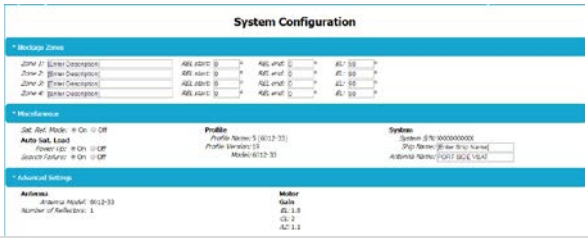
This mode of operation is NOT recommended for ships or any other vessel that turns in the water. A better solution would be to provide a Satellite Compass (multiple GPS Antenna device) to provide true heading input to the ACU. These devices are readily available and are much less expensive than a Gyro Compass.

If there is NO Gyro Compass (ie on a large stationary rig which is anchored to the ocean floor) set the GYRO TYPE parameter to "No Gyro" or to "Fixed".

> **Fixed** mode is used when you do not have a gyro compass, but the ship/vessel/rig is stationary at a fixed heading that you can manually enter for satellite targeting. This allows you to use a standard (small) search pattern and acquire the satellite relatively quickly.

No gyro mode is used when you do not have a gyro compass, the ship does turn and you will use "Sky Search" to initially acquire the satellite. The Sky Search drives the antenna to the calculated elevation angle and then drives azimuth CW 360 degrees, steps elevation up and then drives azimuth CCW 360 degrees and continues to alternately steps elevation up/down and drives azimuth alternately CW/CCW 360 degrees. Because of this large search area, acquiring the satellite will take MUCH longer than if you have valid heading input.

1. Turn on SAT REF Mode. (It must be turned on.)



This combination of settings will cause "No Gyro" Search pattern to be use to find the desired satellite (refer to the setup – Searching chapter).

8. Setup – Tracking Receiver – VSAT

8.1. Determining the IF Tracking Frequency (MHz)

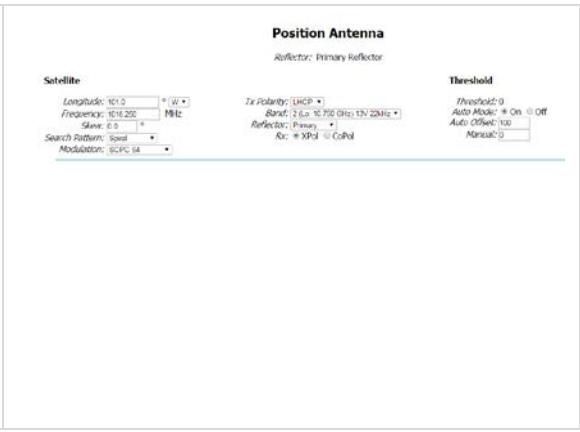
The IF Tracking frequency parameter is a value entered into the MXP MHZ Sub-Menu. The value itself may be provided by your air-time provider and the MHz value will be entered directly in this sub-menu.

Or, the RF downlink frequency of a specific carrier on the desired satellite can be obtained from a satellite website and calculated by using the formula RF- LO = IF. When you take the Satellite Transponder Downlink RF value and subtract the LNB's Local Oscillator (LO) Value, the resultant value will equal the Intermediate Frequency (IF). It is this IF value that will be entered into the MXP for tracking purposes. The MHz and KHz are entered as a single value.

Example: Assuming an LNB LO value of 11.25GHz: We want to track a satellite downlink carrier at 12268.250 MHz.

12268.250 MHz – 11250.000 MHz = 1018.250 MHz IF

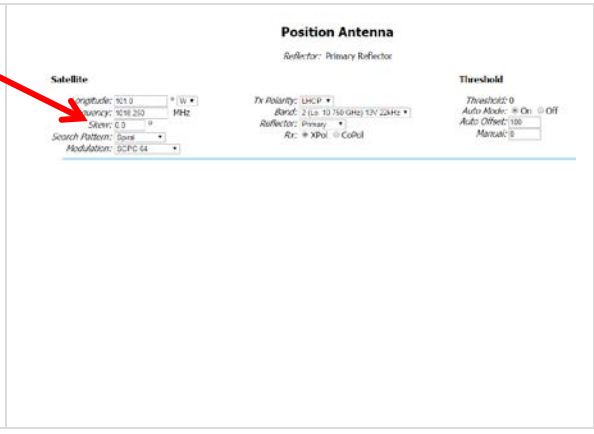
1. Enter the entire six digits of the "megahertz and kilohertz" is simply entered as one value. This is done in the Position Antenna screen.



8.2. SAT SKEW

SKEW is used to optimize the polarization of the feed to the desired satellite signal. It is entered when a known satellite is skewed.

1. Use Skew to peak the polarity.



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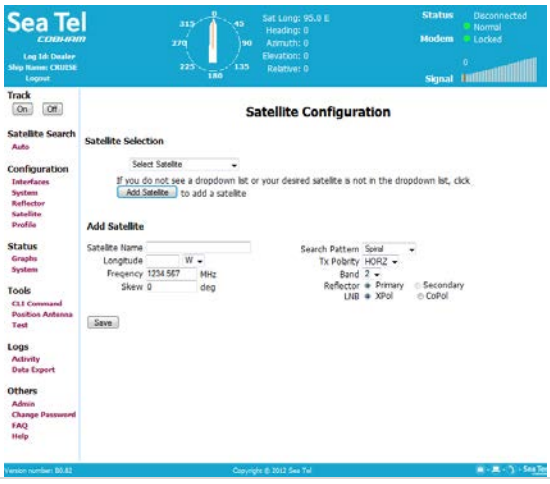
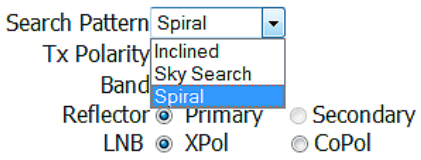
9. Setup – Azimuth Trim

Beginning in IMA software version 1.05, calibrating the targeting of your antenna is much easier. This is accomplished improving Sky Search and changing the way that Azimuth Trim works so that the need for Home Flag Offset is eliminated. Azimuth Trim now corrects the relative position of the antenna in all configurations which have valid/accurate gyrocompass input.

If the antenna has been purposely mounted with the bow mark of the ADE not in alignment with the bow of the ship, such as for safe entry into the radome hatch, note and enter the approximate offset into the AZ TRIM parameter before searching for the satellite for the first time. EXAMPLE: The antenna is being mounted on the port side of the ship where it is unsafe for the hatch to be oriented directly in line with the stern. The installer rotates the ADE so that the bow mark is facing directly to the port and bolts that ADE into place. When first powering the system up, he will enter +90 in the AZ TRIM parameter to indicate that the ADE was rotated CW 90 degrees during the installation. This will make ***initial*** satellite acquisition faster (even though sky search would still find the satellite). This entry is only needed on a new installation that AUTO TRIM has not been run on yet. If the ADE had been similarly installed on the starboard side -90 degrees would have been entered to indicate that the ADE was rotated CCW 90 degrees during the installation.

1. Access the Satellite Configuration screen.	
2. Select Sky Search as your desired type of search pattern to use for this initial satellite acquisition on a newly installed antenna system.	

3. Select the satellite that your airtime services will be provided on in the Satellite Selection dropdown. 4. Refer to the next chapter to enter blockage zones as desired. 5. After the desired satellite has been acquired, allow the antenna to track for about 2 minutes BEFORE clicking Auto Trim. 6. Refer to Setup – Targeting – and follow the instruction for AUTO TRIM to optimize the targeting of the antenna.	

10. Setup – Blockage & RF Radiation Hazard Zones

The Blockage Zones function inhibits the antenna from transmitting within certain pre-set zones. This is typically some structure of the ship that prevents satellite signal from getting to the Sea Tel antenna when the ship is at headings that put that structure in-between the satellite and the satellite antenna,

However, it can also be used as an RF Radiation Hazard zone. If there is an area where people may be near the antenna (within 2 meters), in the antennas transmitted beam for extended periods of time the zone can be set up so that transmit from the satellite antenna will be disabled whenever the antenna is pointed in that zone.

10.1. Radiation Hazard and Blockage Mapping

The MXP can be programmed with relative azimuth sectors (zones) where blockage exists or where transmit power would endanger personnel who are frequently in that area. Your MXP software allows you to set four zones.

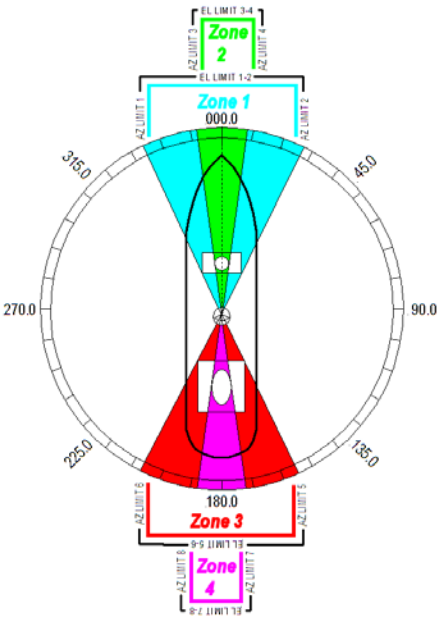
When you create these *ZONES* (up to four), several things happen when the antenna is within any one of the zones:

1. Tracking continues as long as the AGC value is greater than the Threshold value. When the AGC value drops below Threshold, the antenna will wait "Search Delay" parameter amount of time and then re-target the satellite you targeted last. Timeout and re-target will continue until the satellite is re-acquired and tracking can resume.
2. The satellite modem transmission will be disabled until the antenna exits the zone.

The lower and upper azimuth limits are entered into the REL start, REL stop and EL fields within the MXP for each of the blockage zones you wish to create (up to four). Each zone can also be given a name (ie Mast, Deckhouse or Stack:

REL Start is the Lower Relative AZ limit (this is the more counter-clockwise of the two points, even if it is numerically larger). **REL Stop** is the Upper Relative AZ limit (the more clockwise of the two points) for pattern mapping of each. Enter the elevation value that represents the top of the blockage between the two azimuth limit points in the **EL** field.

Repeat for up to four zones, click SAVE when completed.

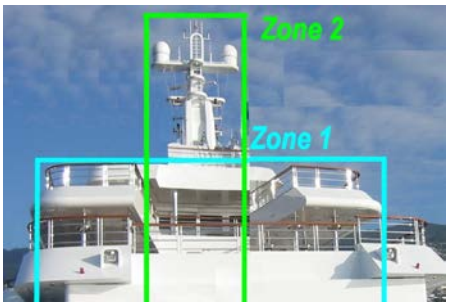


Programming instructions:

Determine the Relative AZ positions **where** blockage, or RF Radiation Hazard, exists. This may be done by monitoring the received signal level and the REL display readings while the ship turns or by graphing the expected blockage pattern. Elevation of the antenna in normal use also must be taken into consideration. A Mast or other structure may cause blockage at low elevation angles, but ***may not*** cause blockage when the antenna is at higher elevation angles where it is able to look over the structure. Up to four zones may be mapped. Only zones which are needed should be mapped.

EXAMPLE - Overlaid Blockage Zones: A ship has a Sea Tel antenna mounted on the center line of the ship. A mast mounted on top of a deckhouse (like the picture above) is forward and an engine exhaust stack, also on a deckhouse, is aft. These two blockage areas have wide azimuth blockage at lower elevations and then a narrower azimuth area of blockage extends up to a higher value of elevation.

ZONE 1 named "Fwd Deckhouse" begins (**REL Start**) at 334 degrees Relative and ends (**REL Stop**) at 026 degrees Relative. Enter **REL Start** value of 334.0 and **REL Stop** value of 26.0. In this case the mast height only causes blockage up to an elevation of 40 degrees, so we set **EL** to 40.0. If the antenna is between these two AZ Limit points but not in the "mast" zone AND the elevation is greater than 40 degrees, the antenna will no longer be blocked.



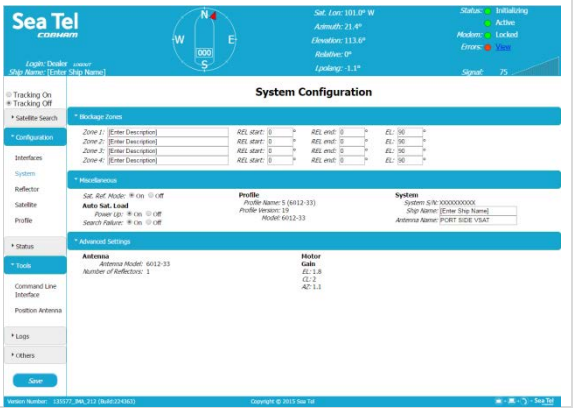
ZONE 2 named "Mast" begins (**REL Start**) at 352 degrees Relative and ends (**REL Stop**) at 008 degrees Relative. Enter **REL Start** value of 352.0 and **REL Stop** value of 8.0. In this case the mast height only causes blockage up to an elevation of 70 degrees, so we set **EL** to 70.0. If the antenna is between these two AZ Limit points but the elevation is greater than 70 degrees, the antenna will no longer be blocked.

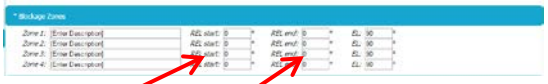
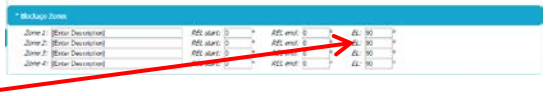
ZONE 3 named "Aft Deckhouse" begins (**REL Start**) at 155 degrees Relative and ends (**REL Stop**) at 205 degrees Relative. Enter **REL Start** value of 155.0 and **REL Stop** value of 205.0. In this case the aft deckhouse height only causes blockage up to an elevation of 30 degrees, so we set **EL** to 30.0. If the antenna is between these two AZ Limit points but the elevation is greater than 30 degrees, the antenna will no longer be blocked.

ZONE 4 named "Stack" begins (**REL Start**) at 173 degrees Relative and ends (**REL Stop**) at 187 degrees Relative. Enter **REL Start** value of 173.0 and **REL Stop** value of 187.0. In this case the stack height only causes blockage up to an elevation of 55 degrees, so we set **EL** to 55.0. If the antenna is between these two AZ Limit points but the elevation is greater than 40 degrees, the antenna will no longer be blocked.

10.2. Programming Instructions:

1. To set up the blockage zones go to the System Configuration screen.



2. Enter a readily identifiable name for the zone (ie Mast, Deck House or Stack). 3. Moving to the right, enter the relative of the starting point of this blockage zone (the more counter-clockwise bearing). 4. Then enter the relative bearing of the stop point of this blockage zone (the more clockwise of the two bearings).	
5. Likewise, for Elevation, you need only to enter the elevation angle, below which you want the transmitter inhibited (blocked). 6. Repeat steps 2-5 to describe up to 4 blockage zones.	

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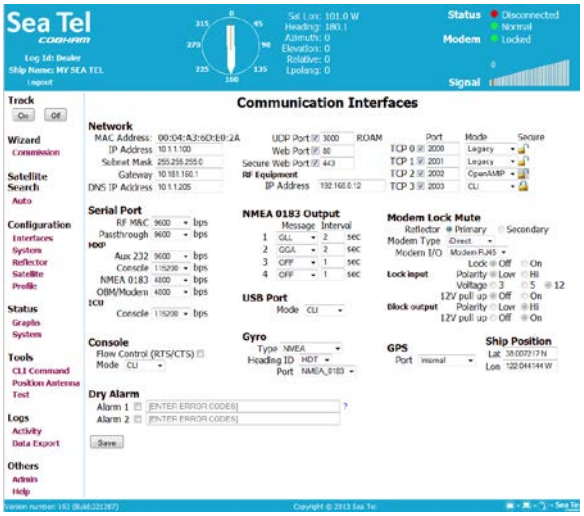
11. Configuring The Satellite Modem Interface.

The configuration setup of an integrated satellite modem to the MXP is accomplished via the Communication Interface Page (Configuration>Interfaces link on the navigational panel on the left hand side of the screen). In order to access this page, the user must be logged in as either "Dealer" or "SysAdmin". The current software load, IMA Ver 105 at the time of this release) contains 6 commonly used satellite Modems (iDirect, Comtech, Gilat, Hughes, STM, and Viasat) as selectable presets and is typically a prompted selection when using the new Commissioning Wizard. However, the MXP allows configuration of a "Custom" modem type. The primary focus of this procedure is to define all of the parameter options made available to allow the commissioning technician to properly integrate any compatible L-Band Satellite modem.

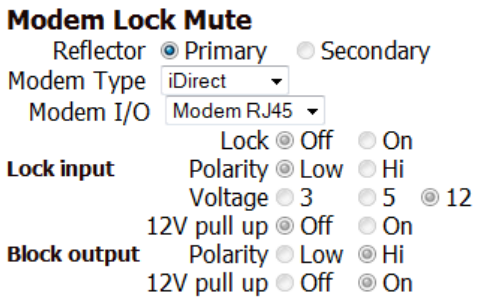
11.1. Satellite Modem Interface

1. If not already, log into the system using the "Dealer" or "SysAdmin" credentials.

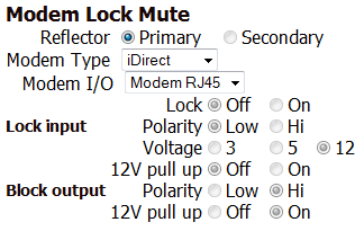


2. On the left hand side of the screen, under Configuration, select the **"Interfaces"** link.

3. On the right side of the screen, approximately half way down is the "Modem Lock Mute" section. This section is where the user, via drop down menu selection and/or mutually exclusive radio buttons, defines:
   - Reflector
   - Modem Type
   - Modem I/O
   - Lock Input
   - Block Output



11.1.1. Reflector setting



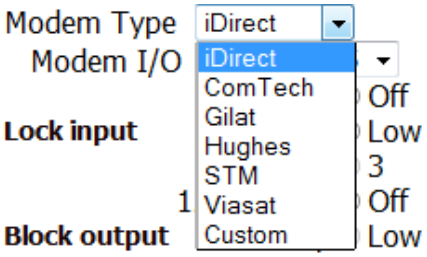
Use: In a dual reflector based antenna system, the "Reflector" selection defines which reflector the modem configuration applies to.

Selection Type: Mutually Exclusive Radio Buttons

Options: Primary or Secondary

Notes: In the current Series 12 antennas this setting should always be set to PRIMARY. Failure to do so may result in abnormal system operation.

11.1.2. Modem Type setting



Use: This selection defines which manufacturer of satellite modem is to be interfaced with the system.

Selection Type: Drop down menu selection

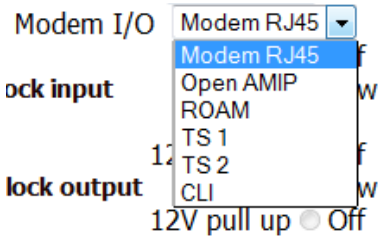
Options: iDirect, ComTech, Gilat, Hughes, STM, Viasat, or Custom.

Notes: The selection of modem type (along with the modem I/O) allows the IMA software to configure the appropriate RX Network Lock, and TX Mute/Block output Lock interfaces per the modem manufacturers' specifications.

Once you select one of the manufacturers and I/O from the dropdown list the other settings that are appropriate for that modem will be set for you (and greyed out).

If your modem manufacturer is not listed, you will need to select "Custom" and manually configure the modem I/O properties. Refer to the custom settings information below.

11.1.3. Modem I/O setting



Use: This selection defines which type (and location) of communication interface between the MXP and the satellite modem.

Selection Type: Drop down menu selection

Options: OpenAMIP, ROAM, TS1, TS2, or CLI.

Notes: The Modem I/O selections of iDirect's **OpenAMIP** or ComTech's **ROAM**, both forms of ABS (**A**utomatic **B**eam **S**witching), communicate via TCP/IP traffic between the MXP's J9 or J10 Ethernet port and the applicable modems Ethernet port. It should also be said that, to use these I/O types, there is a requirement that the integrated satellite modem and NOC (hardware and software) are properly configured and capable to support said feature.

Modem RJ45 is used for standard console port type connections where GPS forwarding is required (i.e. iDirect Console Port) in addition to Positive Satellite ID (RX Network Lock) and TX Mute/Blockage zone functionality

TS1 and **TS2** are hard wired interfaces used only for positive satellite ID (RX Lock) and TX mute functionality.

In some installations, **CLI** (**C**ommand **L**ine **I**nterface) may be desired. CLI is used when a third party ABS device (separate from satellite modem itself) is interfaced to provide antenna control, positive satellite ID (Rx Lock), and Tx mute functionality via TCP/IP traffic between the MXP's J9 or J10 Ethernet port, or Serial Traffic (Console), and the applicable devices Ethernet port.

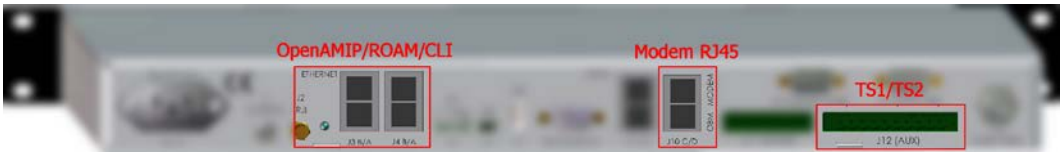
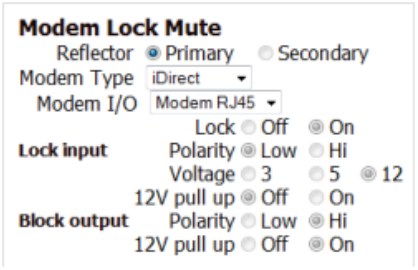


Figure 2 Available MXP Rear Panel Modem IO Ports

11.1.4. Modem I/O – Custom Settings



Use: The individual Modem I/O selections allow the user to manually define the expected driver (output) and detector (input) circuit(s) as well as positive satellite ID functionality between the MXP and the satellite modem.

Selection Type: Mutually Exclusive Radio Buttons

Options: Lock Input: On or Off, Polarity, 12V Pull up.

Block Output: Polarity and 12V Pull up

Notes: The lock input and Block output radio button selections may only be modified if the Modem Type "Custom" Modem Type has been selected.

If any of the other Modem Types are selected, the Lock Input and Block Output radio buttons are predefined for you by software and therefore become read only. This is evidenced to the user by disabling the selections, see image to right for an example of this.

11.1.4.1. Modem I/O – Lock ON/OFF

Use: The Modem I/O Lock Input "**Lock"** selection defines whether or not the MXP will use positive satellite ID functionality.

When OFF, the system will simply use the tracking receiver settings and the subsequent AGC from the receiver to track an acquired satellite. This may be the desired satellite or it may be an adjacent satellite that was acquired during a search for the desired satellite.

When ON, the system must get AGC and ALSO receive a network lock logic signal from the modem to continue tracking the acquired satellite. This prevents tracking the wrong satellite and verifies that the antenna is in fact on the desired satellite (to get network lock from the modem the antenna must be on the correct polarity of the correct satellite). If during a search an adjacent satellite is found, good AGC from the tracking receiver will cause the system to initially track/peak this satellite but be waiting for a network lock signal from the satellite. If the lock signal is not received within 30-40 seconds, that system will return to the search track line and resume searching for the satellite which provides AGC & Lock. Lock Input settings below MUST be set correctly for this functionality to work properly.

Selection Type: Mutually Exclusive Radio Buttons

Options: Lock ON or OFF.

Notes: Modem Type "Custom" must have been selected to allow changes to these settings. Setting Modem Lock to "ON" will enable the positive satellite ID feature whereas setting modem Lock to "OFF" disables the feature. With the exception of the some calibration procedures (ie during Cross-Pol isolation and 1dB compression tests) it highly recommended to leave this setting to ON. By doing so, you eliminate tracking on adjacent satellites for any extended amount of time (typically 30-40 seconds)

11.1.4.2. Modem I/O – Lock Input – Polarity

Use: The Modem I/O Lock Input Polarity selection defines whether the hard lined wire input provides a logic level high or logic level low as indication of Positive Satellite ID (RX Network Lock indication).

Selection Type: Mutually Exclusive Radio Button

Options: Polarity Low or Hi.

Notes: Modem Type "Custom" must have been selected to allow changes to this setting.

You must refer to your satellite modems manufacturers written specifications for its nominal receive lock indication output. Example if you have a satellite modem that provides a nominal 5VDC output when in a NON-Locked condition (off satellite) and 0Vdc when in a locked condition (on satellite), you would set Polarity to "Low".

If your modem provides a continuity based output, short to ground is Low, and Open is High. If your modems output is continuity based logic the Voltage must be set to 12V and

the 12V pull up must be set to "ON" (See Modem I/O Voltage & 12V Pull up sections below). Failure to do so may result in a false Rx Lock trigger when the applicable modem interface cable is removed for any reason.

11.1.4.3. Modem I/O – Lock Input - Voltage

Use: The Modem I/O Lock Input Voltage selection defines the nominal voltage range for the hard lined wire input for indication of Positive Satellite ID (RX Network Lock indication).

Selection Type: Mutually Exclusive Radio Buttons

Options: Voltage 3V, 5V or 12V.

Notes: Modem Type "Custom" must have been selected to allow changes to this setting.

You must refer to your satellite modems manufacturers written specifications for the receive lock indication voltage range that it provides as an output. The receive logic level itself is interpreted by the MXP based on the above mentioned Polarity selection (the actual Low versus Hi polarity trigger is 50% of selected voltage range). Example: You have a satellite modem that provides a 12VDC output range and Polarity has been set to Low. When the detected voltage is between 0 to 6Vdc, the MXP would interpret this as a Positive Satellite ID. Voltage between 6.1 and 12Vdc would be interpreted as a failed Positive Satellite ID (because it is High).

If your modem provides a continuity based output (short to ground is Low, and Open is high), you must set this selection to 12V.

11.1.4.4. Modem I/O – Lock Input - 12V Pull Up

Use: The Modem I/O Lock Input 12V Pull Up selection defines whether or not to use a built-in 12VDC Pull up resistor for the hard lined wire input for indication of Positive Satellite ID (RX Network Lock indication). The MXP requires a voltage input for this satellite ID functionality.

If your modem outputs continuity based logic, the pull up circuit (ON) converts the continuity to voltage. For all voltage based modem outputs, it MUST be set to OFF to prevent false Positive Sat ID indications (voltage high & higher, but never low).

Selection Type: Mutually Exclusive Radio Buttons

Options: 12V Pull Up Off or On.

Notes: Modem Type "Custom" must have been selected to allow changes to this setting.

If your modem provides a continuity based output (short to ground is Low, and Open is high) this selection must be set to "ON". For all voltage based modem outputs, it MUST be set to OFF.

11.1.4.5. Modem I/O – Block Output – Polarity

Use: The Modem I/O - Block Output selection defines whether or not the MXP will provide a logic level Low or logic level Hi output when a condition exists that requires muting the IF transmission of the system. This is known as TX Mute functionality and is a signal from the MXP to the Satellite Modem (which in turn removes drive to the Block Up Converter mounted on the antenna assembly). The signal flow for this feature is from the MXP to the Satellite Modem.

Selection Type: Mutually Exclusive Radio Buttons

Options: Polarity Low or Hi.

Notes: Modem Type "Custom" must have been selected to allow changes to this setting.

You must refer to your satellite modems manufacturers written specifications for the input required to mute the modems output to the BUC. Ascertain whether the input signal must be Hi or Low logic to mute and whether it is continuity based logic or voltage based.

Example: If your satellite modem requires a Hi logic input (continuity or voltage) to cease transmissions you must select Hi.

There are numerous compliance laws (FCC and other worldwide entities) that mandate the ability and/or need to immediately mute transmit on a VSAT system when at least one of

numerous predefined conditions are met. In most cases, these are conditions that ultimately determine that the system is not accurately pointed to the desired satellite. However there are some conditions where this may not be true, as is the case of the antenna being pointed at a pre-defined "Radiation Hazard Zone", which discussed in detail within another chapter of this manual, is programmed in as a Blockage Zone, thus the name Block Output.

There may be an area on board the vessel in which crew and/or guests may be in the direct path of the terminals transmission to the satellite and might possibly be harmed by long term exposure to the microwave signal. This sector would be described as a blockage zone so that the transmissions from the antenna would cease when pointed in that area. Similarly a mast or other structure on the ship, directly in the beam path of the transmission, which would prevent transmitted signal from reaching the satellite and cause reflections which may degrade the signal or even be harmful to the antenna. These obstructions would also be described as a blockage zones. This similar in concept to "sector blanking" a radar array.

11.1.4.6. Modem I/O – Block Output – 12V Pull Up

Use: The Modem I/O Block Output 12V Pull Up selection defines whether or not use a built-in 12VDC Pull up resistor for the hard lined wire input for Blockage output (TX Mute).

If your modem requires a continuity based input (Short to ground is Low, and Open is High) this selection must be set to OFF. For all voltage based modem inputs, it MUST be set to ON.

Selection Type: Mutually Exclusive Radio Buttons

Options: 12V Pull Up OFF or ON.

Notes: Modem Type "Custom" must have been selected to allow changes to this setting.

Example: Your modem requires a high, voltage based, input to mute the modem. You would set Polarity to Hi and 12V Pull Up to ON.

If your modem required a low, continuity based, input to mute the modem. You would set Polarity to Low and 12V Pull Up to OFF.

11.2. Quick Reference: Common Modem Lock & Mute Settings

Modem Type	Compatible ABS Mode	Lock Input - Lock	Lock Input – Polarity	Lock Input – Voltage	Lock Input - 12V Pull Up	Block Output - Polarity	Block Output - 12V Pull Up
iDirect	OpenAMIP*	On	Low	12	Off	Hi	On
ComTech	ROAM*	On	Low	12	On	Low	On
Gilat	N/A	On	Low	12	Off	Low	Off
Hughes	N/A	On	Hi	12	Off	Hi	On
Viasat	N/A	On	Low	12	Off	Low	Off
Custom	CLI*	On	As Required	As Required	As Required	As Required	As Required

***NOTE**: When interfacing ABS (via Ethernet connection) Lock input and Block Output selections have no operational impact.

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12. Setup – Targeting

Optimize the targeting of the antenna to track on or near a desired satellite (within +/-1 degree.

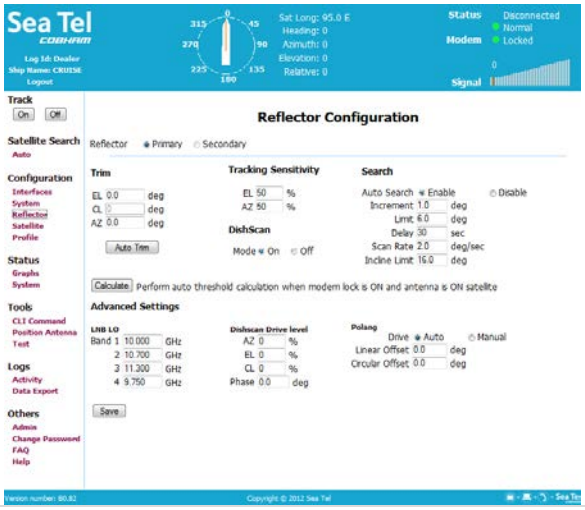
12.1. *AUTO TRIM*

The Auto Trim function will automatically calculate and set the required Azimuth and Elevation trim offset parameters required to properly calibrate the antennas display to the mechanical angle of the antenna itself, while peaked ON satellite.

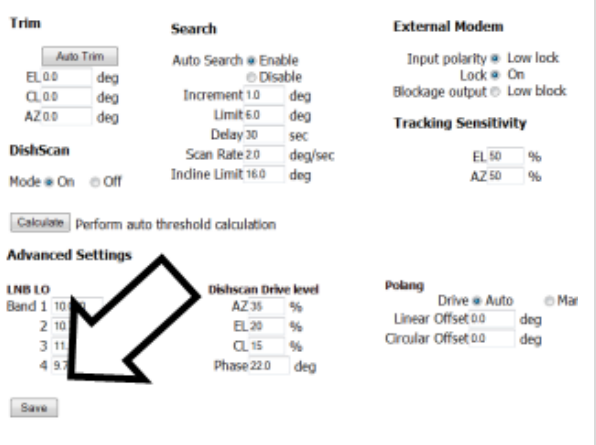
After locating the satellite, with Tracking ON, **wait at least 2 minutes** before performing the AUTO TRIM, this will allow sufficient time for the antenna to peak up on the satellite signal and for the targeting loops to completely stabilize. It is equally important that you verify that the system is tracking the CORRECT satellite (verify a RX lock indication on the satellite modem).

NOTE: The AUTO TRIM feature is NOT allowed unless all of these conditions are met:

- The antenna must be actively tracking a satellite (AGC above threshold) **AND**
- The antenna must have positive SAT ID (RX lock input from the Satellite Modem) **AND**
- The elevation angle of the antenna must be LESS than 83 degrees **AND**
- The antenna must NOT be set for Inclined Orbit Search **AND**
- The system must NOT be set for "No Gyro" mode.

1. To activate the Auto Trim function go to the Reflector Configuration screen.	
2. Click on the Auto Trim button. This does not save these parameters to NVRAM, in order to save to memory, click the Save button.	

3. Click SAVE

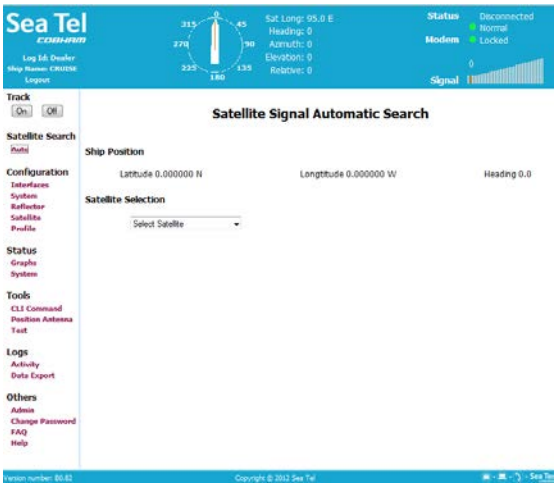


12.2. Manually Optimizing Targeting

1. First, assure that all of your Ship & Satellite settings in the MXP are correct.
2. Access the Satellite Search screen
3. Target the desired satellite by selecting it from the drop down list. You will see a message "Acquiring Satellite Signal…Please Wait" displayed.
4. Watch the Azimuth and Elevation values displayed in the center area of the banner and prepare to click the Track OFF button.

When targeting the antenna will initially drive to an elevation position that is 8 degrees above (or below if the elevation is greater than 83 degrees) the actual calculated position that the satellite should be at. After azimuth and polarization also finish driving, the elevation will drive to the actual elevation of the satellite

5. As soon as the elevation drives (up or down) 8 degrees click the Track OFF button and record the Azimuth and Elevation positions (these are the Calculated positions)..

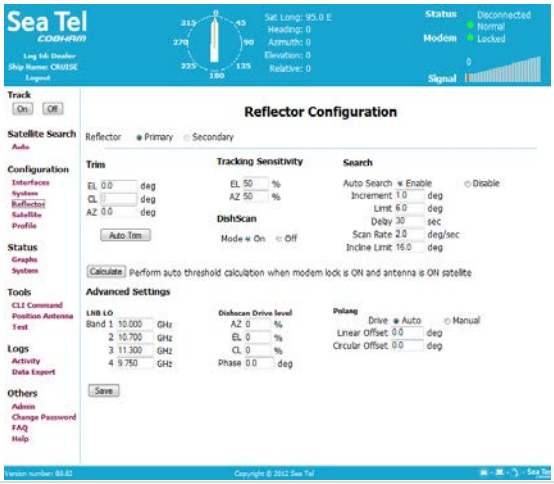


6. Click Track ON button and allow the antenna to search, acquire and track the desired satellite.

As this happens you will see "Satellite Signal Found" and "Modem Lock: LOCKED" messages displayed. Select the Position Antenna screen., turn Tracking OFF and click Save.

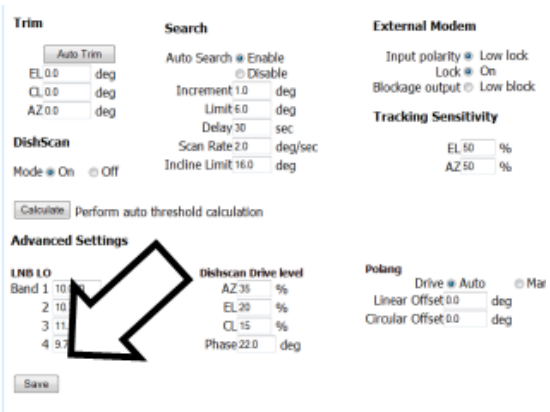
7. After the antenna has been tracking for several minutes, record the Azimuth and Elevation positions of the antenna (these are the Peak positions).
8. Subtract the Peak Positions from the Calculated Positions to determine the amount of Trim which is required.

9. Access the Reflector Configuration page.



10. Enter the Elevation Trim in the EL field.
11. Enter the Azimuth Trim in the AZ field.

12. Click Save.
13. Re-target the satellite several times to verify that targeting is now driving the antenna to a position that is within +/- 1.0 degrees of where the satellite signal is located.



EXAMPLE: The antenna initially targets to an Elevation position of 38.0 degrees and an Azimuth position of 180.2. Shortly after that the Elevation drives to 30.0 degrees and Azimuth stays at 180.2 (Calculated), you find that Peak Elevation while ON your desired satellite is 31.5 degrees and Peak Azimuth is 178.0. You would enter an EL TRIM value of –1.5 degrees and an AZ TRIM of +2.2 degrees. After these trims values have been set, your peak **"ON"** satellite Azimuth and Elevation displays would be very near 180.2 and 30.0 respectively.	

13. Setup – Satellite Configuration

The values that these parameters are set to depends on the hardware configuration required for each satellite. Configure each of the satellites that airtime services will be provided on so that any one of them can be selected, remotely or by the user onboard. The satellite selection will in turn control the hardware on the antenna pedestal to select the correct TX & RX hardware and the correct tracking settings.

Sea Tel provides quad-band LNBs as standard on the Ku-Band feed assemblies.

13.1. Searching Patterns

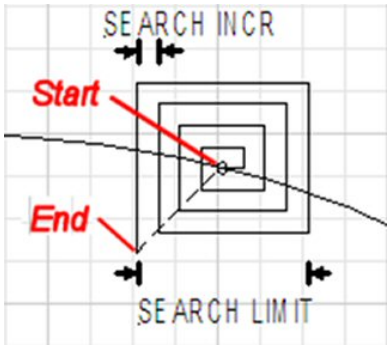
The MXP will initiate an automated search pattern after AGC falls below the current Threshold setting (indicates that satellite signal has been lost). The SEARCH DELAY parameter sets the amount of delay, in seconds that the MXP will wait after AGC has fallen below the threshold value before it starts a search. Below are the choices of patterns that each satellite can be set to.

You configure the dimensions of these patterns MXP to use this pattern by using the Search Increment and Search Limit parameters on the Satellite Configuration page.

13.1.1. Default "Spiral" (Box) Search Pattern

The factory default search pattern in the MXP is a "Spiral" pattern.

When a search begins;

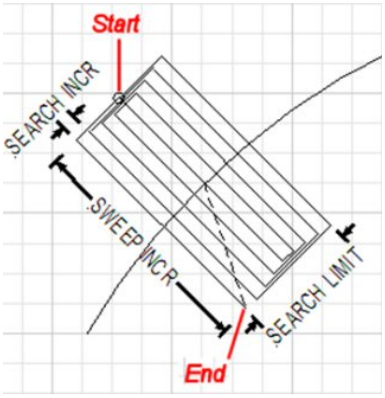


The antenna will then search up in azimuth one Search Increment, search up one Search Increment in elevation, search down two Search Increments in azimuth, search down two Search Increments in elevation, etc until Search Limit is reached. When the end of the search pattern is reached, the MXP will retarget the antenna to the calculated Azimuth and Elevation position of the desired satellite (start point).

If the desired signal is found (AND network lock is achieved in the satellite modem) at this position, or anywhere within the search pattern, the MXP will terminate search and go into Tracking mode. If the desired signal is not found the MXP will wait SEARCH DELAY seconds and then begin the search pattern again. This cycle will repeat until the desired satellite signal is found or the operator intervenes.

13.1.2. Inclined Orbit Search Pattern

Some older satellites, in order to save fuel to keep them exactly positioned over the Equator, are in an inclined geosynchronous orbit. The satellite remains geosynchronous but is no longer geostationary. From a fixed observation point on Earth, it would appear to trace out a figure-eight with lobes oriented north-southward once every twenty-four hours. The north-south excursions of the satellite may be too far off the center point for a default box search pattern to find that satellite at all times during the 24 hour period.



When a search begins;

Initially the antenna will go to a calculated position that is half of SWEEP INCR degrees above, and perpendicular to, the satellite arc (along the same angle as polarization for the desired satellite). This position is the "Start" of the search pattern in the graphic above. Then the antenna will drive down along the polarization angle SWEEP INCR degrees, step one Search

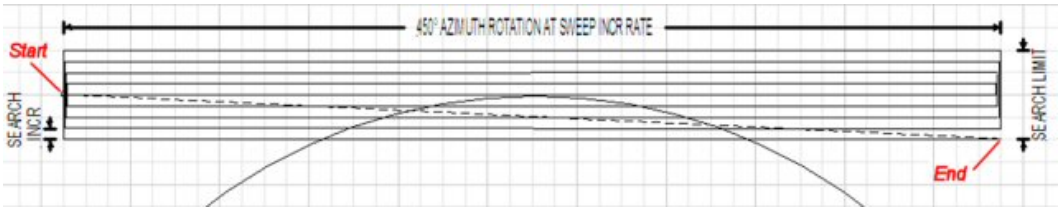
Increment to the right (parallel to the satellite arc), search up along the polarization angle SWEEP INCR degrees, step two Search Increments to the left, search down, etc expanding out in the search pattern until Search Limit is reached. When the end of the search pattern is reached, the MXP will retarget the antenna to the calculated Azimuth and Elevation point.

If the desired signal is found (AND network lock is achieved in the satellite modem) at this position, or anywhere within the search pattern, the MXP will terminate search and go into Tracking mode. If the desired signal is not found the MXP will wait SEARCH DELAY, then target the antenna to start point shown in the graphic above and begin the search pattern again. This cycle will repeat until the desired satellite signal is found or the operator intervenes.

13.1.3. Sky Search Pattern

If the ship does not have a gyro compass to use as a heading input to the MXP, you may manually key in the actual heading of the vessel and then re-target the desired satellite, every time you need to re-target a satellite, or configure the MXP to do a "No Gyro Search Pattern".

Initially the antenna will go to the "Start" relative azimuth position at the calculated elevation. Then the antenna will search up 450 degrees in azimuth, search up one Search Increment in elevation, search down 450 degrees in azimuth, search down two Search Increments in elevation, etc until Search Limit is reached. When the end of the search pattern is reached, the MXP will retarget the



antenna back to the start point shown in the graphic below.

If the desired signal is found (AND network lock is achieved in the satellite modem) at this position, or anywhere within the search pattern, the MXP will terminate search and go into Tracking mode. If the desired signal is not found the MXP will wait SEARCH DELAY seconds and then begin the search pattern again. This cycle will repeat until the desired satellite signal is found or the operator intervenes.

13.2. TX Pol select

Is used to select the transmit polarity of the C-Band Linear/Circular selectable feed, or the Ku-Band linear feed, whichever is currently installed.

13.3. Band select

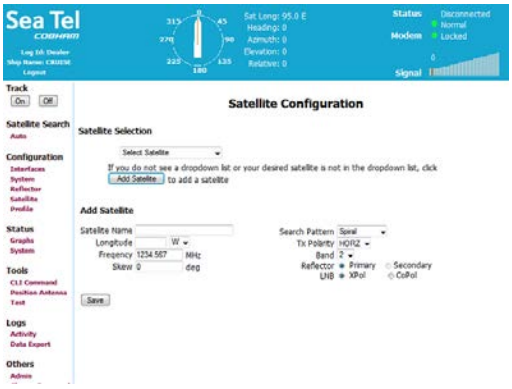
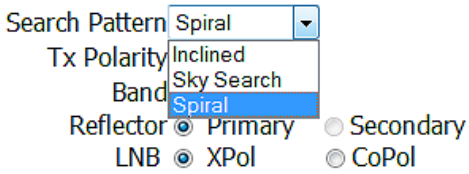
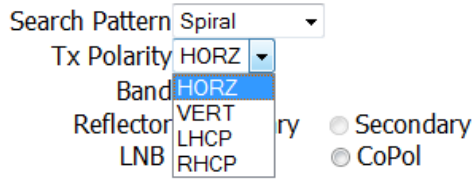
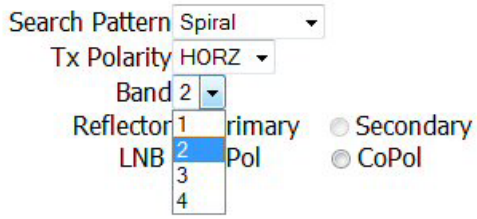
Controls the band selection of the selected LNB (X-Pol or Co-Pol) on the Ku-Band linear feed ONLY. This setting works in conjunction with the X-Pol / Co-Pol selection setting.

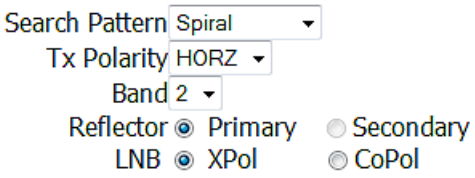
13.4. X-Pol / Co-Pol select

Selects the desired (X-Pol or Co-Pol) on the Ku-Band linear feed ONLY. This setting works in conjunction with the band selection setting.

13.5. Selecting/Configuring Your Satellite Configuration

Choose a predefined satellite configuration or create a new one using the steps below.

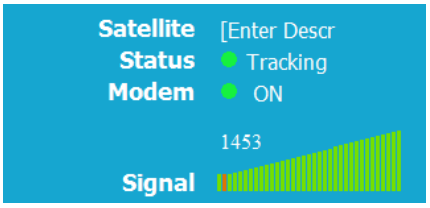
1. Access the Satellite Configuration screen. 2. Select the satellite that your airtime services will be provided on (or add a new one).	
3. Select the desired type of search pattern to use for this satellite.	
4. Select desired TX Polarity from the drop down menu.	
5. Select desired Band from its drop down menu.	

6. Assure that reflector is set to "Primary". 7. Select Cross-Pol LNB (XPol) or Co-Pol LNB (CoPol) as is appropriate for this satellite.	
8. Click the Save button.	

14. Quick Start Operation

If your system has been set up correctly, and if the ship has not moved since the system was used last, the system should automatically acquire the satellite from a cold (power-up) start. Once the satellite has been acquired, the modem then should achieve lock and you should be able to use the system.

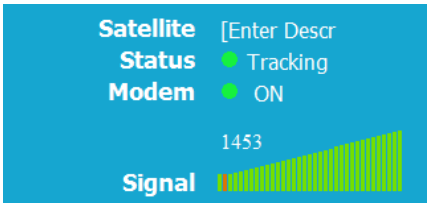
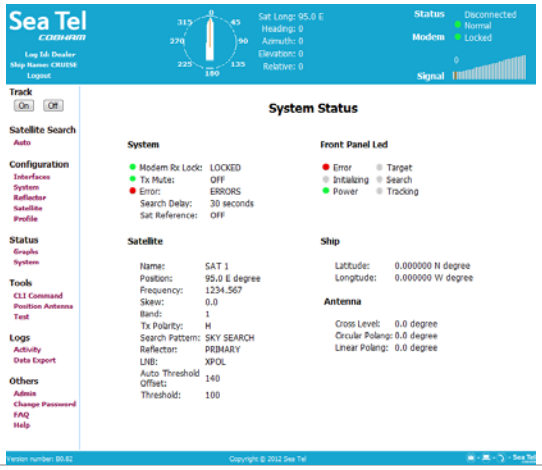
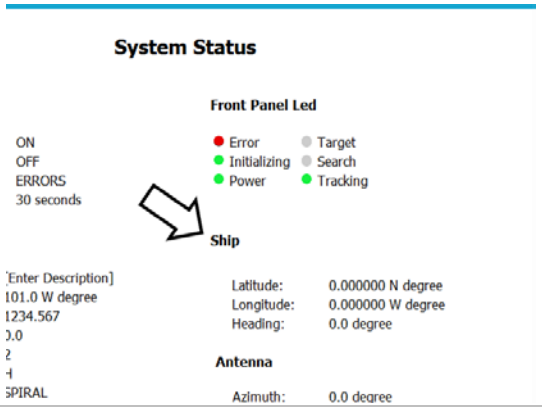
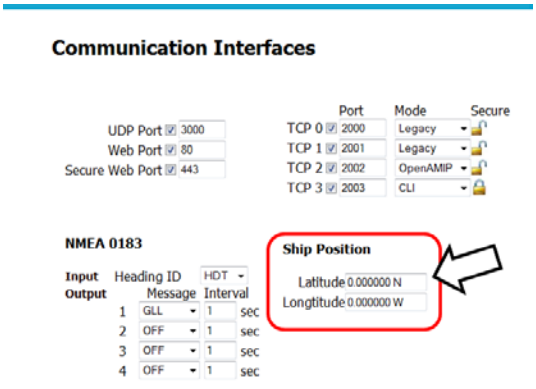
14.1. If satellite signal is found AND network lock is achieved:

1. Tracking will take over (front panel Tracking LED will be ON) and automatically peak the antenna position for highest receive signal level from the satellite.	
2. When the ICU has signal above threshold AND modem has network lock the antenna will continue to track the satellite. 3. Satellite Name (if entered), Tracking indicator, Modem Lock indicator and signal level (number value and bar graph) will be displayed in the header of the MXP GUI pages.	
Upon completion of the above, the system will continue to operate automatically, indefinitely until: • AC power to the system is interrupted OR • The satellite signal is blocked OR • The ship sails into an area of insufficient satellite signal strength/level.	

14.2. If no signal is found:

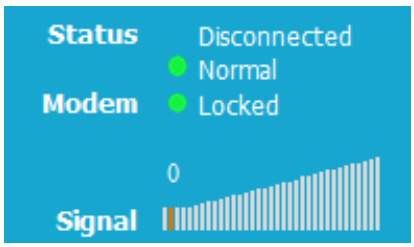
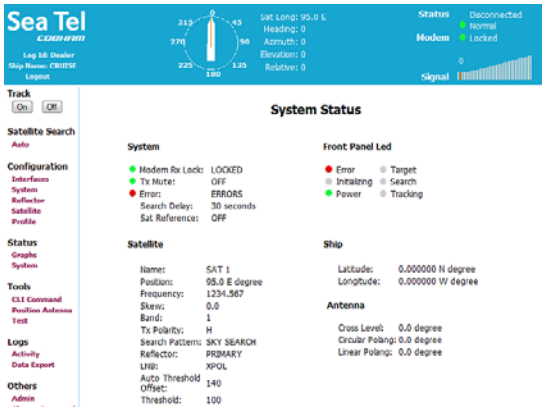
If the system does NOT automatically find the satellite from a cold start, follow the steps below:

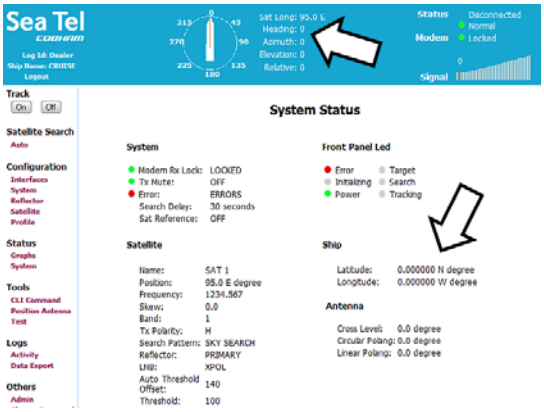
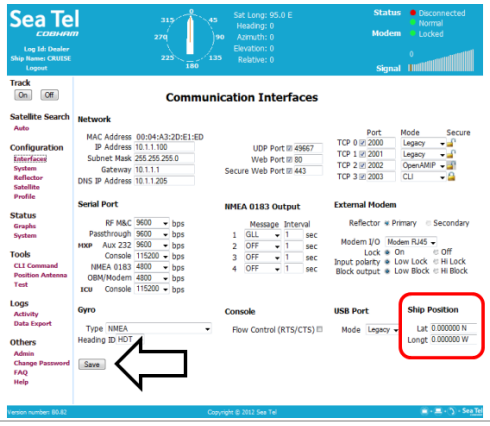
1. The Tracking LED will flash for a short period of time (Search Delay) followed by the Search LED coming ON. 2. The ICU will automatically move the antenna in the selected Search pattern until looking for a signal value that is greater than the threshold value (red bar in the bar graph below).	

3. Not finding a signal greater than Threshold, the bar graph will stay red and the antenna will reach the end of the prescribed search pattern. 4. The antenna will retarget and the cycle will repeat (Search Delay timeout, conduct search pattern followed by retarget).	
5. Check Latitude, Longitude and Heading. These should be correct, but may be updated if necessary. 6. Access the System Status screen.	
7. Find the Latitude, Longitude and Heading displayed values. If they are correct skip to step 12.	
8. If the Latitude & Longitude values are not correct, access the Communication Interfaces screen and enter the ships Latitude & Longitude position in the fields provided. 9. Click Save.	
10. If the Heading value is correct, enter the correct value in the lower right field of the Communication Interfaces screen. 11. Click Save.	

12. Check for blockage (this is the MOST common cause of not being able to acquire the desired satellite). 13. Verify that the correct satellite is selected. 14. Check cable connections to assure that a cable has not been disconnected.	

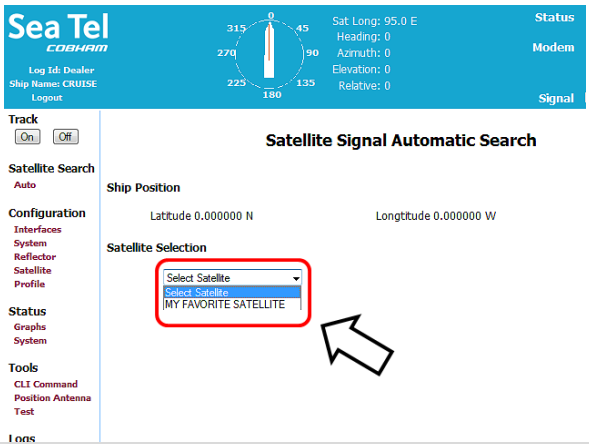
14.3. If satellite signal is found but network lock is NOT achieved:

1. The Tracking LED will flash for a short period of time (Search Delay) followed by the Search LED coming ON. 2. The ICU will automatically move the antenna in the selected Search pattern until it receives a signal value that is greater than the threshold value (red bar in the bar graph). If signal above Threshold is found, Tracking will take over (Tracking LED ON) and automatically peak the antenna position for highest receive signal level from the satellite which has been acquired. The system will wait for the modem to achieve lock. If the modem does not get lock, the antenna will resume its search pattern.	 
3. If the system does not acquire the correct satellite within the prescribed search pattern, the antenna will retarget and the cycle will repeat (Search Delay timeout, conduct search pattern followed by retarget).	
4. Check Latitude, Longitude and Heading. These should be correct, but may be updated if necessary. 5. Access the System Status screen.	

6. Find the Latitude, Longitude and Heading displayed values. If they are correct skip to step 11.	
7. If the Latitude & Longitude values are not correct, access the Communication Interfaces screen and enter the ships Latitude & Longitude position in the fields provided. 8. Click Save.	
9. If the Heading value is correct, enter the correct value in the lower right field of the Communication Interfaces screen. 10. Click Save.	
11. Check for blockage (this is the MOST common cause of not being able to acquire the desired satellite). 12. Verify that the correct satellite is selected. 13. Check for polarization drive failure. 14. Check for improper polarization alignment/position.	
15. Check cable connections to assure that a cable has not been disconnected. 16. Check the modem for failure.	

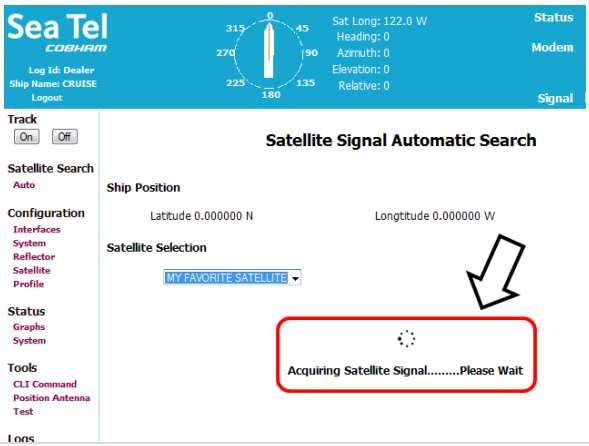
14.4. To Target a different satellite

1. To target a different satellite go to the Satellite Search Auto screen and select the desired satellite from the drop down list.



2. When you make that selection you will see the temporary message:

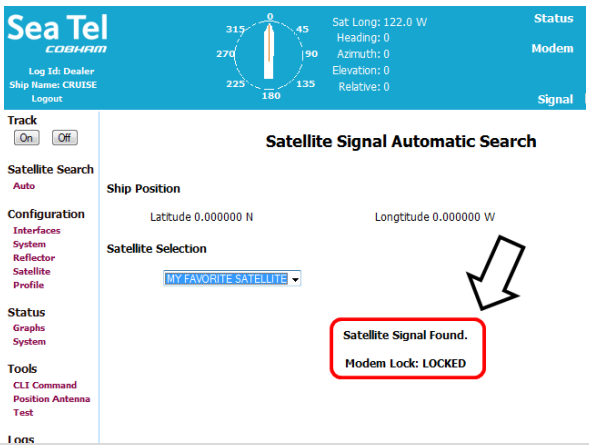
Acquiring Satellite Signal…Please Wait



3. Shortly after that you will see the temporary message:

Satellite Signal Found.

Modem Lock: LOCKED



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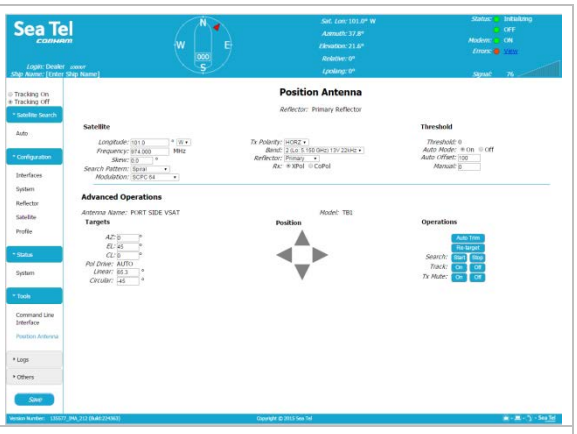
15. Optimizing Cross-Pol Isolation

Now that all of the other setup items have been checked and changed as necessary, it is time to contact the NOC to arrange for cross-pol isolation testing and whatever other commissioning the NOC asks for. Read this procedure thoroughly before you are asked to begin. Assure that you are on the correct satellite and have RX network lock. (the NOC may have you adjust TX Frequency and/or modem TX level prior to beginning cross-pol isolation). At the appointed time follow the steps below for the cross-pol isolation testing.

15.1. Optimizing Cross-Pol Isolation

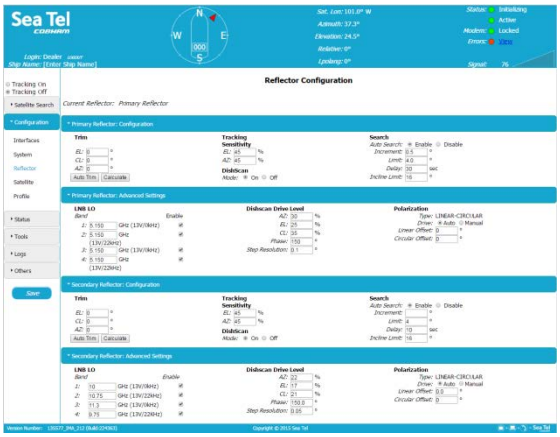
<table>
<tr>
<td>1. Access the Tools - Position Antenna screen.

NOTE: You will use Skew to optimize polarization because it drives the feed immediately (Linear Offset is slower, longer term drive).

2. Record the value in the Skew field in the upper section of the screen. If this satellite has a known Skew, it will be entered in the satellite configuration displayed here. If this satellite is not skewed this field will be 0.0.</td>
<td> 
</td>
</tr>
<tr>
<td>3. While talking to the technician at the NOC make adjustments to the Skew value to adjust polarity of the feed under his/her direction (minus values are accepted – type a minus sign before the number value). It is best to adjust in one degree increments to get close to best isolation and then half degree steps and then tenths as needed. Click "Submit" after each numeric change is typed in.

4. Record the DIFFERENCE in Skew value which was required to achieve optimum cross-pol isolation.

5. Set Skew back to the value recorded in step 2.</td>
<td></td>
</tr>
</table>

6. Access the Reflector Configuration screen. 7. Change the "Linear Offset" value by the amount of difference recorded in step 4. Examples: Skew was 0.0, you increased it to 2.5 to optimize TX polarization. You set Skew back to zero and go to the Reflector Configuration screen where you find Linear Offset to be 0.0, so you increase Linear Offset to 2.5 degrees and click Save. Skew was 3.0, you decrease it to 1.0 to optimize TX polarization. You set Skew back to 3.0 and go to the Reflector Configuration screen where you find Linear Offset to be 0.0, so you set Linear Offset to minus 2 (-2.0) degrees and click Save.	
8. Double check with the NOC to assure that cross-pol is still optimized. 9. Conduct any other testing as directed by the NOC (ie P1dB compression).	

15.1. Cyber Security Caution

Sea Tel Antenna systems are not intended to be connected directly to the Internet. They must be connected behind a dedicated network security device such as a firewall. In addition, we highly recommended that you change default passwords. This is an extremely important consideration that must be taken into account as part of commissioning procedures as attackers with malicious intent (after easily obtaining default passwords and identify internet-connected systems) can be rendered a system inoperable.

For clarification purposes, the factory default Passwords/Configurations are only intended for initial production testing/verification purposes and it is an assumed responsibility of the installing partner to change and record the login credentials and is shared only with persons whom are directly responsible for operation/maintenance of the system. Instructions on how to change passwords may be located within the system manual.

16. Installation Troubleshooting

This section describes the theory of operation to aid in troubleshooting and adjustments of the antenna system. Also refer to the Troubleshooting section of your ACU manual for additional troubleshooting details.

	***WARNING:*** *Electrical Hazard – Dangerous AC Voltages exist in the Breaker Box and the Antenna Pedestal Power Supply. Observe proper safety precautions when working inside the Antenna Breaker Box or Power Supply.*
	***WARNING:*** *RF Radiation Hazard - This stabilized antenna system is designed to be used with transmit/receive equipment manufactured by others. Refer to the documentation supplied by the manufacturer which will describe potential hazards, including exposure to RF radiation, associated with the improper use of the transmit/receive equipment. Note that the transmit/receive equipment will operate independently of the stabilized antenna system.* **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**
	***WARNING:*** *RF Radiation Hazard - Prior to working on the stabilized antenna system, the power to the* ***transmit/receive*** *equipment must be locked out and tagged.* ***Turning OFF power to the Antenna Control Unit does NOT turn Transmit power output OFF.*** **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**
	***WARNING:*** *RF Radiation Hazard - When the transmit/receive system is in operation, no one should be allowed anywhere within the radiated beam being emitted from the reflector.* **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**

16.1. Troubleshooting Ships Gyro Compass problems

Ships Heading display does not follow ships movement and/or you are getting frequent or constant ERROR CODE 0001. Determine the type of gyro compass that is used on the ship, assure that the GYRO TYPE parameter is set correctly (refer to the setup section of this manual) and then proceed to the step that lists the troubleshooting for the correct type of Gyro Compass Signal.

16.1.1. STEP-BY-STEP

1. Verify that the GYRO TYPE parameter is set correctly.
2. Observe the ERROR LED on the FRONT panel. If it is illuminated, this indicates that an error was detected in the Step-By-Step input. Press RESET on the front panel. If the ERROR LED illuminates again, the problem is in the four connections to A, B, C and COMMON.
3. Check the connections to the TMS and to the ACU.
4. Measure the voltage between COMMON and A, B, and C. Each reading should either be near zero or 35 to 70 VDC. If all three are zero, check the repeater fuses. If some read negative and some read positive or if one reads an intermediate values the COMMON terminal is not properly connected.

5. If the ***Ship*** - Heading display is different from the actual Gyro heading, access the Heading entry menu and key in the correct heading value (refer to the operation Ship menu section). Note the reading. After the ship has turned more than one degree, compare the new gyro heading with the reading on the display, if it has moved in the opposite direction then reverse connections A and B. Reset the ACU, put in the correct ship's heading again and verify that the display reading now follows the Gyro heading.

16.1.2. 1:1 SYNCHRO

Observe the ship's heading display on the ACU. Compare its movement with that of the ship. If it does not move at all go to step 1. If it moves but in the wrong direction (even if it does not display the correct heading) go to step 2. If it moves in the correct direction but does not display the correct heading go to step 3. The gyro compass connects to the R1, R2, S1, S2 and S3 terminals.

CAUTION - Electrical Shock Potentials exist on the Gyro Compass output lines. Assure that the Gyro Compass output is turned OFF when handling and connecting wiring to the Terminal Mounting Strip.

1. **The Ships Heading display does not change when the ship changes direction**. Using a multimeter read between R1 and R2. It should read 115 VAC. If it does not then a fuse is blown at the gyro repeater or there is an open between the repeater and the ACU. Read between S1 and S2, S2 and S3 and finally S3 and S1. They should all read between 0 and 90 VAC. The voltage level will change as the ship turns. If one reading is very close to 0 volts wait until the ship has made a major change in heading and then check voltage again. If the reading is still very low there is a problem in the line between the gyro repeater and the ACU or a problem in the gyro repeater itself.
2. **The display changes in the direction opposite of the movement of the ship**. Switch the secondary leads S1 and S2. Caution: there is 90 VAC between them! Verify that when the ship changes direction the display shows change in the same direction. If the direction is correct but the heading is incorrect go to step C.
3. **The ship's heading display does not indicate the correct heading**. If the display is off by 60, 180 or 300 degrees, this indicates that R1 and R2 are reversed. Reverse R1 and R2 and recheck the heading display. If the display is off by 120 or 240 degrees, this indicates that S1, S2 and S3 are in the right order but off by one place. Note their positions and carefully move the connections one position over (S1 to S2, S2 to S3, and S3 to S1). This action will offset the display by 120 degrees. Check if the display now reads correctly. If not move all three leads one more time in the same direction as last time. Verify that the ship's heading is correct.

16.1.3. 360:1 Synchro

Observe the ship's heading display on the ACU. Compare its movement with that of the ship. If it does not move at all go to step 1. If it moves but in the wrong direction (even if it does not display the correct heading) go to step 2. If it moves in the correct direction but does not display the correct heading go to step 3. The gyro compass connects to the Terminal Mounting Strip on TB3- R1, R2, S1, S2 and S3.

CAUTION - Electrical Shock Potentials exist on the Gyro Compass output lines. Assure that the Gyro Compass output is turned OFF when handling and connecting wiring to the Terminal Mounting Strip.

1. The Ships Heading display does not change when the ship changes direction. Using a multimeter read between R1 and R2. It should read 115 VAC. If it does not then a fuse is blown at the gyro repeater or there is an open between the repeater and the ACU. Read between S1 and S2, S2 and S3 and finally S3 and S1. They should all read between 0 and 90 VAC. The voltage level will change as the ship turns. If one reading is very close to 0 volts wait until the ship has made a major change in heading and then check voltage again. If the reading is still very low there is a problem in the line between the gyro repeater and the ACU or a problem in the gyro repeater itself.
2. The display changes in the direction opposite of the movement of the ship. Switch the secondary leads S1 and S2. Caution: there is 90 VAC between them! Verify that when the ship changes direction the display shows change in the same direction. If the direction is correct but the heading is incorrect go to step C.
3. If the ship's heading is different than the bridge, select the HDG function in the SHIP display mode by pressing the SHIP key 4 times. Key in the correct heading using the numeric keys and press ENTER.

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17. Maintenance

This section describes the maintenance procedures for this antenna system. Also refer to the Troubleshooting section of this manual for troubleshooting details.

	***WARNING:*** *Electrical Hazard – Dangerous AC Voltages exist in the Breaker Box and the Antenna Pedestal Power Supply. Observe proper safety precautions when working inside the Antenna Breaker Box or Power Supply.*
	***WARNING:*** *RF Radiation Hazard - This stabilized antenna system is designed to be used with transmit/receive equipment manufactured by others. Refer to the documentation supplied by the manufacturer which will describe potential hazards, including exposure to RF radiation, associated with the improper use of the transmit/receive equipment. Note that the transmit/receive equipment will operate independently of the stabilized antenna system.* **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**
	***WARNING:*** *RF Radiation Hazard - Prior to working on the stabilized antenna system, the power to the* ***transmit/receive*** *equipment must be locked out and tagged.* ***Turning OFF power to the Antenna Control Unit does NOT turn Transmit power output OFF.*** **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**
	***WARNING:*** *RF Radiation Hazard - When the transmit/receive system is in operation, no one should be allowed anywhere within the radiated beam being emitted from the reflector.* **The ultimate responsibility for safety rests with the facility operator and the individuals who work on the system.**

17.1. Warranty Information

Sea Tel Inc. supports these systems with a **TWO** year warranty on parts and labor.

Access to the interior of the Outdoor Equipment (ODE), is allowed for inspection of components as described in the Scheduled Inspections section of this manual may be accomplished by technician/an engineer. Maintenance of the ODE should only be performed by technicians/engineers who are authorized by Cobham SATCOM. Only authorized Partners who have received factory training on this equipment will be able to file a claim for warranty reimbursement. Failure to comply with standard practices, which include but are not limited to modification of the terminal away from factory documented assemblies may also void the warranty period.

What's Covered by the Limited Warranty?

The Sea Tel Limited Warranty is applicable for parts and labor coverage to the complete antenna system, including all ADE (radome, pedestal, antenna, motors, electronics, wiring, etc.) and the ACU or MXP.

What's ***NOT*** Covered by the Limited Warranty?

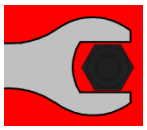
It does ***not*** include Transmit & Receive RF Equipment, Modems, Multiplexers or other distribution equipment, whether or not supplied by Sea Tel commonly used in Satellite Communications (TXRX) Systems. These equipments are covered by the applicable warranties of the respective manufacturers.

Original installation of the system must be accomplished by, or under the supervision of, an authorized Sea Tel dealer for the Sea Tel Limited Warranty to be valid and in force.

Should technical assistance be required to repair your system, the first contact should be to the agent/dealer you purchased the equipment from.

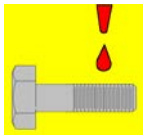
Please refer to the complete warranty information included with your system.

17.2. *Torque and Loctite Specifications*



WARNING: *Assure that all nut and bolt assemblies are tightened according to the tightening torque values listed below:*

SAE Bolt Size	Inch Pounds	Metric Bolt Size	Kg-cm
1/4-20	75	M6	75.3
5/16-18	132	M8	150
3/8-16	236	M10	270
1/2-13	517	M12	430



NOTE: *All nuts and bolts should be assembled using the appropriate Loctite thread-locker product number for the thread size of the hardware.*

Loctite #	Description
224	Low strength for small fasteners.
242	Medium strength
638	High strength for Motor Shafts & Sprockets.
2760	Permanent strength for up to 1" diameter fasteners.
290	Wicking, High strength for fasteners which are already assembled.

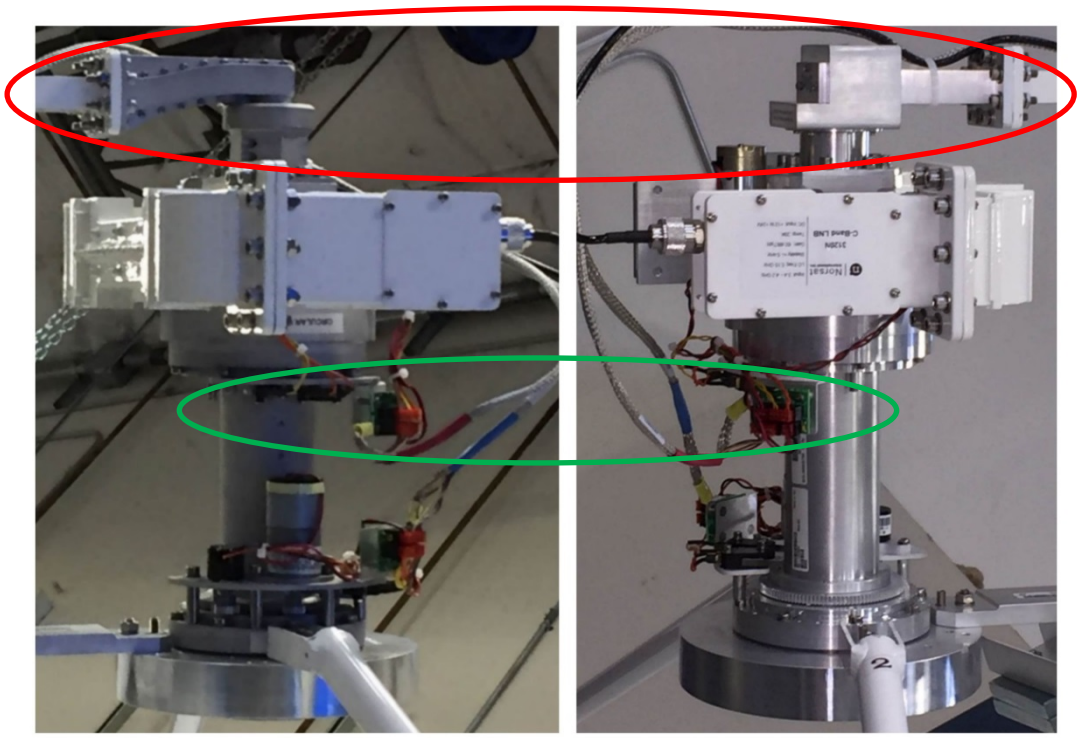
17.3. *General Maintenance*

17.3.1. Identifying the Linear/Circular Selectable Feed Assembly

Due to a change in vendors there are two different part number Linear/Circular Selectable Feed Assemblies. It is important to identify which part number feed is being installed on your antenna to be able to set the feed drive direction properly. Refer to the procedure below to identify which part number feed you have and what settings you need to check in the MXP.

17.3.1.1. Identifying the part number of your feed

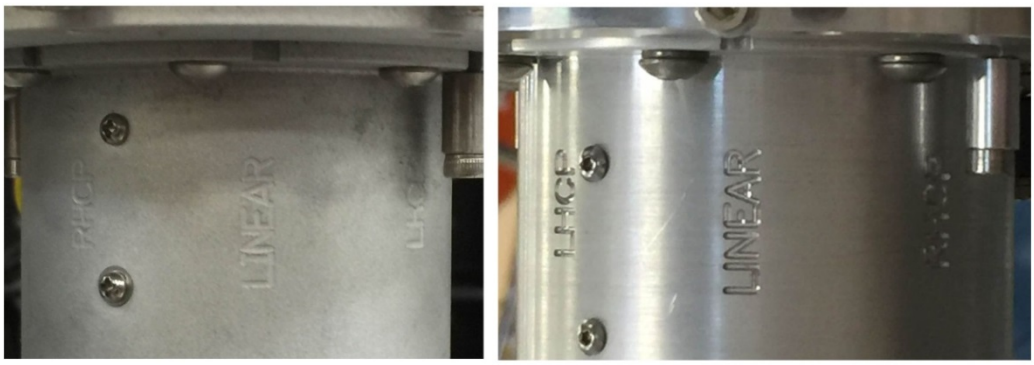
Waveguide Rotary Joint - Note the difference in the designs of the waveguide rotary joint (inside the red ellipse) .



PN: 134869-1 **PN:: 62-147931**

Linear/Circular Markings - Locate the Linear/Circular selections marked in the body of the OMT (general location inside the green ellipse above and in the picture below).

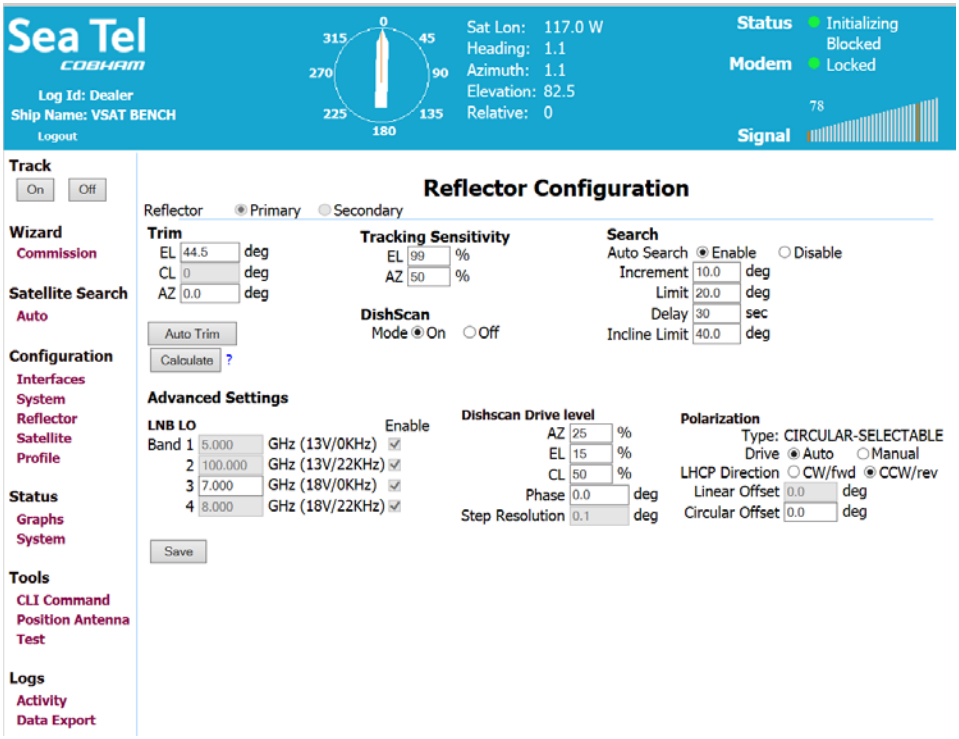
Note that LHCP and RHCP marks are opposite direction from LINEAR on these two feeds. Because the circular polarities are opposite, the drive must be set correctly on the Reflector Configuration page in the IMA GUI.



RHCP – LINEAR – LHCP **LHCP – LINEAR – RHCP**

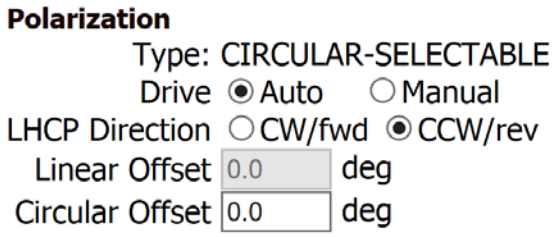
17.3.1.2. Setting Polarization Drive

Log into the IMA GUI and select the Reflector Configuration page.



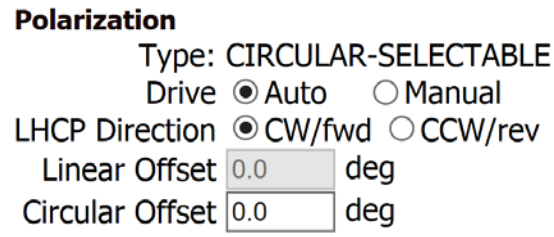
17.3.1.2.1. Feed PN: 134869-1

Drive of the (older) **134869-1** Linear/Circular Feed Assembly must be set to **CCW/Rev**.



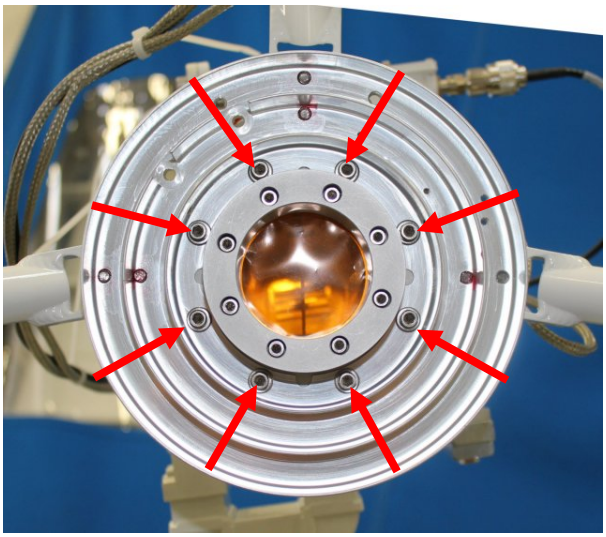
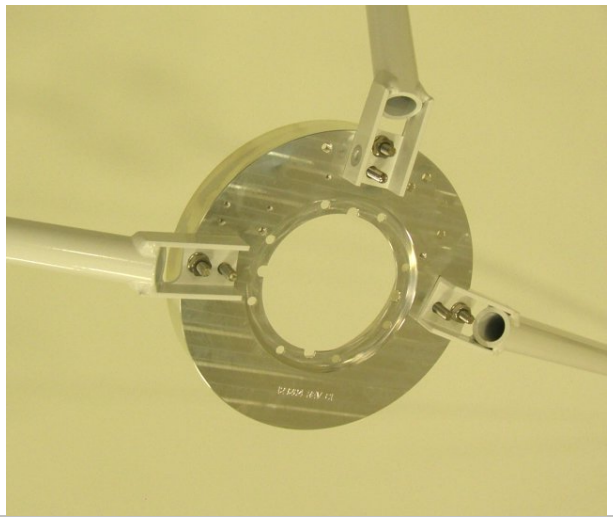
17.3.1.2.2. Feed PN: 62-147931

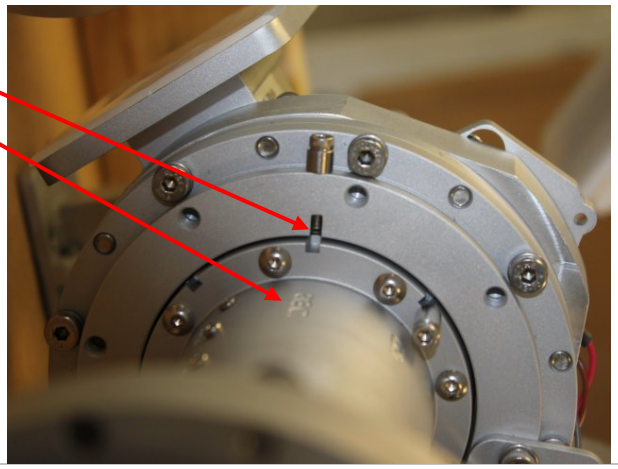
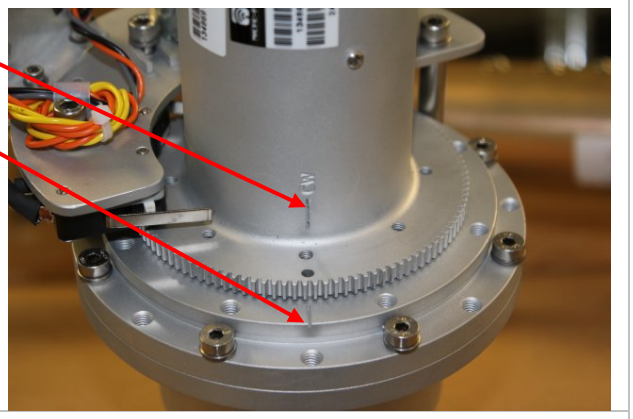
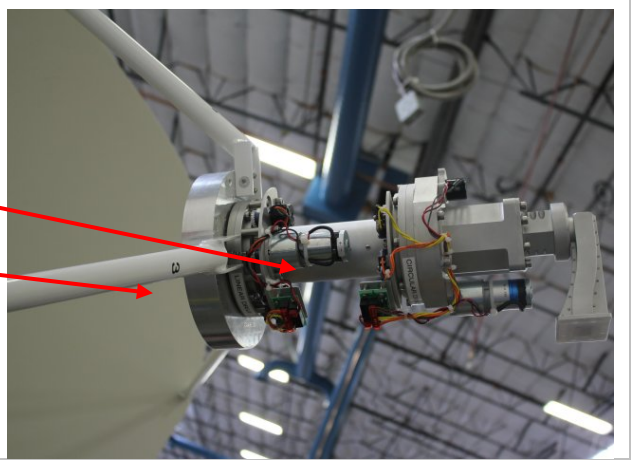
Drive of the (newer) **62-147931** Linear/Circular Feed Assembly must be set to **CW/Fwd**.



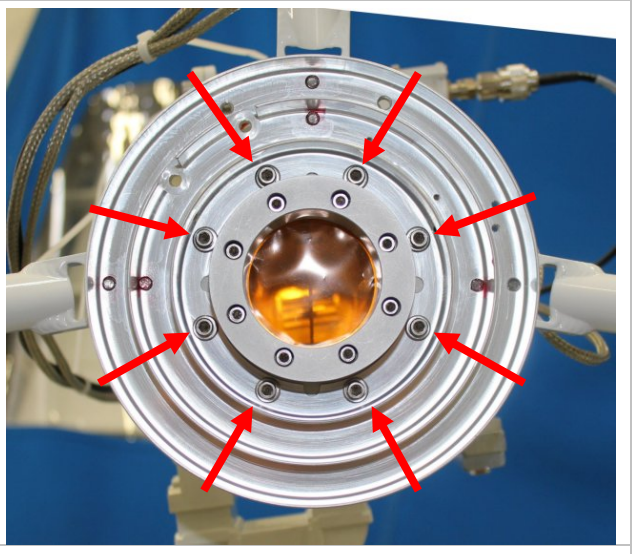
17.3.2. Installing the Linear/Circular Selectable Feed Assembly

Refer to the procedure below to install the Linear/Circular Selectable feed assembly on the 2.4.m meter offset reflector.

1. Assure that the MXP is set to Horizontal TX Polarity. 2. If this is the initial installation of a drop-in feed, skip to step 12. 3. If switching drop-in feeds, remove the currently installed drop-in by following step 4-10.	
4. Disconnect the coax connections to the LNB(s). 5. Disconnect the flexible waveguide from the rigid waveguide. 6. Disconnect the feed harness. 7. Tie the reflector down, or have someone hold it until the drop-in feeds have been swapped. CAUTION: The dish will be very back heavy when the drop-in feed is removed, therefore, the reflector will rise VERY abruptly if not held down until the weight of the feed is replaced. 8. Remove the eight screws (see red arrows) from the front of the scalar plate to disconnect the drop-in feed from the scalar plate.	
9. Remove the drop-in feed assembly that is being replaced. 10. Your scalar plate remains attached to the feed struts as shown.	

11. Assure that the feed assembly is at its calibration alignment Linear Mode position (pin aligned with the "Linear" notch. **AND**	
12. Verify that the feed is aligned at its CW position (CW mark aligned with the scribed mark on the base of the feed assembly).	
13. Mount the feed assembly with the Linear drive motor at the left strut. Linear Drive Motor Left Strut (**#3**)	

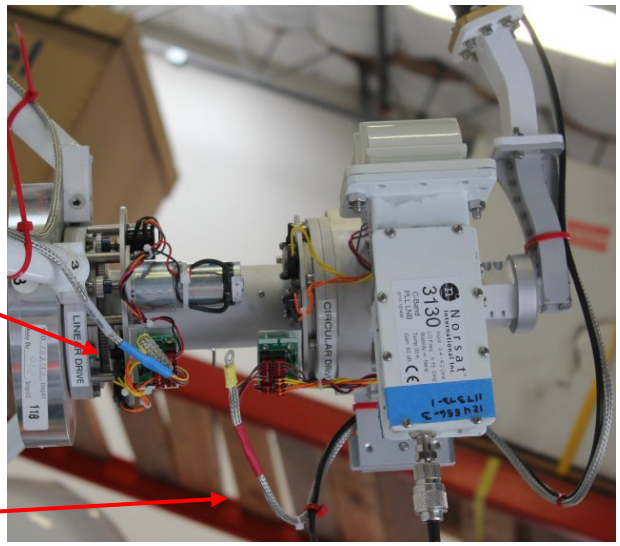
14. Apply Loctite 242 to, install and tighten the eight screws (see red arrows) through the front of the scalar plate and into the end of the drop-in feed assembly.



15. Route the **BLUE** leg of the harness from the **lower** interconnect PCB to the right strut, up to the top strut and over the dish (with the red harness leg & coax).

The **BLUE** leg of the harness attaches to the **lower** interconnect PCB.

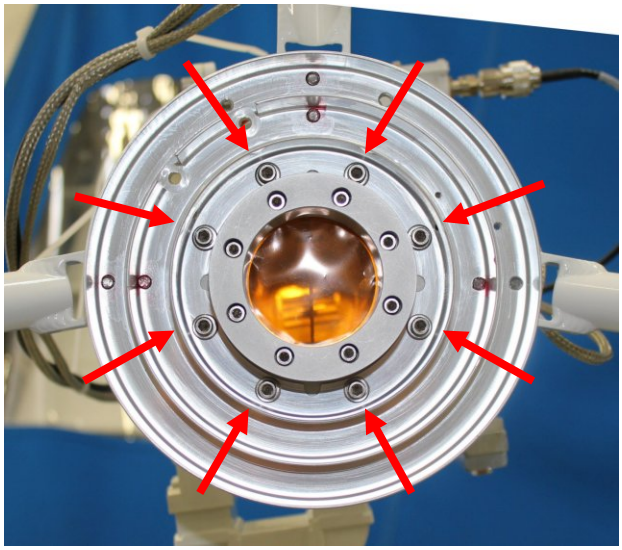
The **RED** leg of the harness attaches to the **upper** interconnect PCB.



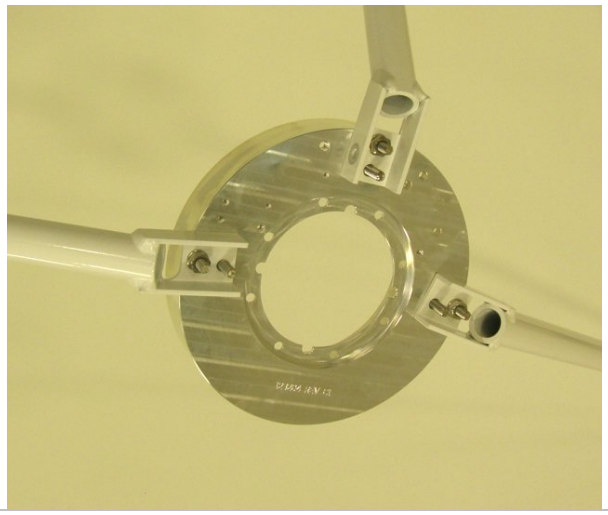
16. On the back side of the reflector:
    - If your antenna is a standard 9711 system, connect the harness to the "Feed" DB25 port on the PCU.
    - If your antenna is a 9711QOR system, connect the harness to the "Reflector A" DB25 port on the QOR Switch Box.

17.3.3. Installing the Ku-Band Co-Pol/Cross-Pol Feed Assembly

Refer to the procedure below to install the Ku-Band Co-Pol/Cross-Pol feed assembly on the 2.m meter offset reflector.

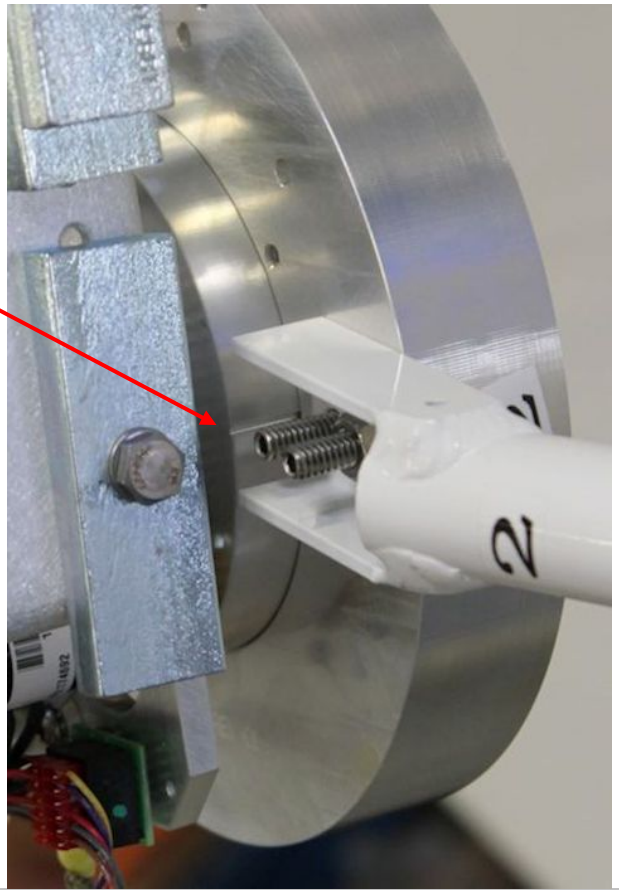
1. Assure that the DAC-2202 System Type does NOT include 8. 2. Assure that the DAC-2202 TX Polarity is set to 2 (Horizontal TX). 3. If this is the initial installation of a drop-in feed, skip to step 12. 4. If switching drop-in feeds, remover the currently installed drop-in by following step 5-10.	
5. Disconnect the coax connections to the LNB(s). 6. Disconnect the flexible waveguide from the rigid waveguide. 7. Disconnect the feed harness. 8. Tie the reflector down, or have someone hold it until the drop-in feeds have been swapped. CAUTION: The dish will be very back heavy when the drop-in feed is removed, therefore, the reflector will rise VERY abruptly if not held down until the weight of the feed is replaced. 9. Remove the eight screws (see red arrows) from the front of the scalar plate to disconnect the drop-in feed from the scalar plate.	

10. Remove the drop-in feed assembly that is being replaced.
11. Your scalar plate remains attached to the feed struts as shown. Top strut should be #1, right side #2 and left side #3.

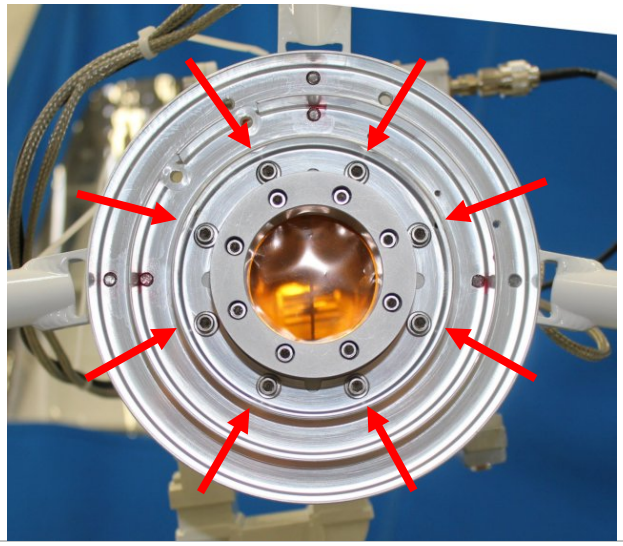


12. Insert the Ku-Band drop-in feed assembly with the alignment aligned to the center of strut #2 (right strut as view from the front of the reflector)

Alignment mark (scribed into the bottom end of the feed assembly)



13. Apply Loctite 242 to, install and tighten the eight screws (see red arrows) through the front of the scalar plate and into the end of the drop-in feed assembly.

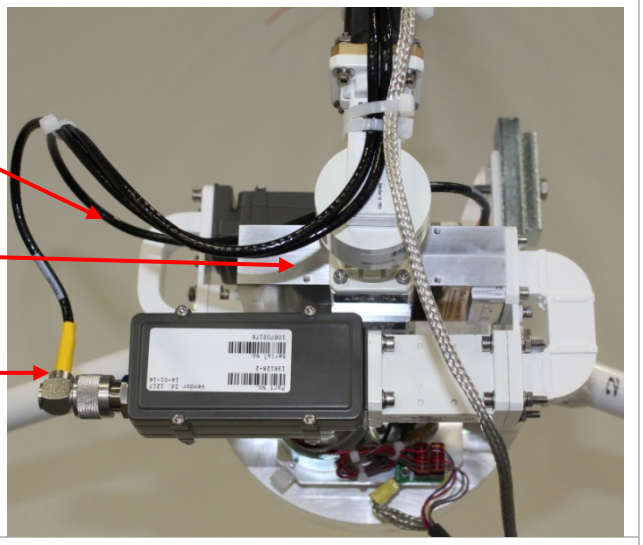


The LNBs and diplexer should be horizontal.

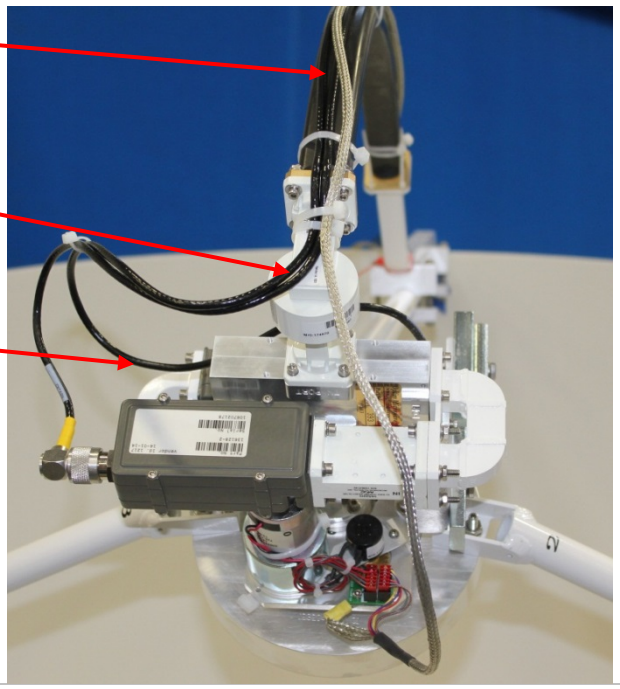
Cross-Pol LNB (Orange Coax)

Diplexer

Co-Pol LNB (Yellow coax)

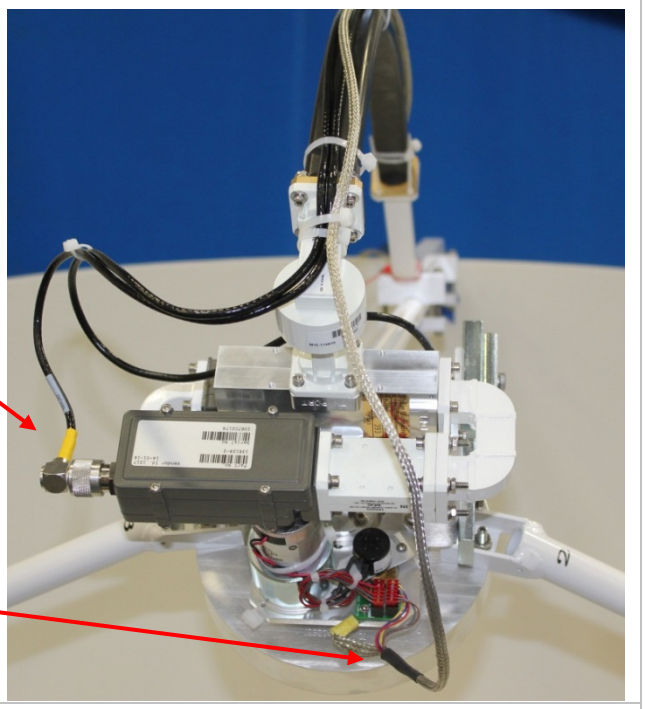


14. Connect the flexible waveguide section from the rotary joint on the TX port of the feed to the top end of the rigid waveguide.
15. Tie the harness & coaxes to the waveguide rotary joint with a cable tie.
16. Wrap the orange receive coax around the feed and connect it to the Cross-Pol LNB (hidden behind the feed in this view). This wrap is required to allow the feed to rotate through its full 270 degree (+/- 135) range of rotation.



17. Leave a gracious service loop in the yellow receive coax and connect it to the Co-Pol LNB. This loop is required to allow the feed to rotate through its full 270 degree (+/- 135) range of rotation.

18. Leave a small service loop in the feed harness and connect it to the IDC connector. This harness does not rotate with the feed during rotation.



19. On the back side of the reflector, route and connect the harness to the "Feed" DB25 port on the PCU as required.
20. On the back side of the reflector, route the Cross-Pol LNB coax (orange) to the J1 (NC) connector of the coax switch on top of the PCU.
21. On the back side of the reflector, route the Co-Pol LNB coax (yellow) to the J2 (NO) connector of the coax switch on top of the PCU.

17.4. Balancing the Antenna

The antenna and equipment frame are balanced at the factory however, after disassembly for shipping or maintenance, balance adjustment may be necessary. The elevation and cross-level motors have a brake mechanism built into them, therefore, ***power*** must be ON to release the brakes and **DishScan®** ***and antenna drive*** must be OFF to balance the antenna. . ***Do NOT remove any of the drive belts***. Balancing is accomplished by adding or removing balance trim weights at strategic locations to keep the antenna from falling forward/backward or side to side. The antenna system is not pendulous so 'balanced' is defined as the antenna remaining at rest when left in any position.

The "**Balance Mode**" selection located on the upper part of the "**Four Quadrant Test**" screen in the **Tools – Test** menu page. When enabled, Balance Mode temporarily turns DishScan®, Azimuth, Elevation and Cross-Level drive OFF. This function is required when trying to balance this antenna system.

Assure that Antenna power is ON and that the antenna has completed initialization.

At the Computer (connected to the MXP):

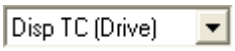
1. Log into the GUI, select Tools - Test in the side bar menus.
2. Select "**Balance Mode**" (located on the upper part of the "**Four Quadrant Test**" screen, just below the page header) to enable balance mode. The screen will then show ON & OFF buttons.
3. Click ON. The screen will temporarily display "Submitting … Please Wait". When this message disappears the antenna is in balance mode. DO NOT EXIT THIS SCREEN.

At the Antenna:

4. At the Antenna: Balance the antenna with the elevation near horizon (referred to as front to back balance) **by adding, or subtracting, small counter-weights**.
5. Then balance Cross Level axis (referred to as left-right balance) **by moving existing counter-weights from the left to the right or from the right to the left**. Always move weight from one location on the equipment frame to the same location on the opposite side of the equipment frame (ie from the top left of the reflector mounting frame to the top right of the reflector mounting frame). Do NOT add counter-weight during this step.
6. Last, balance the antenna with the elevation pointed at, or near, zenith (referred to as top to bottom balance) **by moving existing counter-weights from the top to the bottom or from the bottom to the top**. Always move weight from one location on the equipment frame to the same location on the opposite side of the equipment frame (ie from the top left of the reflector mounting frame to the bottom left of the reflector mounting frame). Do NOT add counter-weight during this step.
7. When completed, the antenna will stay at any position it is pointed in for at least 5 minutes (with no ship motion).
8. ***Do NOT cycle antenna power to re-Initialize the antenna***. Return to the Computer (MXP), which is still in Balance Mode. Click OFF. The screen will temporarily display "Submitting … Please Wait". When this message disappears the antenna is in normal operation mode. When you exit Balance Mode the antenna will return to normal (DishScan®, Azimuth, Elevation and Cross-Level drive ON).

17.4.1. Fine Balance and Monitoring Motor Drive Torque

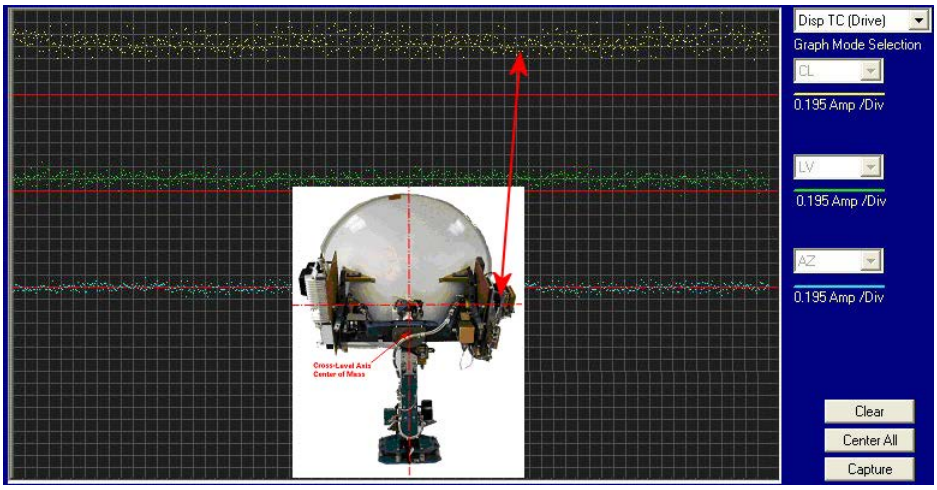
The GRAPHS **DISPTC** graph chart provides a means for monitoring torque commands required for each motor for diagnostic purposes and verifying antenna balance. By observing each trace, the required drive of the antenna via the motor driver PCB may be established.

- To view the Torque Commands, select the 

graph chart.
- This chart displays the Torque Command errors for each axis via three traces, CL (Cross Level), LV (Elevation), and AZ (Azimuth), at a fixed 0.195 amps/vertical division.
- In all axes, tracing centered on the reference line means that that axis is neutral. Tracing **above** the reference line means that that axis is driving CCW. Tracing **below** the reference line means that that axis is driving CW.
- A normal trace display will be ± 1 divisions from the red reference line while under calm sea conditions and with DishScan® Drive turned off. See example below

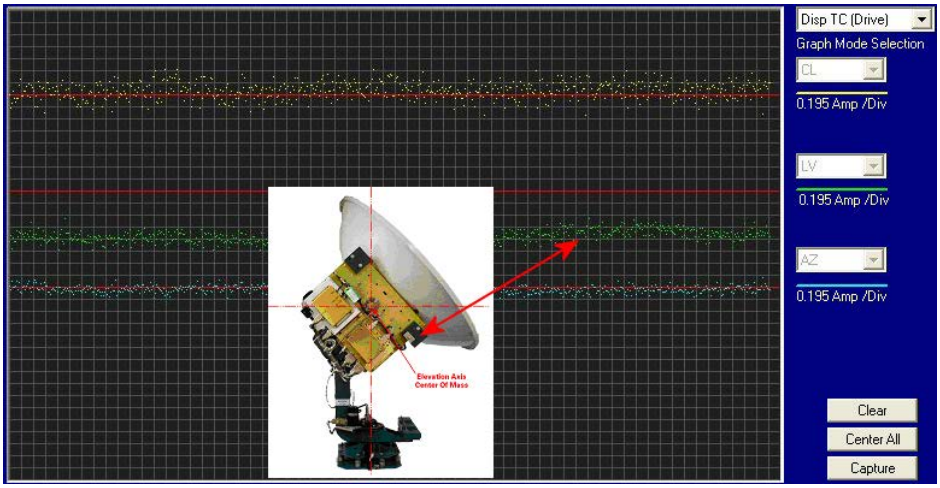
- The Cross Level displayed above the reference line indicates that CL is driving CCW (Left).

  Example: The antenna pictured in the screen capture below is imbalanced so that it is "Right Heavy". The CL trace is plotting above the red reference line (indicating that drive CCW is required to keep the Cross-Level beam level (to the horizon).



- The Level display will plot below the reference line when the antenna requires CW drive (Up in elevation).

Example: The antenna pictured in the screen capture below is imbalanced so that it is "Front, or Bottom, Heavy". The LV trace is plotting above the red line, indicating that CW drive is required to maintain the current elevation position.



- The Azimuth display plots below the red line when the antenna is driven CW and plots above the red line as the antenna is driving CCW.

18. Stowing the Antenna

This antenna must be properly stowed if the ship will be underway while AC power to the Above Decks Equipment (ADE) is de-energized. Failure to do so may void your warranty.

CAUTION: *There are two stow restraints that* ***MUST*** *be installed on this antenna pedestal* ***if the ship will be underway while the Above Decks Equipment is de-energized****.*

This antenna has brakes on the motors to help prevent damage to the antenna against short power outages while underway; however, it is strongly recommended that AC Power to the ADE and BDE be supplied from an adequately rated Un-interruptible Power Supply (UPS) to protect the antenna.

18.1. Installing the Stow Restraints

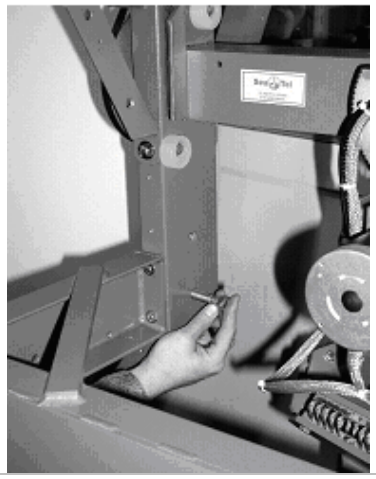
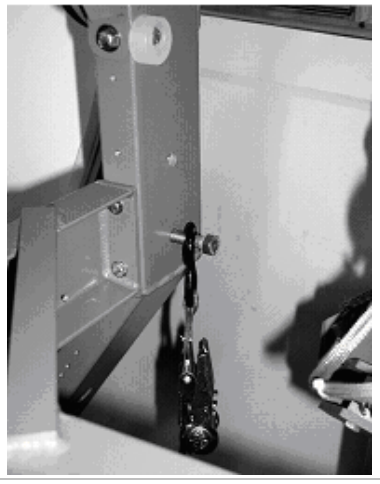
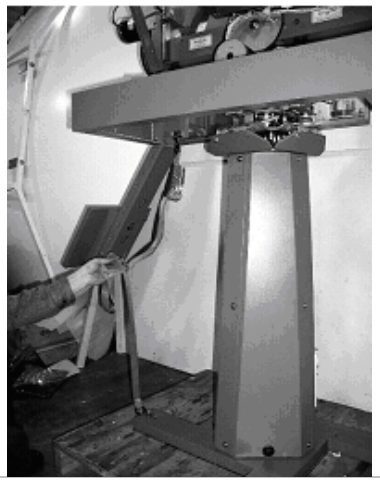
WARNING: Antenna pedestal ***must be properly restrained (stowed)*** to prevent damage to wire rope isolators, isolator springs and/or antenna pedestal mechanism during underway conditions ***when power is removed from the antenna assembly.***

The normal operating condition for the Sea Tel Antenna system is to remain powered up at all times. This ensures that the antenna remains actively stabilized to prevent physical damage to the antenna pedestal and reduce condensation and moisture in the radome to prevent corrosion. If, for some reason, the antenna must be powered down during underway transits, it should be secured with nylon straps regardless of sea conditions to prevent damage to the antenna system. Refer to the procedure below to secure the antenna pedestal.

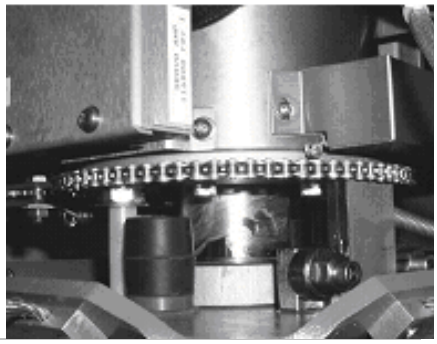
Equipment & Hardware needed:

- Two (2) ½-13 x 2-inch Stainless Steel bolts.
- Two (2) Nylon straps with ratchet mechanism. ***Nylon straps must be rated to 300 lbs. Working load capacity and 900 lbs. Max rated capacity.***

Stowing procedure:

1. Point the antenna to Zenith, (90 degree elevation angle), straight up. 2. Install one (1) ½-13 x 2-inch bolt into the inside of each elevation beam as shown in Figure 1.	
3. Hook one end hook of the nylon strap to bolt in elevation beam as shown in Figure 2.	
4. Hook the other end hook of the nylon strap to the pedestal-mounting frame as shown in Figure 3.	

5. Use the ratchet of the strap to tighten nylon straps. As the straps are tightened, observe the vertical isolation canister assembly as shown in Figure 4.
6. Tighten straps until the canister has been pulled down approx. ¼ to ½ inch. Do not over-tighten. You must leave approximately 1/8 inch clearance between the rubber stops and the azimuth driven sprocket to allow the vertical vibration isolation to function properly.



NOTE: Remove *the Stow straps, and bolts,* ***before applying power*** and returning the antenna to normal operating condition.

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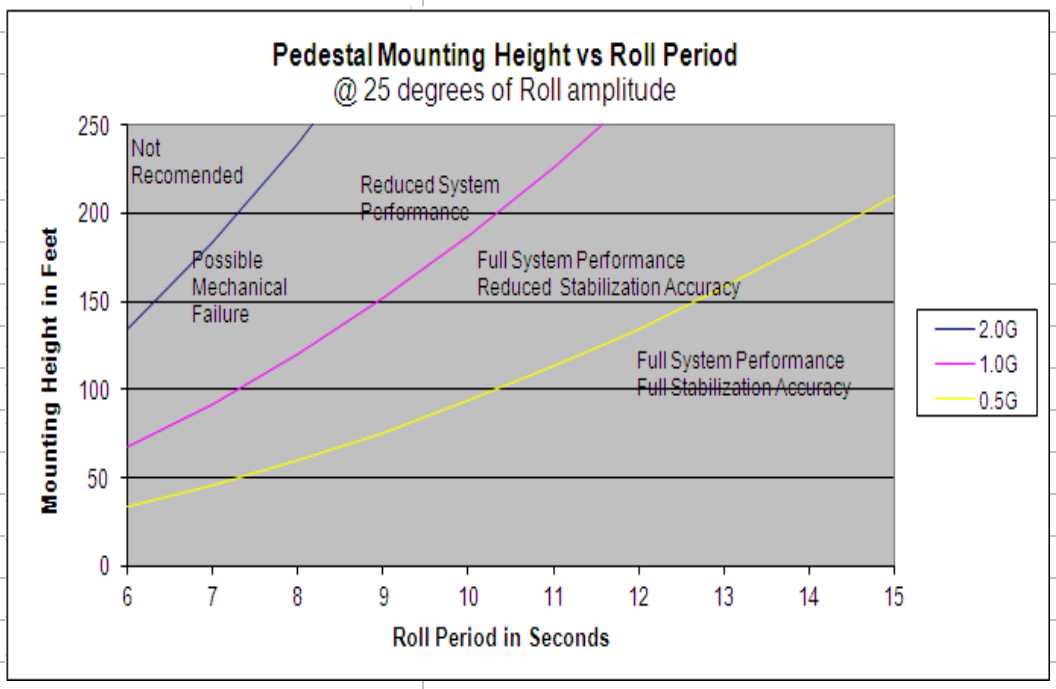
19. 9711-56 IMA Technical Specifications

The technical specifications for your system are listed below:

19.1. Above Decks Equipment

System Weight (ADE)	
Weight	1180 Lbs w/ 144" Radome, 1610 Lbs w/ 168" Radome
Stabilized Antenna Pedestal Assembly	
Type	Three-axis (Level, Cross Level and Azimuth)
Stabilization	Torque Mode Servo
Stability Accuracy	0.1° RMS, 0.2° peak in presence of specified ship motions (see below).
Azimuth Motor	Size 34 Brushless DC Servo, Double Stacked W/Encoder
Level Motor	Size 34 Brushless DC Servo W/Brake
Cross Level Motor	Size 34 Brushless DC Servo W/Brake
Inertial Reference	3 Solid State Rate Sensors
Gravity Reference	2 Solid State 3-Axis Accelerometers
AZ transducer	256 line optical encoder / home switch
Pedestal Range of Motion:	
Elevation Joint Angle	-15 to +100 degrees
Cross Level (Inclined 30°)	+/- 25 degrees
Azimuth	Unlimited
Elevation Pointing	+0 to +85 degrees (with 15 degree Roll)
	+5 to +80 degrees (with 20 degree Roll)
	+10 to +75 degrees (with 25 degree Roll)
Relative Azimuth Pointing	Unlimited
Maximum Ship Motions	
Roll	+/- 25 degrees (Roll only)
	+/- 20 degrees (combined with Pitch)
Pitch	+/-15° at 6-12 sec periods
Yaw	+/-8 degrees at 15-20 sec periods
Turning rate	Up to 12 deg/sec and 15 deg/sec/sec
Headway	Up to 50 knots
Heave	0.5G
Surge	0.2G
Sway	0.2G
Specified Ship Motion (for stability accuracy tests)	
Roll	+/- 20° at 8 second period
Pitch	10° Fixed
Relative Azimuth (Heading)	0, 45 and 90° with respect to roll input

Mounting Height	Sea Tel recommends you do not exceed tangential accelerations of 0.5G (See below chart)



Antenna Reflector (primary)	
Type	Honeycomb Fiberglass Parabola
Diameter	2.4 Meter Modified Offset
TX Gain	41.7 dBi at 6.18 GHz
	48.45 dBi at 14.25 GHz
RX Gain	38.5 dBi at 3.95 GHz
	47.75 dBi at 11.85 GHz
G/T (30° elevation, clear sky)	28.2 dB/k (calculated)
FCC Input Power Spectral Density Limitation	-14.0 dBW/4 KHz
Minimum EIRP (TVRO)	NA
KU-band Feed	
Type	Sub Reflector, Prime focus, with diplexer Xpol/copol
Port to Port Isolation (Xpol)	> 120 dB
Port to Port Isolation (copol)	> 90 dB
Cross Pol Isolation	> 35 dB typical (30dB within 1dB contour)
Polarization	Linear
Polarization Control	24 volt DC motor with position feedback
Polarization Range of Motion	270 degrees (+/- 135)
Receive Frequency Range	10.7-12.75 GHz Ku Band
Transmit Frequency Range	13.75-14.5 GHz Ku Band
Co-Pol Diplexer	
Type:	DPX75K-002
Common Port (to feed)	WR-75 Flange, 10.70-14.5 GHz
Transmit Output (from SSPB)	WR-75 Flange, 13.75-14.5 GHz
Receive Output (to Co-Pol LNB)	WR-75 Flange, 10.70-12.75 GHz
Co-Pol LNB	Refer to LNB spec

C-band Feed	
Type	Prime Focus Circular/linear selectable
Cross Pol Isolation	> 120 dB
Co-Pol Isolation	NA
Port to Port Isolation	> 35 dB typical (30dB within 1dB contour)
Polarization	Linear w/motorized skew adjustment
Polarization Control	24 volt DC motor with pot feedback
Polarization Range of Motion	180 degrees
Receive Frequency Range	3.400-4.200 GHz (linear) 3.625-4.200 GHz (circular)
Transmit Frequency Range	5.850-6.725 GHz (linear) 5.850 - 6.425 GHz (circular)
Norsat 3000 Series C-Band LNB	
Sea Tel Part Number: 124556-1	
Gain (typical)	58 dBm
Noise temperature maximum	15K to 35K
Power requirements	+15 to +24 V supplied through center conductor of IF cable
Current (typical)	350 mA (typical)
LO Phase Noise (typical)	-73 dBc/Hz at 1 kHz
	-83 dBc/Hz at 10 kHz
	-93 dBc/Hz at 100 kHz
Conversion gain	55 dB min, 70 dB max
LO Stability (over temp)	±5 kHz to ±25 kHz
Input frequency (GHz)	3.40 to 4.20 GHz
L.O. frequency (GHz)	5.15 GHz
Output frequency (MHz)	950 to 1750 MHz
LO Radiation	-60 dBm
Image Rejection	40 dB min
1db gain compression point (typical)	+15 dBm
IP 3 (typical)	+25 dBm
Output Connector	N Connector
Impedance	50 Ohm
Input Flange	CPR-229
C-band TX Radio Package	
SSPB	Terrasat C-Band 200W IBUC2
Output Flange	CPR-137G
Input Connector	N-Type
RF Input Frequency Range	950 to 1850 MHz
RF Output Frequency Range	5.85-6.725 GHz
RF Output VSWR	1.3:1
RF Pout@ 1 dB (P1dB)	(200W) +53 dBm
Reference Frequency Level	-12 to +5 dBm
Reference Frequency	10 MHz external (multiplexed on TX IFL). Internal 10 MHz optional
M&C Options	RS-232/RS 485, Ethernet
Step attenuator	30 dB in 0.1 dB steps
Alarms	None listed

SMW Quad LNB 136128-2	
Band 1	
Voltage Required	13VDC
Input RF Frequency	10.95-11.70 GHz
Local Oscillator Frequency	10.00 GHz
Output IF Frequency	950 to 1700 MHz
Band 2	
Voltage Required	13VDC + 22 KHz Tone
Input RF Frequency	11.70-12.25 GHz
Local Oscillator Frequency	10.75 GHz
Output IF Frequency	950 to 1500 MHz
Band 3	
Voltage Required	18 VDC
Input RF Frequency	12.25-12.75 GHz
Local Oscillator Frequency	11.30 GHz
Output IF Frequency	950 to 1450MHz
Band 4	
Voltage Required	18VDC + 22 KHz Tone
Input RF Frequency	10.70-11.70 GHz
Local Oscillator Frequency	9.75 GHz
Output IF Frequency	950 to 1950 MHz
KU-band TX Radio Package	
SSPB	Terrasat Ku-Band IBUC2 50W or 100W
Output Flange	WR-75
Input Connector	N-type female
RF Input Frequency Range	950 to 1700 MHz
RF Output Frequency Range	13.75-14.5 GHz
RF Output VSWR	1.5:1
RF Pout@ 1 dB (P1dB)	(50W) +47 dB min (100W) +50 dB min
Reference Frequency Level	-12 to +5 dBm
Reference Frequency	10 MHz external (multiplexed on TX IFL). Internal 10 MHz optional
M&C Options	RS485/RS232, Ethernet optional
Step attenuator	30 dB in 0.1 dB steps
Alarms	None listed
Power Supply (ADE-ICU)	
A/C Input Voltage	85-264 VAC, 47-63Hz, single phase
Voltage	24 VDC, 150W
Wattage	150W (total)
Current Capacity	13.0A (total)

GPS (On Board)	
Waterproof	IPX7
Operating Temperature	-30°C to +60°C
Storage Temperature	-40°C to +60°C
Altitude	-304m to 18,000m`
Vibration	IEC 68-2-64
Shock	50G Peak, 11ms
Connector	RJ11
Input Voltage	
Min	4.75VDC
Typ	5.0VDC
Max	5.25VDC
NMEA output messages	GGA, GLL
Refresh Rate	1s
Integrated Control Unit (ICU)	
Connectors	
J1	SMA (F) - RXIF Input from LNB 1 (Cross-Pol)
J2	SMA (F) - RXIF Input from LNB 2 (Co-Pol)
J3	SMA (F) - RXIF Output To Rotary Joint
J4 B/A	Ethernet - RJ45 Serial M&C - A=Radio M&C, B=Pass through
J5	Mini USB Antenna M&C
J6	DE-9 (F) - Serial Console - Antenna Serial M&C
J7	DE-9 (F) - Serial Radio M&C
J8	RJ-11 (F) - GPS Antenna Input
J9	DE-15 (F) - Motor Control to MDE
J10	DE-25 (F) - Feed Harness Connection
J14	DE-9 (F) - Serial Pass through M&C
J16	F (F) - TXIF Output to BUC
J19	M16 (F) - Power Supply DC Voltage Output to BUC
J20	Modular AC Power Input Receptacle
Status LEDs	Diagnostic Status of the EoC
	Diagnostic Status of the ICU
AC Input Power	85-264 VAC, 47-63Hz, single phase, 2A-1A
Coax Switch	
LNB-A (J1)	SMA (F)
LNB-B (J2)	SMA (F)
Rotary Joint (J3)	SMA (F)
Controls	Configurable from GUI
Integrated SCPC Receiver	
Tuning Range	950 to 1950 MHz in 1 KHz increments
Input RF Level	-85 to -25dBm typical
Output RF Level	Input level +/- 1dB typical
Sensitivity	30mV/dB typical (25 counts/dB typical)
Bandwidth (3dB)	150 KHz
Interfaces	
Modem/MXP M&C Interface	OpenAMIP & Legacy
Network Interface	4-port managed fast ethernet switch
User Interface	Web Browser/Console Port

Motor Driver Enclosure	
Connectors	
Drive	DA-15P
Home	DE-9S
AZ	DA-15S
EL	DA-15S
CL	DA-15S
Status LEDs	
CL Drive	Yes
EL Drive	Yes
Az Drive	Yes
MDE Status	Yes
ADE-BDE Interface Connections	
Dual Channel Rotary Joint	SMA (F) x 2
Power Requirements	
ADE	85-264 VAC, 47-63Hz, single phase, Pedestal=450 Watts (brake release, pedestal drive and BUC drive) PLUS RF Equipment=2450Watts. **Total power consumption=2900Watts MAX**.
Radome Assembly (144 inch)	
Type	Frequency Tuned
Material	Composite foam/laminate
Size	
Diameter	365.76m (144 inch)
Height	360-68m (142 inch)
Hatch Size	45.72m x 86.36m (18" high x 34" wide)
Side Door	45.72m x 91.44m (18” wide x 36” high)
Number of panels	Twelve panels (6 upper & 6 lower panels), one top cap and one base pan
Installed height:	416-56m (164 inch) including base frame if mounted with standard Legs, 375.92m (148 inch) if Flush-mounted
Installed weight	See System Weight of the ADE Above (includes Radome, base frame w/standard legs & braces and the Antenna Pedestal Assembly)
RF attenuation	1.5 dB @ 6 GHz, dry
	1.5 dB @ 12 GHz, dry
	1.5 dB @ 14 GHz, dry
Wind:	Withstand relative average winds up to 201 Kmph (125 mph) from any direction.
Ingress Protection Rating	IP 56

Radome Assembly (168 inch)	
Type	Frequency Tuned
Material	Composite foam/laminate
Size	
Diameter	426.72cm (168 inch)
Height	420.88cm (165.7 inch)
Hatch Size	45.72cm x 86.36cm (18" high x 34" wide)
Side Door	45.72cm x 91.44cm (18" wide x 36" high)
Number of panels	Twenty-four panels (6 upper & 6 lower panels), one top cap and one base pan
Installed height:	438cm (172.44 inch) including base frame if mounted with standard Legs, 429.26cm (169 inch) if Flush-mounted
Installed weight	See System Weight of the ADE Above (includes Radome, base frame w/standard legs & braces and the Antenna Pedestal Assembly)
RF attenuation	1.5 dB @ 6 GHz, dry
	1.5 dB @ 12 GHz, dry
	1.5 dB @ 14 GHz, dry
Wind:	Withstand relative average winds up to 201 Kmph (125 mph) from any direction.
Ingress Protection Rating	IP 56
ADE Environmental Conditions	
Temperature Range (Operating)	-25º to +55º Celsius (-13º to +131º F)
Humidity	100% Condensing
Wind Speed	56 m/sec (125 mph)
Solar Radiation	1,120 Watts per square meter, 55º Celsius
Spray	Resistant to water penetration sprayed from any direction.
Icing	Survive ice loads of 4.5 pounds per square foot. Degraded RF performance will occur under icing conditions.
Rain	Up to 101.6mm (4 inches) per hour. Degraded RF performance may occur when the radome surface is wet.
Corrosion	Parts are corrosion resistant or are treated to endure effects of salt air and salt spray. The equipment is specifically designed and manufactured for marine use.
Chemically Active Substances	
Environmental Condition	Test Level
Sea Salt	5 percent solution

19.2. Below Decks Equipment

Media Xchange Point (MXP)	
Standard 19 Inch Rack mount	One Unit High
Physical Dimensions	17 X 17 X 1.75 (Inches)/ 43.18 x 43.18 x 4.45 (cm)
Input Voltage	85-264 VAC, 47-63Hz, single phase, 110 Watts
Weight	6.6lbs/ 3.0 kgs
Front Panel	
	4 Modem LEDs (On the MXP Board)
	2 MXP status LEDs
Rear Panel Connections	
AC Input	Modular AC Power Input Receptacle
J1	SMA (F) - RXIF Output to Satellite Modem
J2	SMA (F) - RXIF Input from ADE
J3 B/A	Ethernet - 2 ports of the 4 Port 10/100 Ethernet Switch 10.1.1.100
J4 B/A	Ethernet - 2 ports of the 4 Port 10/100 Ethernet Switch 10.1.1.100
J5	SFP Gigabit Ethernet
J6	Mini USB Antenna M&C
J7	USB Host (Type A) - **N/C - Future Development**
J8	DE9 (F) - Serial Console - Antenna Serial M&C
J9 A/B	RJ45 Serial M&C - A=Radio M&C, B=Pass through
J10 C/D	RJ45 Serial M&C - C=Modem, D=OBM
J11	Terminal Strip - Gyro Compass (SBS-Synchro) Interface Terminals
J12	Terminal Strip - Auxiliary Interface Terminals
J13	DE-9 (M) - NMEA 0183 Interface Port
J14	DE-9 (M) - AUX (RS-232) Interface Port
J15	NMEA 2000 Interface Port - **Future Development**
Gyro Compass Interface	
Connections	**Plug-in Terminal Strip**
Pin 1	Synchro R1
Pin 2	Synchro R2
Pin 3	Synchro S1 / SBS A
Pin 4	Synchro S2 / SBS B
Pin 5	Synchro S3 / SBS C
Pin 6	SBS COM
Synchro Interface	
Connectors	5 screw terminal connections (Plug-In)
Input Voltage Level	36-110 VDC, 400 or 60 Hz
Synchro Ratios	1:1, 36:1, 90 or 180:1 and 360:1
Impedance	1M ohm
SBS Interface	
Connectors	4 screw terminal connections (Plug-In)
Input Voltage Level	20-90 VDC
Interface	Opto-isolated
Polarity	Auto switching
Ratio	6 steps per degree
Impedance	10K Ohm

Auxiliary Interface	
Connections	**Plug-in Terminal Strip**
Pin 1 - GND	Ground
Pin 2 - Aux IN1	Modem Lock Input 1
Pin 3 - Aux IN2	Modem Lock Input 2
Pin 4 - GND	Ground
Pin 5 - SW1	Modem Mute Output 1
Pin 6 - SW2	Modem Mute Output 2
Pin 7 - SW3A	Dry Contact set 1
Pin 8 - SW3B	Dry Contact set 1
Pin 9 - SW4A	Dry Contact set 2
Pin 10 - SW4B	Dry Contact set 2
External AGC (AUX Inputs)	
Connectors	2 screw terminal connections
Input Voltage Level	0-5 VDC
Impedance	30K Ohm
Control (Logic Sense can be reversed)	Low Level (<1.25VDC) = Modem Lock :: High Level (>1.25 VDC) = Modem Unlock
SW1 Blockage / TX Mute Output	
Connections	1 screw terminal connection (SW1)
Connections	1 screw terminal connection (SW2)
Control Level	Not Blocked or Not mispointed=OPEN circuit
	Blocked or mispointed=SHORT to ground
SW2 Blockage / TX Mute Output	
Connections	1 screw terminal connection (SW2)
Control Level	Not Blocked or Not mispointed=OPEN circuit
	Blocked or mispointed=SHORT to ground
Dry Contact Output Sets (SW3 A-B & SW4 A-B)	
Switched outputs	4.7K pull up or Pull Down
Current handling	Current sink of 0.5 amps max.
No Alarm State	Normally Open
Alarm State	Contact closure
NMEA 0183 Interface	
Connections	5 screw termninal connections (RXA+ /RXA- input, RXB+/ RXB- input, and TXA+ output)
Rx Sentence Format (GPS)	$xxGLL,DDmm,mmmm,N,DDDmm.mmmm,W (UTC optional) (*CS optional)
Rx Sentence Format (Gyro)	Heading $xxHDT,xxx.x
Tx Sentence Format (GPS)	$GPGGA,0,DDmm,N,DDDmm,W (configurable)
NMEA string examples:	
RX:	
$GPGLL,3800.4300,N,12202.6407,W,231110,A*32	
$GPGGA,231110,3800.4300,N,12202.6407,W,2,08,1.2,40.0,M,-31.3,M,,*4A	
TX:	
$GPRMC,231325,A,3800.4300,N,12202.6405,W,000.0,184.9,190412,014.1,E*67	
$GPVTG,184.9,T,170.8,M,000.0,N,0000.0,K*74	

BDE Environmental Conditions	
Temperature	0 to 40 degrees C
Humidity	Up to 100% @ 40 degrees C, Non-Condensing

Power Requirements (MXP)	
BDE	85-264 VAC, 47-63Hz, single phase, 110 Watts

19.3. Regulatory Compliance

Survival Shock and Vibration	IEC-60945, MIL-STD-167
Operational Shock and Vibration	Operational: IEC-60945, Survival: MIL STD-167
EMI/EMC Compliance Ku-Band	ETSI EN 301 843-1 V1.4.1 (2004-06)
	ETSI EN 301 489-1 V1.4.1 (2002-08)
	ETSI EN 300 339 (1998-03)
	IEC EN 60945:1997
Satellite Earth Stations and System (SES)	ETSI EN 301 428-1 V1.3.1 (2006-02)
	ETSI EN 302 340 V1.1.1 (2006-04)
Safety Compliance	IEC EN 60950-1:2001 (1st Edition)
Environmental Compliance	RoHS
	Green Passport
FCC ESV Compliance C-Band	47 C.F.R. § 25.221
FCC ESV Compliance Ku-Band	47 C.F.R. § 25.222
FCC ESV Compliance Ka-Band	NA
Options	Bluetooth

19.4. Cables

19.4.1. Antenna Control Cable (Provided from ACU-MUX)

RS-422 Pedestal Interface

Type	Shielded Twisted Pairs
Number of wires	
Wire Gauge	24 AWG or larger
Communications Parameters:	9600 Baud, 8 bits, No parity
Interface Protocol:	RS-422
Interface Connector:	DE-9P

19.4.2. Antenna Transmit & Receive IF Coax Cables (Customer Furnished)

Due to the dB losses across the length of the RF coaxes at L-Band, Sea Tel recommends the following 50 ohm coax cable types (and their equivalent conductor size) for our standard pedestal installations: These cables must be fitted with 50 ohm Type-N(M) connectors at each end.

Run Length	Coax Type	Conductor Size
up to 75 ft	LMR-300 or RG-8	18 AWG
up to 150 ft	LMR-400, RG-213 or RG214	14 AWG
up to 200 ft	LMR-500 or LDF4-50 Heliax	10 AWG
Up to 300 ft	LMR-600	6 AWG

For runs longer that 300 feet, Sea Tel recommends Single-mode Fiber Optic Cables with Fiber Optic converters.

19.4.3. Multi-conductor Cables (Customer Furnished)

Due to the voltage losses across the multi-conductor cables, Sea Tel recommends the following wire gauge for the AC & DC multi-conductor cables used in our standard pedestal installations:

Run Length	Conductor Size
up to 50 ft	20 AWG (0.8 mm)
up to 100 ft	18 AWG (1.0 mm)
up to 150 ft	16 AWG (1.3 mm)
up to 250 ft	14 AWG (1.6 mm)
Up to 350 ft	12 AWG (2.0 mm)

19.4.4. AC Power Cable (Pedestal & RF Equipment)

Refer to Power Requirements specification for the ADE (above).

19.4.5. AC Power Cable (Optional Marine Air Conditioner)

Voltage:	220 volts AC
Breaker Required	20 Amp
Full Load Amperage:	5.4 Amps

19.4.6. Gyro Compass Interface Cable (Customer Furnished)

Type:	Multi-conductor, Shielded
Number of wires	4 Conductors for Step-By-Step Gyro, 5 Conductors for Synchro
Wire Gauge:	see Multi-conductor Cables spec above
Insulation:	600 VAC

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20. Drawings

The drawings listed below are provided as apart of this manual for use as a diagnostic reference. Spare Parts kits listings are provided as part number reference for replaceable parts and common assemblies.

20.1. 9711-56 IMA Specific Drawings

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BOM Explosion Report

Item Number: 40-300020
Description: Sea Tel, 9711-56 IMA, 200W/100W, AC RDY, 144 IN
Item Revision: A.03 ECO-00025945
Date as of: 04/16/2018 07:01:30 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	62-159184	A.01 MCO-00034132	BASE FRAME ASSY,75 IN,INT AC,OFFSET, WHITE,CRATED	
5	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
6	1	ea	88-207565-100	MCO-00025816	IBUC, TERRASAT, Ku, 100W, 5 YR WARRANTY	
7	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
8	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
12	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
15	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
16	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	(NOT SHOWN)
26	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	(NOT SHOWN)
27	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	(NOT SHOWN)
28	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	(NOT SHOWN)
30	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	(NOT SHOWN)
		pcs	40-300020	A.03 ECO-00025945	Sea Tel, 9711-56 IMA, 200W/100W, AC RDY, 144 IN	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

BOM Explosion Report

Item Number: 40-300275
Description: Sea Tel, 9711-56, 100W/200W SW, AC
Item Revision: A.11 ECO-00025945
Date as of: 04/16/2018 07:01:42 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	69-151077	A.02 ECO-00026390	ASSEMBLY, 75 BASE FRAME, CRATED	
5	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
6	1	ea	88-207565-100	MCO-00025816	IBUC, TERRASAT, Ku, 100W, 5 YR WARRANTY	
7	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
8	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
10	1	ea	134070-1	D.05 ECO-00023731	FIELD INSTALLATION KIT, AC BUCK TRANSFORMER	
11	1	pcs	123496-2	C.02 MCO-00020128	AIR CONDITIONER, R417A, 220V, DUAL 50/60HZ, INTNL	
12	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
15	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
16	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	(NOT SHOWN)
26	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	(NOT SHOWN)
27	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	(NOT SHOWN)
28	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	(NOT SHOWN)
30	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	(NOT SHOWN)
		pcs	40-300275	A.11 ECO-00025945	Sea Tel, 9711-56, 100W/200W SW, AC	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

BOM Explosion Report

Item Number: 40-300290
Description: SEA TEL, 9711-56 IMA, 100/200 SW, 168 IN
Item Revision: A.13 ECO-00026180
Date as of: 04/16/2018 07:01:14 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	ea	111849-9	W.01 MCO-00021338	RADOME ASSY, 168 IN, WHITE/FOAM/SIDE	
3	1	ea	115912-1	H.02 ECO-00024353	BASE FRAME ASSY, 110 IN, W/PAN ACCESS, STEEL	
5	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
6	1	ea	88-207565-100	MCO-00025816	IBUC, TERRASAT, Ku, 100W, 5 YR WARRANTY	
7	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
8	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
15	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
16	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	(NOT SHOWN)
26	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	(NOT SHOWN)
27	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	(NOT SHOWN)
28	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	(NOT SHOWN)
30	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	(NOT SHOWN)
31	1	ea	121934	F.01 ECO-00019144	WARRANTY PACKET, LARGE TX/RX, TVRO	
		pcs	40-300290	A.13 ECO-00026180	SEA TEL, 9711-56 IMA, 100/200 SW, 168 IN	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

BOM Explosion Report

Item Number: 40-300296
Description: SEA TEL, 9711-56 IMA S/W, 200W/50W, AC
Item Revision: A.12 ECO-00026847
Date as of: 04/16/2018 07:00:29 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	69-151077	A.02 ECO-00026390	ASSEMBLY, 75 BASE FRAME, CRATED	
5	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
7	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
8	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
10	1	ea	134070-1	D.05 ECO-00023731	FIELD INSTALLATION KIT, AC BUCK TRANSFORMER	
11	1	pcs	123496-2	C.02 MCO-00020128	AIR CONDITIONER, R417A, 220V, DUAL 50/60HZ, INTNL	
12	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
15	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
16	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	(NOT SHOWN)
26	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	(NOT SHOWN)
27	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	(NOT SHOWN)
28	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	(NOT SHOWN)
30	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	(NOT SHOWN)
31	1	ea	121934	F.01 ECO-00019144	WARRANTY PACKET, LARGE TX/RX, TVRO	
		pcs	40-300296	A.12 ...	SEA TEL, 9711-56 IMA S/W, 200W/50W, AC	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

BOM Explosion Report

Item Number: 40-300323
Description: SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC, WHT
Item Revision: A.04 ECO-00025945
Date as of: 04/16/2018 07:00:52 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	69-151077	A.02 ECO-00026390	ASSEMBLY, 75 BASE FRAME, CRATED	
4	1	pcs	88-207564-200CFE	MCO-00025785	IBUC, TERRASAT, C, 200W, CFE	
5	1	pcs	88-207565-100CFE	MCO-00025817	IBUC, TERRASAT, Ku, 100W, CFE	
6	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
7	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
8	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	
9	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
10	1	pcs	123496-2	C.02 MCO-00020128	AIR CONDITIONER, R417A, 220V, DUAL 50/60HZ, INTNL	
11	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
12	1	ea	134070-1	D.05 ECO-00023731	FIELD INSTALLATION KIT, AC BUCK TRANSFORMER	
15	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	
16	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	
17	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	
18	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	
		pcs	40-300323	A.04 ECO-00025945	SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC, WHT	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

BOM Explosion Report

Item Number: 40-300324

Description: SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC-RDY,WHT

Item Revision: A.06 ECO-00025945

Date as of: 04/11/2018 09:52:00 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	69-151077	A.02 ECO-00026390	ASSEMBLY, 75 BASE FRAME, CRATED	
4	1	pcs	88-207564-200CFE	MCO-00025785	IBUC, TERRASAT, C, 200W, CFE	
5	1	pcs	88-207565-100CFE	MCO-00025817	IBUC, TERRASAT, Ku, 100W, CFE	
6	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
7	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
8	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	
9	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
11	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
15	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	
16	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	
17	1	ea	121934	F.01 ECO-00019144	WARRANTY PACKET, LARGE TX/RX, TVRO	
18	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	
19	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	
		pcs	40-300324	A.06 ECO-00025945	SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC-RDY,WHT	

Created By: Mike Needham

Create Time: 04/11/2018 09:55:14 AM PDT

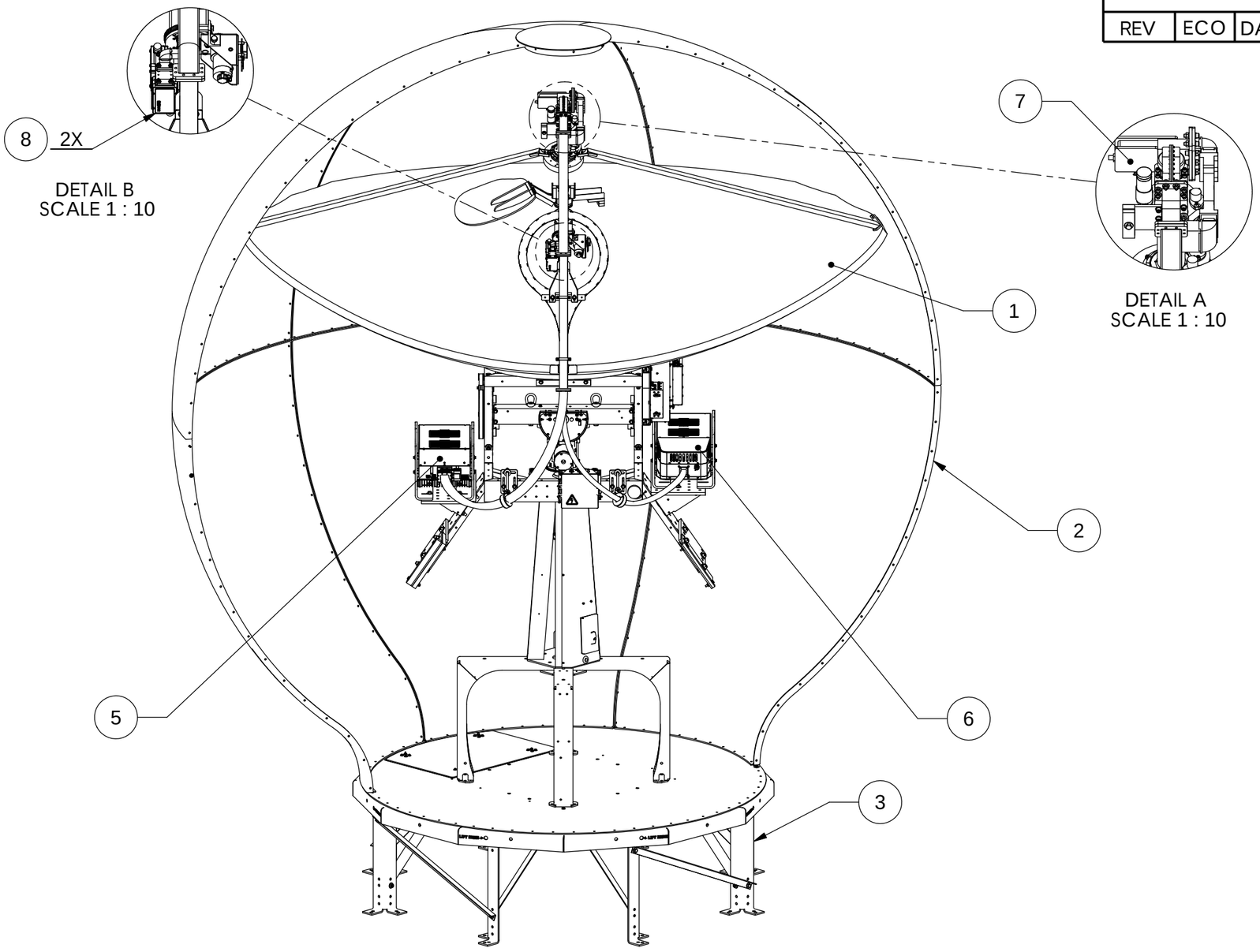
BOM Explosion Report

Item Number: 40-300325
Description: SEA TEL, 9711-56 IMA SW, 200W/100W, AC-RDY,WHT
Item Revision: A.05 ECO-00025945
Date as of: 04/16/2018 07:00:42 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-300265	A ECO-00022452	SeaTel 9711-56IMA	
0	REF		84-135577-181	181 DCO-00024297	IMA Software Version 181	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	
3	1	pcs	69-151077	A.02 ECO-00026390	ASSEMBLY, 75 BASE FRAME, CRATED	
4	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
5	1	ea	88-207565-100	MCO-00025816	IBUC, TERRASAT, Ku, 100W, 5 YR WARRANTY	
6	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
7	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
8	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	
9	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
11	1	ea	129337-1	A.01 ECO-00016134	INSTALL KIT, AIR CON. BREAKER	
15	1	ea	114569	G ECO-00017783	BALANCE WEIGHT KIT	
16	1	ea	122539-1	B ECO-00008543	SHIP STOWAGE KIT, XX97	
17	1	ea	124877-1	C ECO-00008543	DECAL KIT, XX97, SEATEL 126 IN/144 IN RADOME	
18	1	pcs	83-139992	A.03 ECO-00025874	DOC PACKET 9711 IMA, USB, ECCN EAR99	
		pcs	40-300325	A.05 ECO-00025945	SEA TEL, 9711-56 IMA SW, 200W/100W, AC-RDY,WHT	

Created By: Mike Needham
Create Time: 04/16/2018 07:10:51 AM PDT

REVISION HISTORY				
REV	ECO	DATE	DESCRIPTION	BY



REFERENCE DRAWINGS:
140852 SYSTEM BLOCK DIAGRAM
140851 ANTENNA SYSTEM SCHEMATIC
133746 PEDESTAL SCHEMATIC
123908 INSTALLATION ARRANGEMENT
121910 SHIPYARD SPEC.
124877 DECAL KIT

THIS DRAWING GOVERNS THE ASSEMBLY OF THE PART NUMBERS LISTED, REGARDLESS OF REVISION;

40-300020 Sea Tel, 9711-56 IMA, 200W/100W, AC RDY, 144 IN
40-300290 SEA TEL, 9711-56 IMA, 100/200 SW, 168 IN
40-300296 SEA TEL, 9711-56 IMA S/W, 200W/50W, AC
40-300323 SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC, WHT
40-300324 SEA TEL, 9711-56 IMA SW, CFE-200W/100W, AC-RDY,WHT
40-300325 SEA TEL, 9711-56 IMA SW, 200W/100W, AC-RDY,WHT

SYSTEM WEIGHTS △2					
SYSTEM P/N	GA	RADOME	BASE FRAME	AC KIT	SYSTEM TOTAL

NOTES: UNLESS OTHERWISE SPECIFIED
1. MANUFACTURE PER SEATEL STANDARD 122298.
△2 RECORDED WEIGHTS ARE THE ACTUAL MEASURED WEIGHTS OF SYSTEM AS ORDERED. FOR SYSTEM LIFTING AND MOUNTING CUSTOMER SHALL FOLLOW LOCAL SAFETY CODES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: JWM
WEIGHT:
MATERIAL: N/A
FINISH: N/A
SURFACE ROUGHNESS:
3rd ANGLE PROJECTION

DRAWN BY: K.D.H.
DRAWN DATE: 4/2/18
APPROVED BY:
APPROVED DATE:

COBHAM
Sea Tel, Inc., dba Cobham SATCOM, Concord
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: SeaTel 9711-56IMA

SIZE: B | SCALE: 1:22 | DRAWING NUMBER: 97-300265 | REV: A

FIRST USED: 9711-56 IMA | SHEET NUMBER: 1 OF 1

DOCUMENT N0. 99-149142-A

BOM Explosion Report

Item Number: DL-157896-A
Description: SYSTEM BLOCK LIST, 9711-56 SW IBUC
Item Revision: A DCO-00025405
Date as of: 04/19/2018 07:21:57 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF		92-157896-A	A DCO-00025405	SYSTEM BLOCK DIAGRAM, 9711-56 SW IBUC	
1	1	pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	
2	1	ea	62-151315	A MCO-00025305	ANTENNA ASSY, 2.4M OFFSET, 9711 IMA SW	
3	1	pcs	62-147931	A.06 ECO-00024924	Feed Assy, C-Band Circ-Lin TX-RX	
4	1	pcs	62-156574	A.04 ECO-00026390	FEED ASSY, KU-NET, LOW POWER	
5	1	ea	88-207707-000	MCO-00032338	LNB, C BAND, NORSAT 3120N-800002, 20Kn, 10KHz	
6	2	pcs	136128-2	B MCO-00020128	LNB, SMW, QUAD LO, KU BAND, TYPE N	
7	1	ea	88-207564-200	MCO-00025815	IBUC, TERRASAT, C, 200W, 5 YR WARRANTY	
8	1	ea	88-207565-100	MCO-00025816	IBUC, TERRASAT, Ku, 100W, 5 YR WARRANTY	
20	1	ea	134735-2	G.04 ECO-00025724	ENCLOSURE ASSY, ICU, CABLE CLAMP	
21	1	ea	131227-1	K.01 ECO-00025131	ENCLOSURE ASSY, MOTOR DRIVER, 09G2	
22	1	ea	140631-1	A ECO-00008547	MOTOR, SIZE 34, BLDC, .6 IN SHAFT, W/ENCODER	
23	2	ea	125974-1	F MCO-00028578	MOTOR, SIZE 34, BLDC W/ BRAKE, 15-PIN	
24	1	ea	134826-1	C ECO-00008546	HOME SWITCH ASSY, SHIELDED, GEN2, 97	
25	1	ea	131381-1	01 ECO-00016864	GARMIN GPS MODULE, SERIAL, 118 INCH TERMINATED	
26	1	ea	133595-3	A.03 ECO-00008545	ENCLOSURE ASSY, QOR SWITCH, AUX J7	
28	1	ea	140059-124	A ECO-00008547	HARNESS ASSY,REFLECTOR,KU NET, CASSEGRAIN,124 IN	
29	1	ea	134799-3	B ECO-00008546	HARNESS ASSY, REFLECTOR, G2 CIR/LIN FEED, 140 IN	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

BOM Explosion Report

Item Number: DL-157896-A
Description: SYSTEM BLOCK LIST, 9711-56 SW IBUC
Item Revision: A DCO-00025405
Date as of: 04/19/2018 07:21:57 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
30	1	ea	129526-36	D ECO-00008544	HARNESS ASSY, PCU TO MOTOR DRIVER, XX09	
31	2	ea	130082-56	A ECO-00008544	HARNESS, EL/CL MOTOR INTERFACE, 56 IN	
32	1	ea	130083-64	A ECO-00008544	HARNESS ASSY, AZ MOTOR INTERFACE, 64 IN	
33	1	ea	130084-64	C ECO-00008544	HARNESS, HOME FLAG ADAPTER, 64 IN	
34	1	ea	37-145487-A	01 MCO-00017091	HARNESS ASSY, PCU TO QOR SWITCH, 2.5 FT	
35	1	ea	131206-12	B.02 ECO-00008545	HARNESS ASSY, MUX RS485 M&C TO DAS, 12 IN	
36	2	pcs	37-157702-A	01 MCO-00033534	HARNESS ASSY, M&C,MUTE+RS232 IBUC-G TERRASAT,96"	
37	1	pcs	37-207150-000	MCO-00019897	CABLE ASSY, RJ45 IP67 BAJONETT TO RJ45, 2M	
38	1	pcs	37-207150-001	MCO-00035343	CABLE ASSY, RJ45 IP67 BAJONETT TO RJ45, 4M	
40	1	ea	115708-7	C ECO-00008542	CIRCUIT BREAKER BOX ASSY, 97 220V, 20A	
41	1	ea	88-207375-000	A MCO-00024020	POWER RING ASSY, 3CH, 20 AMP	
42	1	ea	139646-84	B ECO-00008547	CABLE ASSY, 9711 PED AC PWR TO H-BRIDGE SPLITTERS	
43	1	ea	136172-2	B ECO-00009830	MOUNTING ASSY, AC RELAY SWITCH	
44	1	ea	134365-1	A ECO-00008546	AC PWR CABLE, M16 TO C13 (PCU), 1M LENGTH	
45	2	ea	139660-2	01 ECO-00009560	CABLE ASSY, AC PWR, M16 MALE TO TERRASAT, 2M	
46	1	ea	139406-3	01 ECO-00009053	HARNESS ASSY, QOR, AC RELAY	
50	1	ea	130521-96ORG	B ECO-00008545	CABLE ASSY, SMA(M) 90 TO N(M) 90, 96 IN, ORG	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

BOM Explosion Report

Item Number: DL-157896-A

Description: SYSTEM BLOCK LIST, 9711-56 SW IBUC

Item Revision: A DCO-00025405

Date as of: 04/19/2018 07:21:57 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
51	1	ea	130521-108YEL	B ECO-00008545	CABLE ASSY, SMA(M) 90 TO N(M) 90, 108 IN, YEL	
52	1	ea	111079-12	H MCO-00032057	CABLE ASSY, SMA(M)-N(M), 12 FT.	
53	1	ea	37-207119-005	MCO-00026461	COAX CABLE, SRC316T, SMA (M)RA - N (M)RA, 5ft	
54	1	ea	141095-514120	02 ECO-00011962	CABLE ASSY, SRC316T, SMA (M)-N(M), 120 IN. GRN	
55	1	ea	113303-15	V.01 ECO-00008542	CABLE ASSY, SMA 90 - SMA (M), 20 IN	
56	1	ea	141095-631084	02 ECO-00011962	CABLE ASSY, SRC316 TRI SHIELD, SMA (M)RA - SMA(M),	
57	1	ea	141095-531084	02 ECO-00011962	CABLE ASSY, SRC316 TRI SHIELD, SMA (M)RA - SMA(M),	
58	1	ea	121281	A ECO-00008543	CABLE ASSY, SMA(F)-SMA(M), 3 IN.	
59	1	ea	141095-611036	02 ECO-00011962	CABLE ASSY, SRC316 TRI SHIELD, SMA (M) TO SMA (M),	
60	1	ea	141095-511036	02 ECO-00011962	CABLE ASSY, SRC316 TRI SHIELD, SMA (M) TO SMA (M),	
61	2	ea	115492-1	MCO-00012114	ADAPTER, N(F)-SMA(F), W/FLANGE	
62	1	ea	116466	H MCO-00030561	ROTARY JOINT, 4.5 GHz, DUAL COAX.	
70	1	pcs	88-147964-A	MCO-00019241	Waveguide Filter, BP with Radar Reject	
80	1	ea	112991-6	MCO-00012113	WAVEGUIDE, WR-137, FLEXGUIDE, 48 IN	
81	1	ea	140290-1	A.01 ECO-00008547	WAVEGUIDE, WR-137, RIGID, 97IMA	
82	1	ea	112991-2	E.03 ECO-00008542	WAVEGUIDE, WR-137, FLEXGUIDE, 24 IN	
83	1	ea	117507	B ECO-00008542	WAVEGUIDE, WR-137, 20 DEG E-BEND	
90	1	ea	110171-7	E.03 ECO-00008542	WAVEGUIDE, WR-75 FLEXIBLE, 48 IN	
91	1	ea	140291-2	A.01 ...	WAVEGUIDE, WR-75, RIGID W/FLEX, 97IMA, ...	

Created By: Mike Needham

Create Time: 04/19/2018 07:23:54 AM PDT

BOM Explosion Report

Item Number: DL-157896-A
Description: SYSTEM BLOCK LIST, 9711-56 SW IBUC
Item Revision: A DCO-00025405
Date as of: 04/19/2018 07:21:57 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
				...ECO-00008547	...LONG	
100	1	pcs	62-146414	B.09 ECO-00026390	ENCLOSURE ASS'Y, MXP W/ USER INTERFACE	
101	1	ea	134563-1	D.01 ECO-00026180	BELOW DECK KIT, MXP	
105	1	ea	135689-10	MCO-00015608	CONN,PHOENIX,PLUGBLE,TERM BLCK,5.08MM PITCH,10 POS	
106	1	ea	135689-6	MCO-00012114	CONN,PHOENIX,PLUGGABLE,TERM BLOCK, 5.08MM P,6 POS	
107	1	ea	136897	C MCO-00012115	CONNECTOR, DE9 (F) - TERM. BLOCK	
110	1	ea	111079-6	H ECO-00008542	CABLE ASSY, SMA(M)-N(M), 6 FT.	
111	1	ea	114973-72	G ECO-00008542	CABLE ASSY, N(M)-N(M), 72 IN.	
112	1	ea	116700-6	G ECO-00008542	CABLE ASSY, RG223, N(M)-F(M), 6 FT.	
113	1	ea	111115-6	C ECO-00008542	CABLE ASSY, F(M)-F(M), 6 FT.	NOT SHOWN
120	1	ea	136872	A.01 ECO-00008546	BRACKET ASSY, CONNECTOR, RACK MOUNT	
130	1	ea	119478-5	E ECO-00008542	CABLE ASSY, RJ-45 SERIAL, 60 IN.	
132	1	ea	133287-2	B MCO-00012115	CABLE ASSY, USB 2.0, 6FT, A/M TO MINI B/M (5PIN)	
133	1	ea	120643-25	C ECO-00008543	CABLE ASSY, RS232, 9-WIRE, STRAIGHT, 25 FT.	
134	1	ea	138691-1	A MCO-00012115	CABLE ASSY, RJ45 TO DB9F, CISCO CONSOLE	
135	1	ea	119479-10	C ECO-00008542	CABLE ASSY, CAT5 JUMPER, 10 FT.	
135	1	ea	126877	C.04 ECO-00008544	HARNESS ASSY, COMTECH MODEM INTERFACE	
140	1	ea	136489	B ...	POWER CORD, 36", IEC TO 110VAC	NOT SHOWN

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

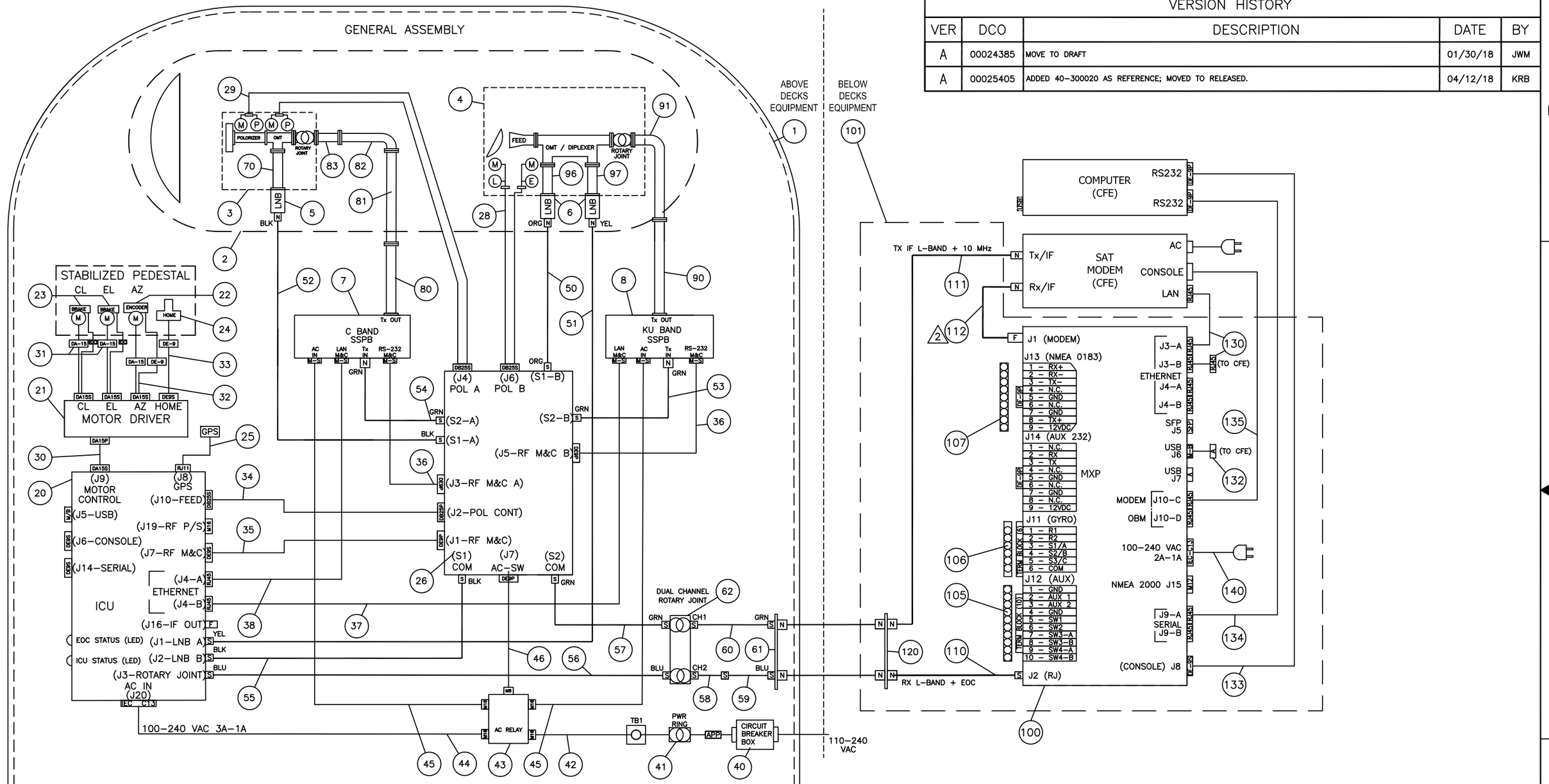
BOM Explosion Report

Item Number: DL-157896-A
Description: SYSTEM BLOCK LIST, 9711-56 SW IBUC
Item Revision: A DCO-00025405
Date as of: 04/19/2018 07:21:57 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
				...MCO-00025523		
140	1	ea	136490	A MCO-00025524	POWER CORD, 36", IEC TO 220VAC	NOT SHOWN
			DL-157896-A	A DCO-00025405	SYSTEM BLOCK LIST, 9711-56 SW IBUC	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

VERSION HISTORY				
VER	DCO	DESCRIPTION	DATE	BY
A	00024385	MOVE TO DRAFT	01/30/18	JWM
A	00025405	ADDED 40-300020 AS REFERENCE; MOVED TO RELEASED.	04/12/18	KRB



REFERENCE DRAWINGS:

1. 40-300020 SEA TEL, 9711-56 IMA 200W/100W
2. 40-300275 SEA TEL, 9711-56 SW IBUC2/IBUC2
3. 40-300290 SEA TEL, 9711-56 SW IBUC2/IBUC2
2. 40-300296 SEA TEL, 9711-56 SW IBUC2/IBUC2
3. 40-300323 SEA TEL, 9711-56 SW IBUC2/IBUC2
4. 40-300224 SEA TEL, 9711-56 SW IBUC2/IBUC2
5. 40-300225 SEA TEL, 9711-56 SW IBUC2/IBUC2
6. DL-157896-A SYSTEM BLOCK LIST, 9711-56
7. 93-157895-A SCHEMATIC, ANTENNA SYSTEM 9711-56
8. 140110 SCHEMATIC, ANTENNA PEDESTAL 9711

NOTES UNLESS OTHERWISE SPECIFIED:

1. S = SMA COAX CONNECTOR

2. 50 OHM MODEM SHOWN, FOR 75 OHM MODEM REPLACE ITEM 111 WITH ITEM 112 ON THE TX PATH AND 112 WITH 113 ON THE RX PATH

DRAWN BY:	JWM
DRAWN DATE:	12-23-2017
APPROVED BY:	
APPROVED DATE:	

COBHAM
Sea Tel, Inc., dba Cobham SATCOM, Concord
Tel. 925-798-7979 Fax. 925-798-7986

TITLE:
SYSTEM BLOCK DIAGRAM
9711-56 IMA, SW, IBUC2

SIZE	SCALE:	DRAWING NUMBER	VER
B	N/A	92-157896	A

FIRST USED: 9711-56 IMA SW IBUC2 | SHEET NUMBER 1 OF 1

DOCUMENT NO. 99-148189-A

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A01	24357	1/29/2018	MOVE TO DRAFT	JVM

PART #: 134870-1
C BAND LINEAR
MOTOR ASSEMBLY

PART #: 134871-1
C BAND LIMIT
SWITCH ASSEMBLY

PART #: 115425-2
C BAND LINEAR
POL-POT ASSEMBLY

C BAND LINEAR POL
SELECT CIRCUIT

PART #: 134870-1
C BAND LINEAR/CIRCULAR
MOTOR ASSEMBLY

PART #: 134871-1
C BAND LIMIT
SWITCH ASSEMBLY

PART #: 115425-2
C BAND CIRCULAR / LINEAR
POL-POT ASSEMBLY

C BAND CIRCULAR / LINEAR
POL SELECT CIRCUIT

PART #: 140815-1
SUB-REFLECTOR
LIMIT
SWITCH ASSEMBLY

PART #: 138671-2
SUB-REFLECTOR MOTOR
ASSEMBLY W/ ENCODER

PART #: 140815-1
SUB-REFLECTOR
LIMIT
SWITCH ASSEMBLY

PART #: 138671-1
KU BAND POL
MOTOR ASSEMBLY
W/ ENCODER

PART #: 134561-12
KU BAND POL
HOME FLAG SENSOR
ASSEMBLY

PART #: 139031-1
PCB ASSY, MOTOR
TERM W/ VOLTAGE
REGULATORS

PART #: 134623
MOTOR TERMINATION PCB

PART #: 134623
MOTOR TERMINATION PCB

PART #: 140596-1
SUB-REFLECTOR
MOTOR PCB
TERM. ASSEMBLY

MOTOR +
MOTOR -
+5VDC
POL-POT-1
GND
MOTOR +
MOTOR -
+5VDC
POL-POT-2
GND

PART #: 134799-3
C BAND REFLECTOR HARNESS ASSEMBLY

J4 ANTENNA A
C BAND FEED
CONTROL

PART #: 37-207150-001
C BAND LAN M&C HARNESS ASSEMBLY

TERRASAT IBUC2-G C BAND
PART #: 88-207564-200

LAN M&C
SERIAL M&C

J4A-ICU
RF M&C
ETHERNET

C BAND FEEDS
LINEAR / CIRCULAR FEED
PART #: 62-147931-A

RF OUT
WR-137

RF IN
WR-229

C BAND
CROSS-POL
LNB

POWER
INPUT

TX/IF
INPUT

QOR SWITCH ASSEMBLY
PART #: 133595-3

PART #: 37-157702-A
C BAND SERIAL M&C HARNESS ASSEMBLY

J3 ANTENNA-A
C BAND BUC
RF M&C
SERIAL

PART #: 141095-514120
C BAND TX/IF COAX CABLE ASSEMBLY

PART #: 111079-12
C BAND RX/IF COAX CABLE ASSEMBLY

S2-A TX/IF
COAX SWITCH

S1-A RX/IF
COAX SWITCH

IN-0
IN-1
24VDC
POL-POT-1
AUX-2
GND
MOTOR +
MOTOR -
ENC-A
ENC-B
+5VDC
+15VDC
POL HOME FLAG
GND

J6 ANTENNA B
Ku BAND FEED
CONTROL

PART #: 140059-124
Ku BAND REFLECTOR HARNESS ASSEMBLY

PART #: 37-207150-000
Ku BAND LAN M&C HARNESS ASSEMBLY

TERRASAT KU BAND IBUC-2
PART #: 88-207565-100
PART #: 88-207565-050

J4B-ICU
RF M&C
ETHERNET

Ku BAND FEED
Part #: 62-156574

RF OUT
WR-75

WR-75
Ku BAND
CROSS-POL
LNB
ORG

WR-75
Ku BAND
CO-POL
LNB
YEL

PART #: 37-207119-005
Ku BAND TX/IF COAX CABLE ASSEMBLY

PART #: 130521-96ORG
Ku BAND CROSS POL RX/IF COAX CABLE ASSEMBLY

PART #: 37-157702-A
Ku BAND SERIAL M&C HARNESS ASSEMBLY

J5 ANTENNA-B
Ku BAND BUC
RF M&C SERIAL

S2-B TX/IF
COAX SWITCH

S1-B RX/IF
COAX SWITCH

PCU / ICU
J1 RF M&C
SERIAL INPUT

PCU / ICU
J2 FEED
INPUT

J7 AC
RELAY
CONTROL

TX/IF
COAX SWITCH
S2 COM

RX/IF
COAX SWITCH
S1 COM

PART #: 113303-15
CROSS POL RX/IF COAX CABLE ASSEMBLY

PART #: 131206-12
9 PIN PARREL HARNESS ASSEMBLY

PART #: 37-145487-A
25 PIN PARALELL HARNESS ASSEMBLY

J4A-ICU
RF M&C
ETHERNET

J4B-ICU
RF M&C
ETHERNET

ICU J8 GPS
SERIAL PORT

ICU J9
MOTOR
CONTROL

ICU J7
RF M&C-A
SERIAL PORT

ICU J5
USB PORT

ICU J19
AUX POWER
PORT

ICU J6
SERVICE RS232
SERIAL PORT

ICU J10
FEED CONTROL

ICU J14
RF M&C-B
RS232
SERIAL PORT

PART #: 131381-1
GPS SERIAL
ANTENNA ASSEMBLY

IFL-1
(TX-IF)

PART #: 141095-511036
TX/IF COAX CABLE ASSEMBLY

L BAND TX-IF + 10MHz

PART #: 141095-531084
TX/IF COAX CABLE ASSEMBLY

IFL-2
(RX/IF)

PART #: 141095-611036
RX/IF COAX CABLE ASSEMBLY

PART #: 121281
RX/IF COAX CABLE ASSEMBLY

L BAND RX-IF + EOC

PART #: 141095-631084
RX/IF COAX CABLE ASSEMBLY

PART #: 116466
DUAL CHANNEL
COAX ROTARYJOINT

PART #: 130190-418
3PDT POWER RELAY
PART #: 130189-14
3PDT POWER RELAY BASE

PART #: 139660-2
POWER CORD TO Ku BAND BUC

PART #: 139660-2
POWER CORD TO C BAND BUC

PART #: 139646-84
PEDESTAL POWER CORD TO AC RELAY

PART #: 136172-2
AC POWER RELAY ASSEMBLY

PART #: 139406-3
AC RELAY CONTROL HARNESS

PART #: 134365-1
POWER CORD TO ICU

J16 RX/IF OUT

J2 CROSS-POL RX/IF
RX/IF COAX SWITCH
J1 CO-POL RX/IF

J3 RX/IF & EOC
ROTARY JOINT

PART #: 134735-2
ICU ENCLOSURE ASSEMBLY

SHIPS ELECTRICAL GND
110/240VAC
50/60Hz
20AMPS

SHIPS HULL GND

CB-1

PART #: 115706-7
PEDESTAL AC CIRCUIT BREAKER ASSEMBLY

PART #: 88-207375-000
20 AMP AC SLIP-RING ASSEMBLY

TB1

IEC
C13

IEC
C14

100-240VAC
3-1.3 AMPS

ICU J20
AC POWER
INPUT

REFERENCE DRAWINGS:

1. 40-300022 SYSTEM, 9711-56SW, IMA
2. 40-300275 SYSTEM, 9711-56SW, IMA
3. 40-300290 SYSTEM, 9711-56SW, IMA
4. 40-300296 SYSTEM, 9711-56SW, IMA
5. 40-300323 SYSTEM, 9711-56SW, IMA
6. 40-300324 SYSTEM, 9711-56SW, IMA
7. 40-300325 SYSTEM, 9711-56SW, IMA
8. DL-157896-A SYSTEM BLOCK LIST, 9711-56SW, IMA
9. 92-157896-A SYSTEM BLOCK DIAGRAM, 9711-56SW, IMA
10. 140110 ANTENNA PEDESTAL SCHEMATIC, 9711-IMA

NOTES:

⚠ REFER TO DRAWING 140110, ANTENNA PEDESTAL SCHEMATIC, 97IMA, FOR CONNECTION DETAILS

2. S = SMA COAX CONNECTOR

DRAWN BY:	JVM
DRAWN DATE:	1-26-2018
APPROVED BY:	
APPROVED DATE:	

Sea Tel
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: ANTENNA SYSTEM SCHEMATIC, 9711-56SW, IMA

SIZE	SCALE:	DRAWING NUMBER	REV
D	NONE	93-157895-A	01
FIRST USED: 9711-56SW, IMA		SHEET NUMBER	1 OF 1

DOCUMENT NO. 124225-4_A

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
X1	N-A	10-14-13	PRELIMINARY RELEASE	TBD
A	14961	9/8/14	RELEASE TO PRODUCTION	KLD

FEED
DB-25P

DB-25S
(ICU-J10)

2	BRG-1B
1	BRG-1A
3	BRG-2A
4	BRG-2B
7	GND
6	POL-POT
5	+5.0V-B
11	+15V
20	IN-1
24	GND
25	GND

1

RF M&C
M16

M16
J19

5	24VDC
2	GND
4	24VDC
3	GND
1	GND

IF OUT
F

J16
(ICU-J116)
L-BAND TUNER

LNB-B
S

J2
NO

SWITCH

LNB-A
S

J1
NC

ROTARY JOINT
S

J3
RX L-BAND + EOC

100-240 VAC
IEC C13

J20
IEC C14

GND
L2 100-240 VAC
2A-1A
L1

134735-2
ENCLOSURE ASS'Y, ICU

DA-15S
(PCU-J3)

MISO(+)	
MISO(-)	
SPSCK(+)	
SPSCK(-)	
MOSI(+)	
MOSI(-)	
SS(+)	
SS(-)	
+24V	
+24V	
+24V	
GND	
GND	
GND	
GND	

SERVICE
DE-9S

DE-9P

USB

USB

RJ11
(ICU-J8)

GPS
RJ11

GND	
TX	
RX	
+5.0V-B	

DA-15P

P/N 129526

DA-15S

1	BRN	BRN
2	RED	RED
3	ORG	ORG
4	YEL	YEL
5	GRN	GRN
6	BLU	BLU
7	VIO	VIO
8	GRY	GRY
9	WHT	WHT
10	WHT/BRN	WHT/BRN
11	WHT/RED	WHT/RED
12	WHT/ORG	WHT/ORG
13	WHT/YEL	WHT/YEL
14	WHT/GRN	WHT/GRN
15	WHT/BLU	WHT/BLU

DRIVE
DA-15P

MISO(+)
MISO(-)
SPSCK(+)
SPSCK(-)
MOSI(+)
MOSI(-)
SS(+)
SS(-)
+24V
+24V
+24V
GND
GND
GND
GND

P/N 125974-1

BLDC MOTOR

MRT-U	WHT	
MRT-V	BLU	
MRT-W	BRN	
5V-CL	ORG	
HALLL-W	YEL	
HALL-V	RED	
HALL-U	GRN	
GND	BLK	

BRAKE

GND	BLK	
24V	BLK	

DA-15P

IDC

DA-15S

P/N 130082

DA-15P

1	BRN	BRN
2	RED	RED
3	ORG	ORG
4	YEL	YEL
5	GRN	GRN
6	BLU	BLU
7	VIO	VIO
8	GRY	GRY
	WHT/GRN	WHT/GRN
	WHT/BLU	WHT/BLU
9		
10		

CL
DA-15S

MRT-U
MRT-V
MRT-W
5V-CL
HALLL-W
HALL-V
HALL-U
GND
GND
24V

P/N 125974-1

BLDC MOTOR

MRT-U	WHT	
MRT-V	BLU	
MRT-W	BRN	
5V-CL	ORG	
HALLL-W	YEL	
HALL-V	RED	
HALL-U	GRN	
GND	BLK	

BRAKE

GND	BLK	
24V	BLK	

DA-15P

IDC

DA-15S

P/N 130082

DA-15P

1	BRN	BRN
2	RED	RED
3	ORG	ORG
4	YEL	YEL
5	GRN	GRN
6	BLU	BLU
7	VIO	VIO
8	GRY	GRY
	WHT/GRN	WHT/GRN
	WHT/BLU	WHT/BLU
9		
10		

EL
DA-15S

MRT-U
MRT-V
MRT-W
5V-CL
HALLL-W
HALL-V
HALL-U
GND
GND
24V

P/N 124039-1

BLDC MOTOR

MRT-U	WHT	
MRT-V	BLU	
MRT-W	BRN	
5V-CL	ORG	
HALLL-W	YEL	
HALL-V	GRY	
HALL-U	GRN	
GND	BLK	

ENCODER

ENC-AZ-B	BRN/GRN	
ENC-AZ-A	ORG/YEL	
5V	RED	
GND	BLK	

DE-9P

DA-15S

P/N 130083

DA-15P

1	WHT	WHT
2	BLU	BLU
3	BRN	BRN
4	ORG	ORG
5	YEL	YEL
6	GRY	GRY
7	GRN	GRN
8	BLK	BLK
2	WHT/GRN	WHT/GRN
1	WHT/ORG	WHT/ORG
4	RED	RED
5	BLK	BLK

DE-9S

AZ
DA-15S

MRT-U
MRT-V
MRT-W
5V-CL
HALLL-W
HALL-V
HALL-U
GND
ENC-AZ-B
ENC-AZ-A
5V
GND

P/N 134826-1

COM	AZ REF	WHT/RED
NC	GND	BRN

DE-9P

P/N 130084

DA-15S

DA-15P

4	RED	RED
3	WHT/RED	WHT/RED
5	BRN	BRN

DE-9S

DE-9P

HOME
DE-9S

24V
AZ REF
GND

MOTOR JUNCTION ASS'Y
131227-1

DRAWN BY: JWM
DRAWN DATE: 10-14-2013
APPROVED BY:
APPROVED DATE:

Sea Tel
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: PEDESTAL SYSTEM SCHEMATIC, 9711

SIZE: D | SCALE: NONE | DRAWING NUMBER: 140110 | REV: A

FIRST USED: 7911-IMA | SHEET NUMBER: 1 OF 1

DOCUMENT NO. 124225-4_A

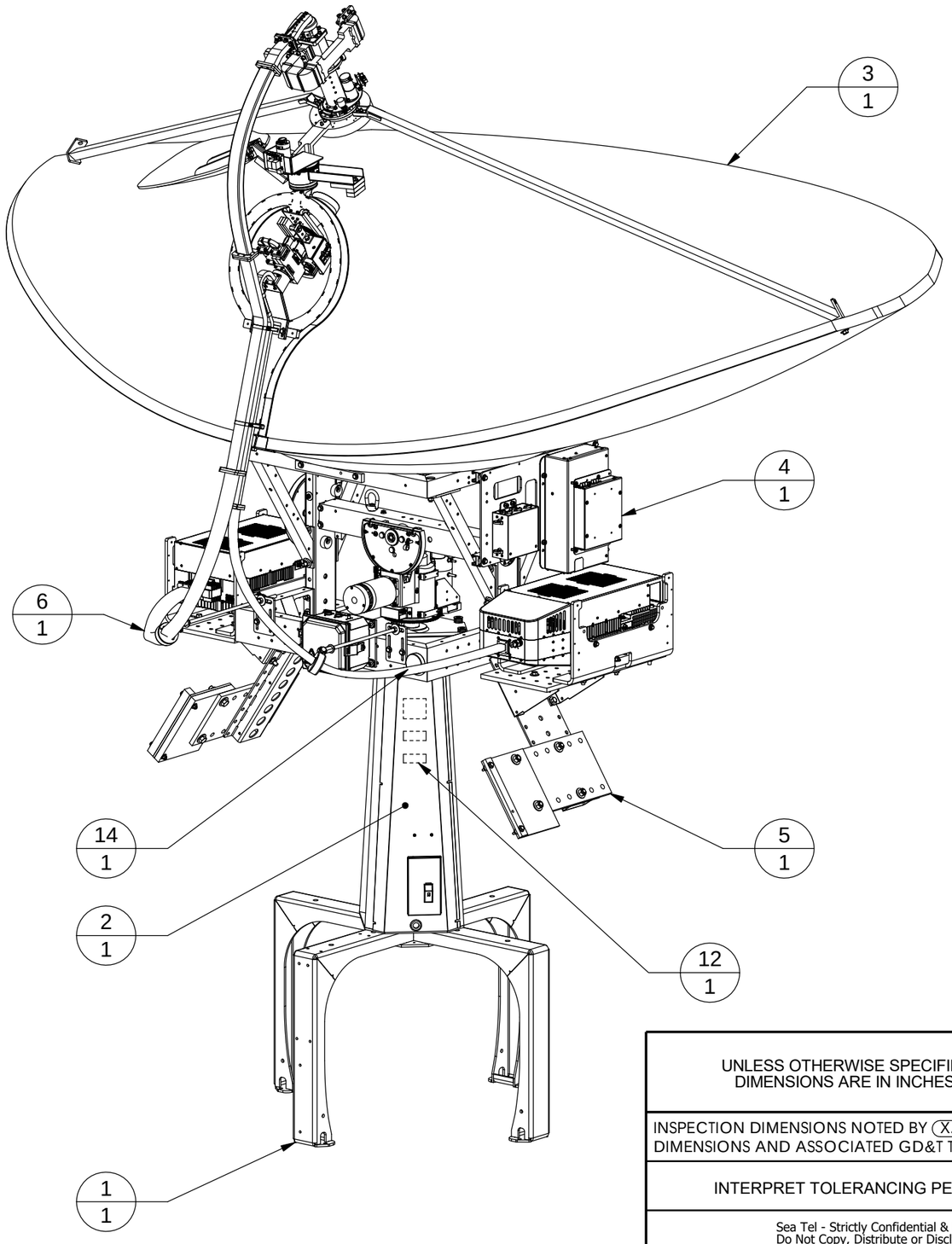
BOM Explosion Report

Item Number: 62-158183
Description: GENERAL ASSY, 9711-56 SW 100/200 IBUCG
Item Revision: A.07 ECO-00026847
Date as of: 04/19/2018 07:22:39 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-158183	A.01 ECO-00026995	GENERAL ASSY, 9711-56 SW 200W/100W IBUC	
0	1		DL-000604-A	A DCO-00009769	Software Assembly General Release IMA	
1	1	ea	62-151313	A.06 ECO-00026031	PEDESTAL ASSY, 9711 IMA SW	
2	1	ea	62-151314	A.01 MCO-00026493	POWER ASSY, 220V, 32.8 IN SHROUD, TX/RX, IMA SW	
3	1	ea	62-151315	A MCO-00025305	ANTENNA ASSY, 2.4M OFFSET, 9711 IMA SW	
4	1	pcs	62-158184	A.06 ECO-00025945	ELECT. EQU. FRAME ASSY, 9711-56 SW IBUC-G/IBUC-G	
5	1	pcs	62-158185	A.01 ECO-00025945	BALLANCE KIT, 9711-56 SW 100/200	
6	1	pcs	62-156922	A.02 ECO-00026077	WAVEGUIDE RUN, 9711-56 IMA-SW	
11	1	ea	123530-2	E.01 ECO-00010154	GROUND BONDING KIT, XX97	NOT SHOWN
12	1	ea	121655-1	N ECO-00017953	LABELS INSTALLATION, XX97, 9711, STXXX	
14	1	ea	134420-1	A.01 ECO-00008546	MK2-GPS KIT	
40	1	ea	62-148855	A.03 MCO-00025395	KIT, PACKAGING, PEDESTAL/REFLECTOR, LARGE TX/RX	NOT SHOWN
		pcs	62-158183	A.07 ECO-00026847	GENERAL ASSY, 9711-56 SW 100/200 IBUCG	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

REVISION HISTORY				
REV	ECO	DATE	DESCRIPTION	BY



NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 62-158183, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°	DESIGNER/ENGINEER: JWM	DRAWN BY: LIND	COBHAM Sea Tel, Inc., dba Cobham SATCOM, Concord Tel. 925-798-7979 Fax. 925-798-7986
	WEIGHT: 672.1 LBS	DRAWN DATE: 04/20/2018	
INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED	MATERIAL: N/A	APPROVED BY:	TITLE: ASSY DWG, GA, 9711-56 IMA
INTERPRET TOLERANCING PER ASME Y14.5 - 2009	FINISH: N/A	APPROVED DATE:	
	SURFACE ROUGHNESS:	SIZE B / SCALE: 1:15	DRAWING NUMBER: 97-158183 / REV: A01
	3rd ANGLE PROJECTION	FIRST USED: 9711-56IMA	SHEET NUMBER: 1 OF 1

DOCUMENT N0. 99-148645-A

BOM Explosion Report

Item Number: 139990-2
Description: MOUNTING ASSY, ICU WITH QOR SWITCH
Item Revision: B.01 ECO-00017953
Date as of: 04/12/2018 11:13:59 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
1	1	ea	139972-1	02 ECO-00018753	PLATE, 97IMA, ICU MOUNT	
2	2	ea	125150-021	A.01 ECO-00008543	UNISTRUT, 1-1/4 H-CHANNEL, 21 IN, AL	
3	1	ea	134735-2	G.04 ECO-00025724	ENCLOSURE ASSY, ICU, CABLE CLAMP	
4	1	ea	131227-1	K.01 ECO-00025131	ENCLOSURE ASSY, MOTOR DRIVER, 09G2	
5	1	ea	133595-3	A.03 ECO-00008545	ENCLOSURE ASSY, QOR SWITCH, AUX J7	
6	1	ea	37-145487-A	01 MCO-00017091	HARNESS ASSY, PCU TO QOR SWITCH, 2.5 FT	(NOT SHOWN)
7	1	ea	131206-12	B.02 ECO-00008545	HARNESS ASSY, MUX RS485 M&C TO DAS, 12 IN	(NOT SHOWN)
8	8	ea	125151-1	MCO-00012114	NUT, 1 1/4 UNISTRUT, 1/4-20, W/SPRING, STEEL	
10	1	ea	113303-15	V.01 ECO-00008542	CABLE ASSY, SMA 90 - SMA (M), 20 IN	
20	4	ea	131572-5321	MCO-00012114	STANDOFF, HEX, M/F, M4 X 14, BRASS W/ZINC PLATING	
30	1	ea	121655-16	N ECO-00017953	LABELS INSTALLATION, 97IMA UPGRADE KIT	
40	2	ea	122782	MCO-00012114	CABLE TIE HOLDER, .281 DIA PUSH MOUNT	
50	4	ea	119745-220	MCO-00012113	SCREW, PAN HD, PHIL, M4 X10, SS.	
58	4	ea	114580-230	MCO-00024303	WASHER, FLAT, M4, SS.	
60	1	ea	114593-164	MCO-00012113	SCREW, SOCKET HD, 10-32 x 1/2, SS.	
66	1	ea	119952-011	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, #10, SS.	
68	1	ea	114580-011	MCO-00012113	WASHER, FLAT, #10, SS.	
70	4	ea	114586-537	MCO-00012113	SCREW, HEX HD, 1/4-20 x 3/4, SS.	
71	2	ea	114586-543	MCO-00012113	SCREW, HEX HD, 1/4-20 x 2, SS.	
72	2	ea	114586-545	MCO-00012113	SCREW, HEX HD, 1/4-20 x 2-1/2, SS.	
76	12	ea	114581-029	MCO-00016035	WASHER, LOCK, 1/4, SS	
77	8	ea	114580-027	MCO-00012113	WASHER, FLAT, 1/4, SMALL PATTERN, SS.	
78	8	ea	114580-029	MCO-00012113	WASHER, FLAT, 1/4, SS.	

Created By: Mike Needham
Create Time: 04/12/2018 11:16:22 AM PDT

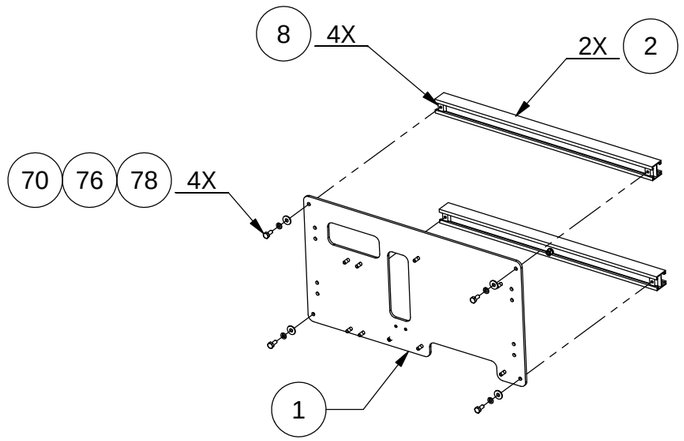
BOM Explosion Report

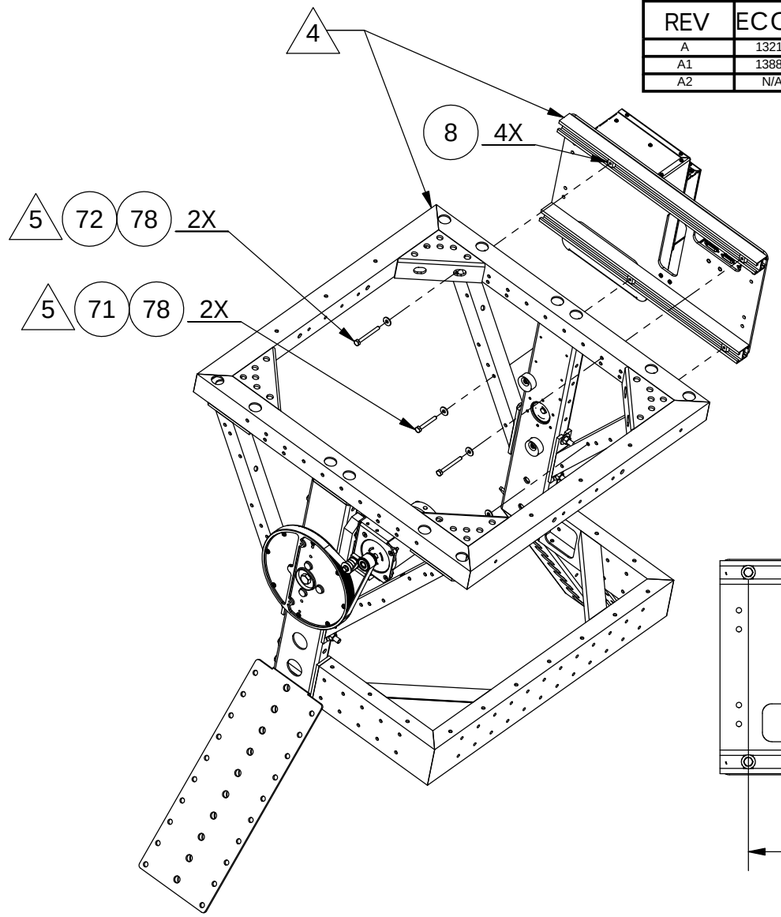
Item Number: 139990-2
Description: MOUNTING ASSY, ICU WITH QOR SWITCH
Item Revision: B.01 ECO-00017953
Date as of: 04/12/2018 11:13:59 AM PDT

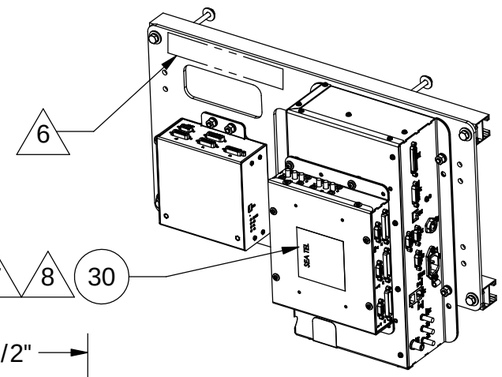
Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
79	8	ea	114583-029	MCO-00012113	NUT, HEX, 1/4-20, SS.	
		ea	139990-2	B.01 ECO-00017953	MOUNTING ASSY, ICU WITH QOR SWITCH	

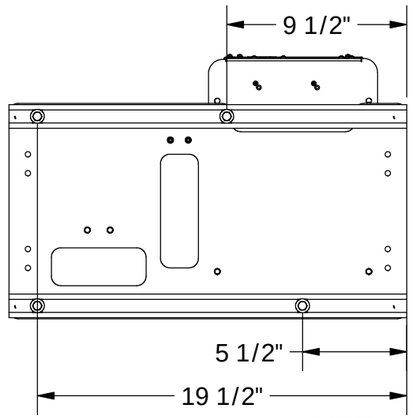
Created By: Mike Needham
Create Time: 04/12/2018 11:16:22 AM PDT

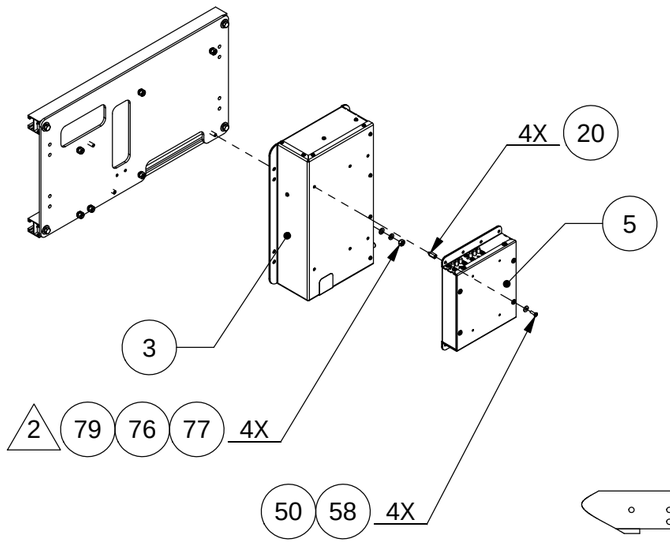
REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	13212	2-19-14	RELEASED TO PRODUCTION, WAS X3	K.D.H.
A1	13888	4-24-14	-2, ITEM 30 WAS 121655-16	K.D.H.
A2	N/A	7-2-14	ASS -3; ADD DASH TABLE	K.D.H.

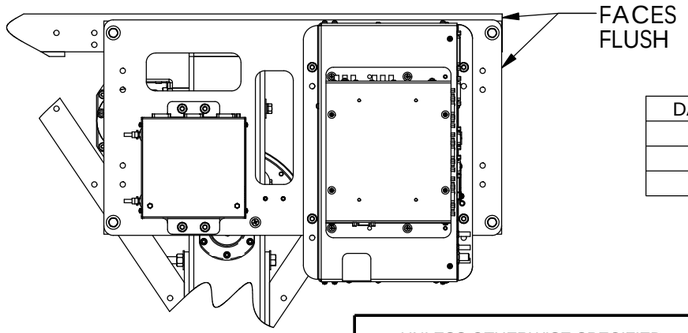


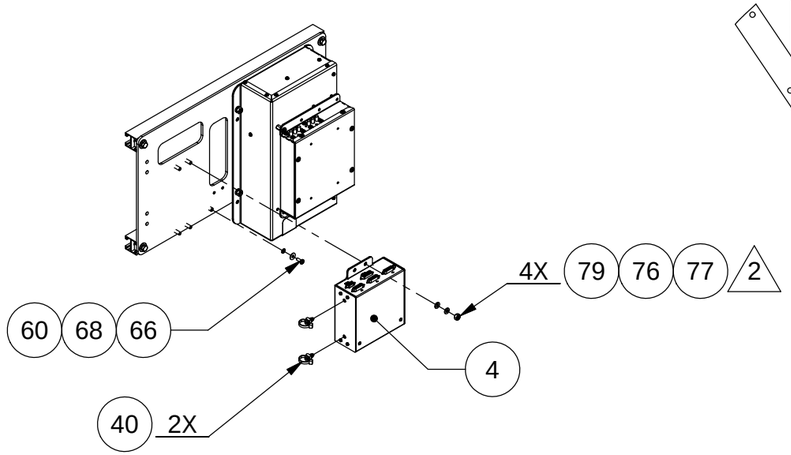












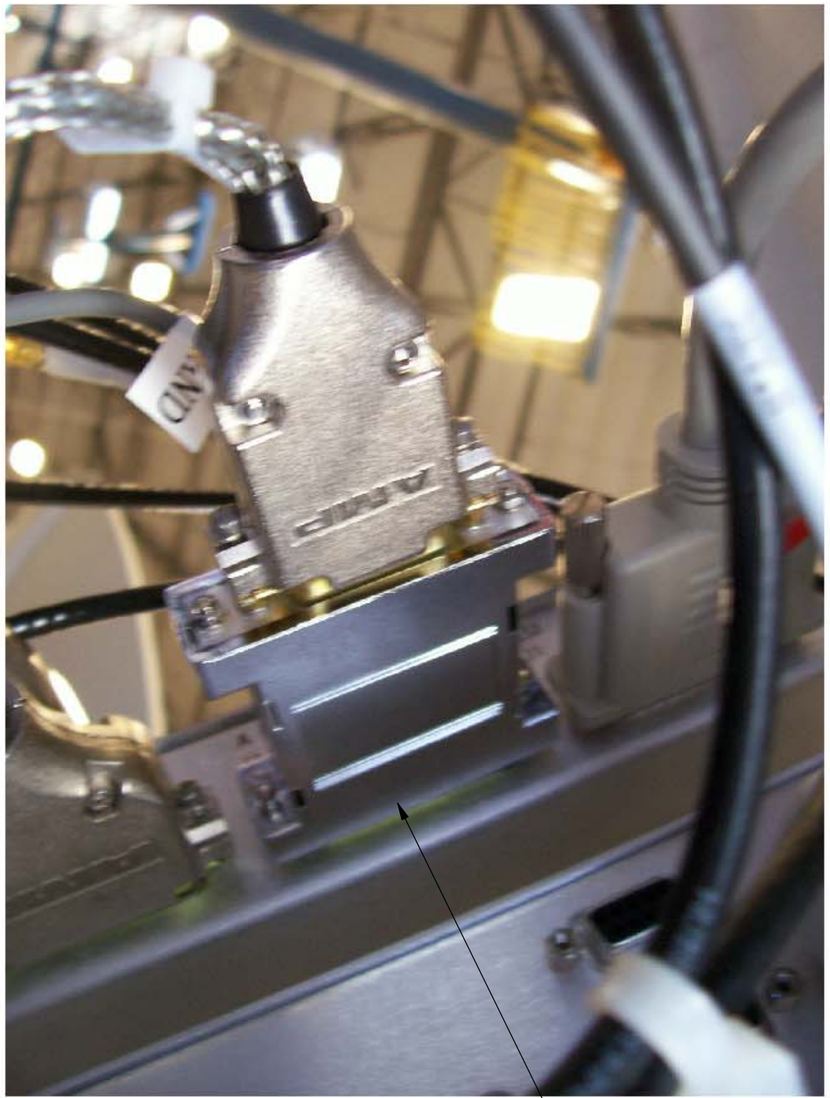
DASH	DESCRIPTION
-1	97IMA UPGRADE KITS
-2	97IMA
-3	97IMA X/KU

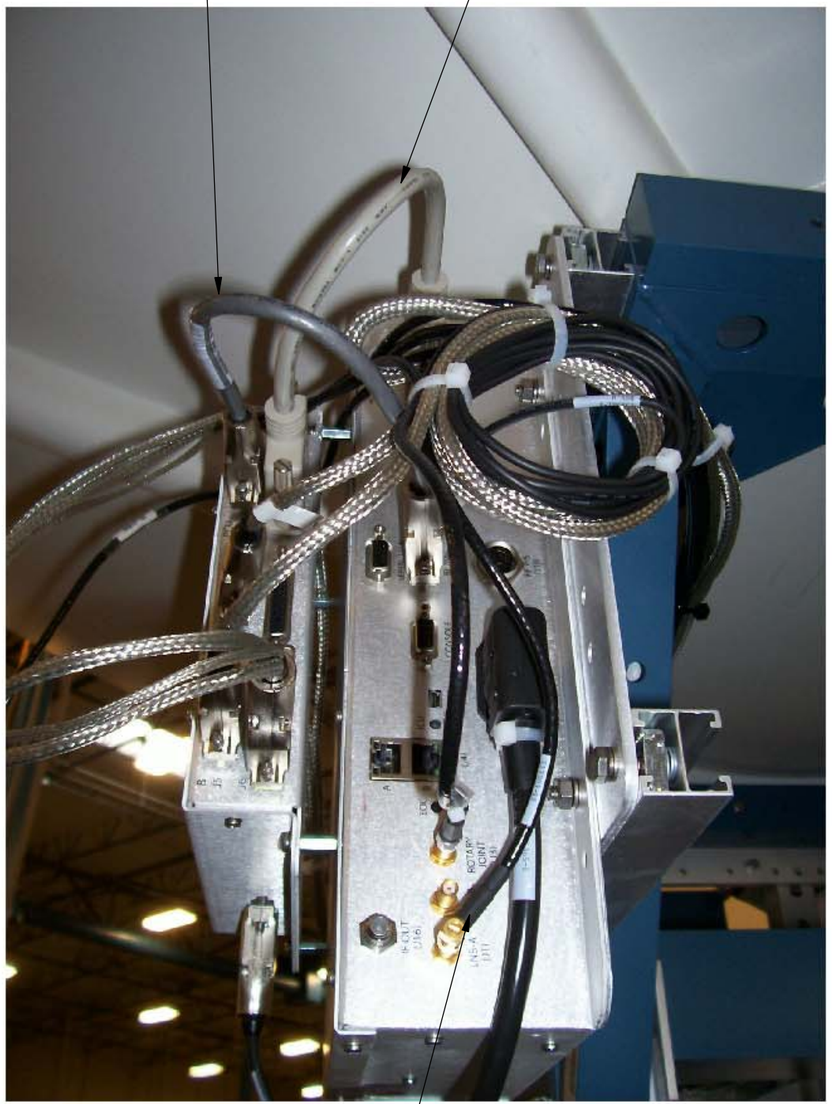
NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. △2 USE ONLY LOCTITE 242 ON THIS MOUNTING HARDWARE.
3. △3 DO NOT APPLY LOCTITE AT THIS TIME. LOCTITE TO BE APPLIED AT HIGHER LEVEL ASSEMBLY.
4. △4 ENSURE MOUNTING IS FLUSH WITH FRAME.
5. △5 IDENTIFY ITEMS 71, 72 (QTY 2 EA) & 78 (QTY 4 EA) PER SEATEL SPEC 122930, APP G. & ATTACH TO ASS'Y.
6. △6 IDENTIFY ASS'Y PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
7. △7 NOTE ORIENTATION.
8. △8 INSTALL LABEL (ITEM 1 OF LABEL KIT ITEM 30) HERE, ALL OTHERS TO BE INSTALLED ON 140056.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°
INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: JWM	DRAWN BY: K.D.H.	Sea Tel COBHAM	
WEIGHT: 22.9 LBS.	DRAWN DATE: 10-8-13	Tel. 925-798-7979 Fax. 925-798-7986	
MATERIAL: N/A	APPROVED BY:	TITLE: ICU MOUNTING ASS'Y, WITH QOR SWITCH	
FINISH: N/A	APPROVED DATE:		
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:12	DRAWING NUMBER: 139990	REV: A2
3rd ANGLE PROJECTION	FIRST USED: 97IMA UPGRADE	SHEET NUMBER: 1 OF 2	





SIZE	SCALE:	DRAWING NUMBER	REV
B	1:12	139990	A2
		SHEET NUMBER 2 OF 2	

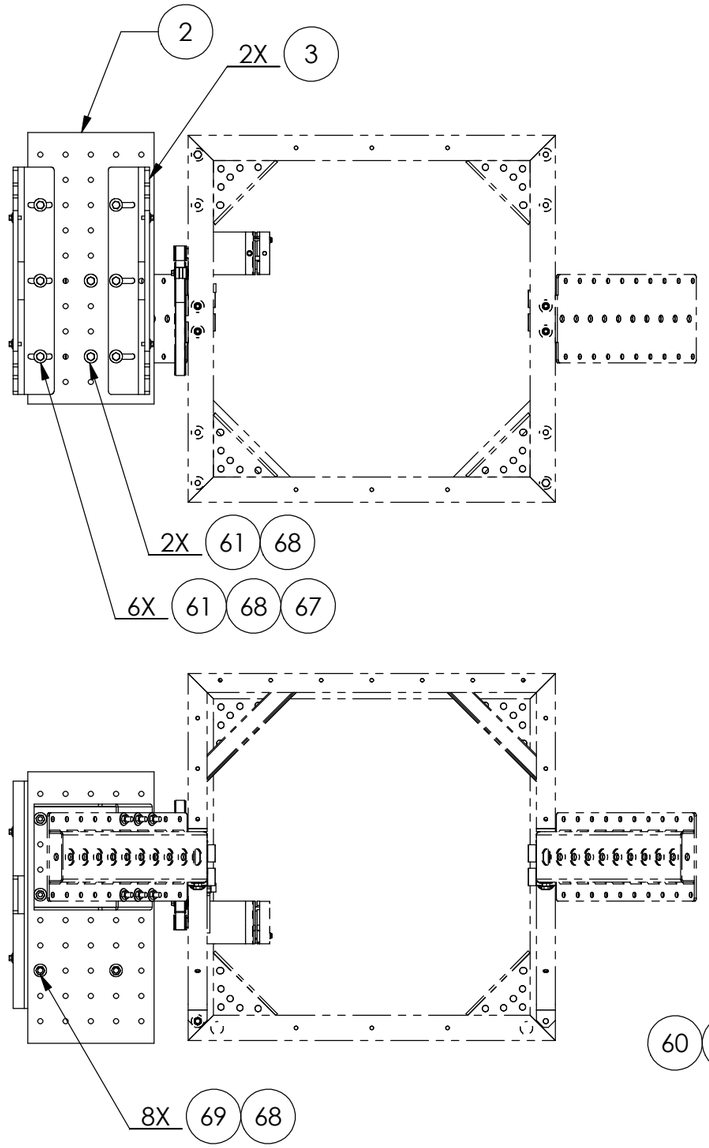
BOM Explosion Report

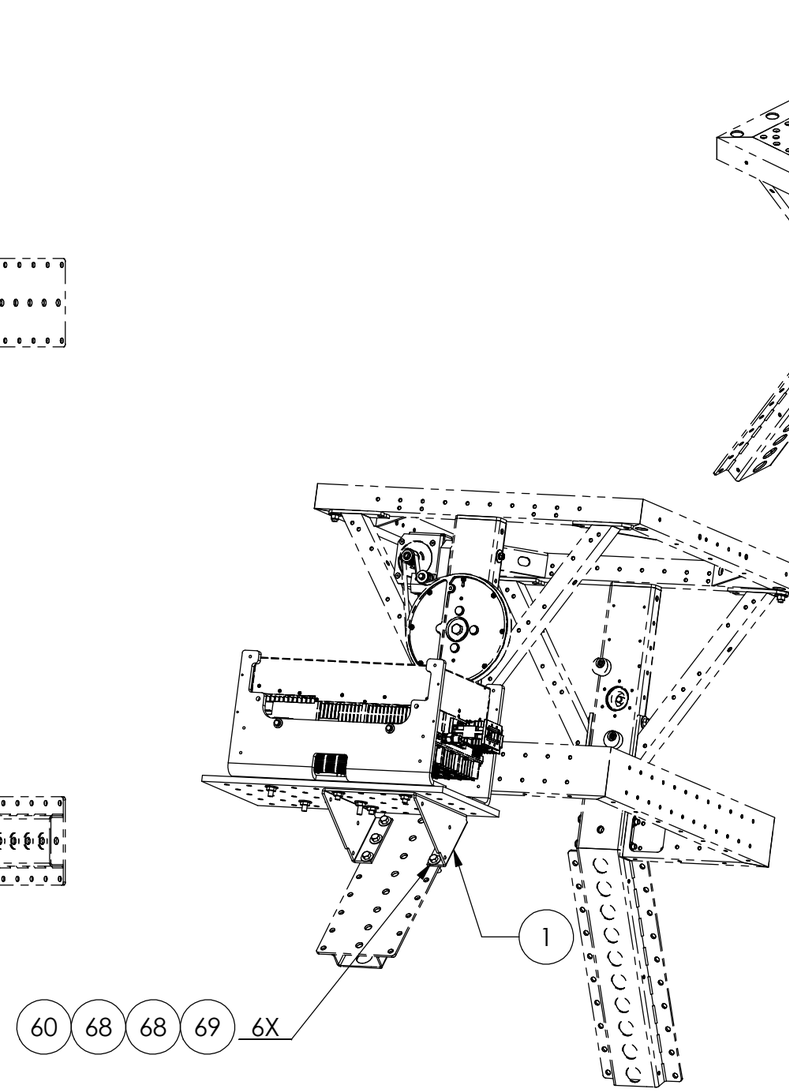
Item Number: 62-156921
Description: IBUC MOUNTING ASSY, TERRASAT, 9711-56SW
Item Revision: A.03 ECO-00025725
Date as of: 04/19/2018 07:23:13 AM PDT

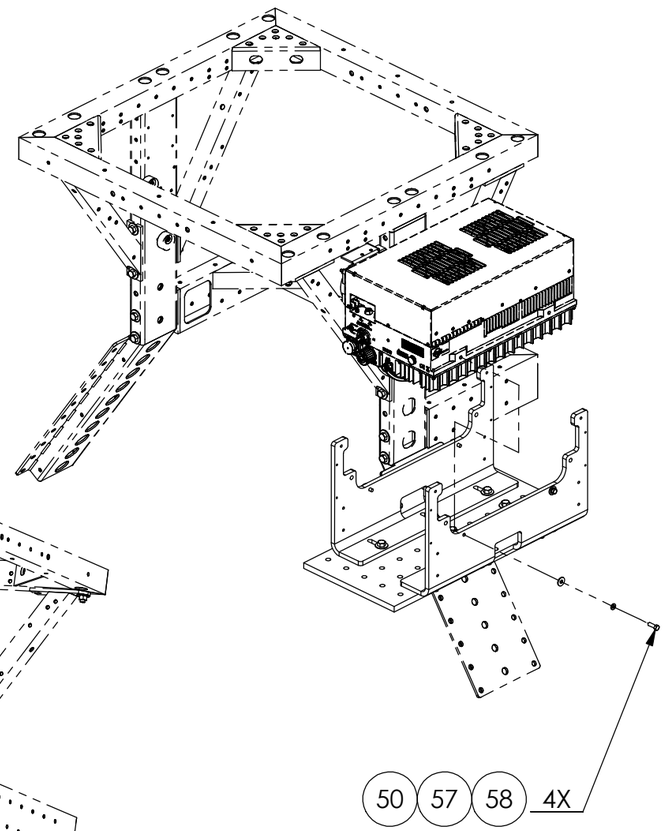
Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-156921	A.01 ECO-00025725	IBUC MOUNTING ASSY, TERRASAT, 9711-56SW	
1	1	ea	121359	D ECO-00008543	PLATFORM PLATE	
2	1	pcs	41-152872-A	01 MCO-00026056	PLATE, BUC MOUNTING, PARADISE, TERRASAT & CODAN	
3	2	pcs	41-152870-A	03 MCO-00035444	BRACKET, BUC MOUNTING, PARADISE, CODAN & TERRASAT	
10	4	ea	123082-1041	MCO-00012113	SPACER, 1/4 X .50 OD X .313, ALUM, ALODINE	
50	4	ea	114586-538	MCO-00012113	SCREW, HEX HD, 1/4-20 x 1, SS.	
57	8	ea	114581-029	MCO-00016035	WASHER, LOCK, 1/4, SS	
58	8	ea	114580-029	MCO-00012113	WASHER, FLAT, 1/4, SS.	
60	6	ea	114586-623	MCO-00012114	SCREW, HEX HD, 3/8-16 x 1, SS.	
61	8	ea	114586-627	MCO-00012113	SCREW, HEX HD, 3/8-16 x 1-3/4, SS.	
67	6	ea	119952-031	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, 3/8, SS.	
68	28	ea	114580-031	MCO-00012114	WASHER, FLAT, 3/8, SS.	
69	14	ea	114583-031	MCO-00012113	NUT, HEX, 3/8-16, SS.	
		pcs	62-156921	A.03 ECO-00025725	IBUC MOUNTING ASSY, TERRASAT, 9711-56SW	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

REVISION HISTORY				
REV	ECO	DATE	DESCRIPTION	BY
A01	00025725	1/2/18	BUBBLE ID 50 WAS 51	K.D.H.







NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 62-156921, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

C-BAND MOUNTING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER:	K.D.H.
WEIGHT:	51.890 LBS.
MATERIAL:	N/A
FINISH:	N/A
SURFACE ROUGHNESS:	
3rd ANGLE PROJECTION	
DRAWN BY:	K.D.H.
DRAWN DATE:	8-16-17
APPROVED BY:	
APPROVED DATE:	
SIZE	B
SCALE:	1:12
FIRST USED:	9711-56

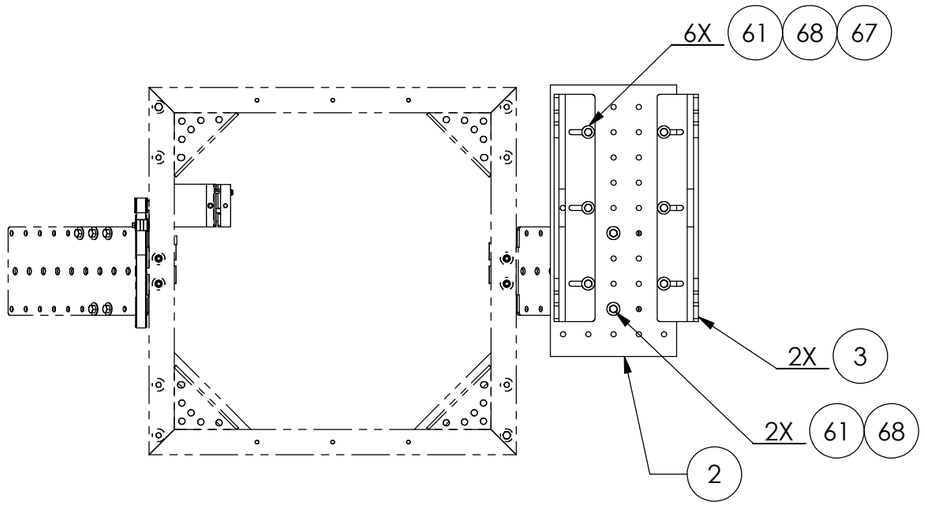
COBHAM
Sea Tel, Inc., dba Cobham SATCOM, Concord
Tel. 925-798-7979 Fax. 925-798-7986

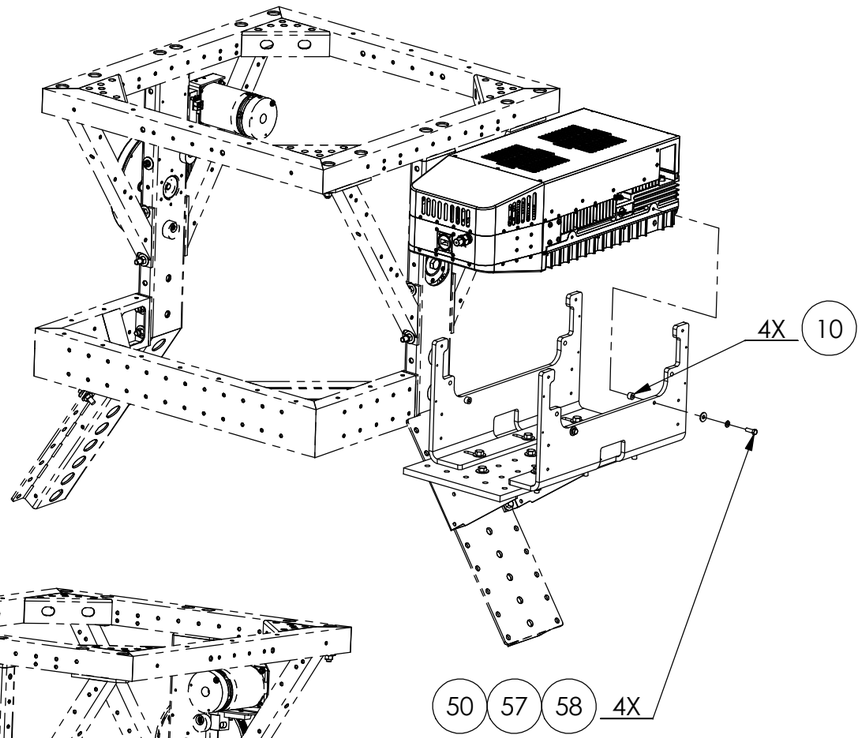
TITLE: IBUC MOUNTING ASSY, TERRASAT, 9711-56SW

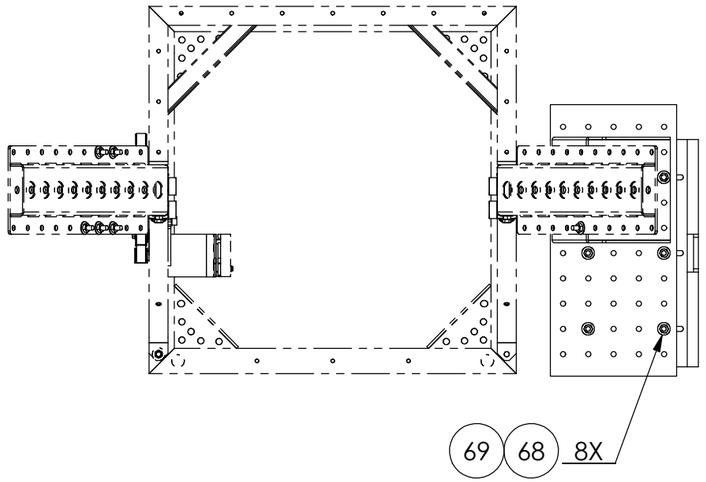
DRAWING NUMBER: 97-156921 REV: A01

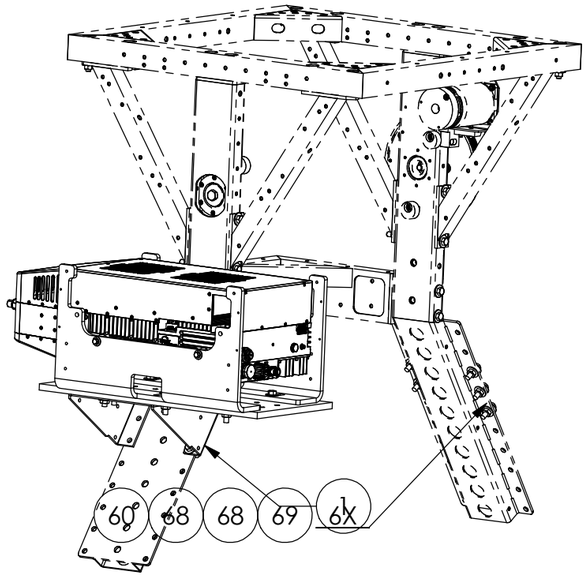
SHEET NUMBER: 1 OF 2

DOCUMENT N0. 99-148645-A









Ku-BAND MOUNTING

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:12	97-156921	A01
		SHEET NUMBER 2 OF 2	

DOCUMENT N0. 99-149137-A

BOM Explosion Report

Item Number: 62-151315

Description: ANTENNA ASSY, 2.4M OFFSET, 9711 IMA SW

Item Revision: A MCO-00025305

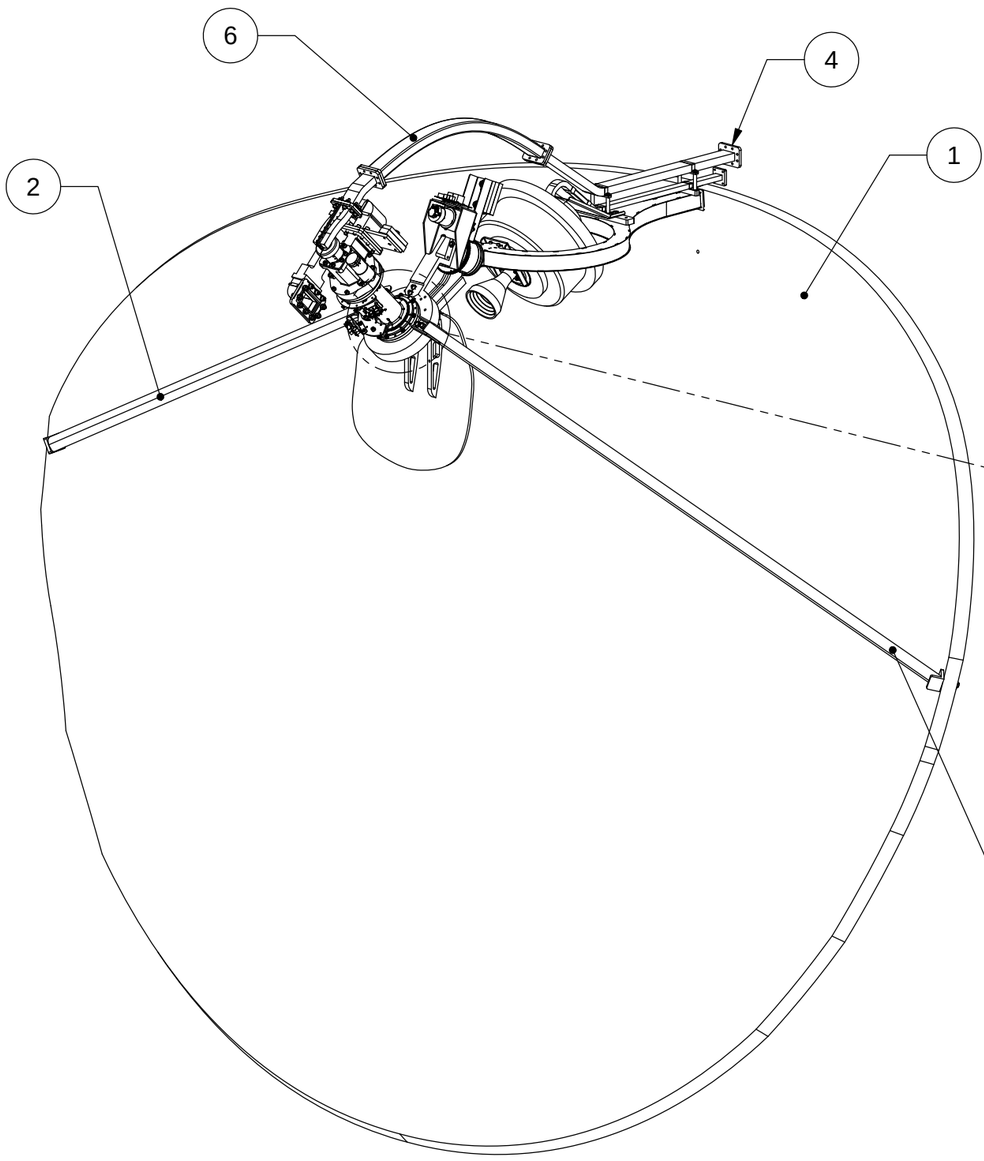
Date as of: 04/11/2018 09:52:18 AM PDT

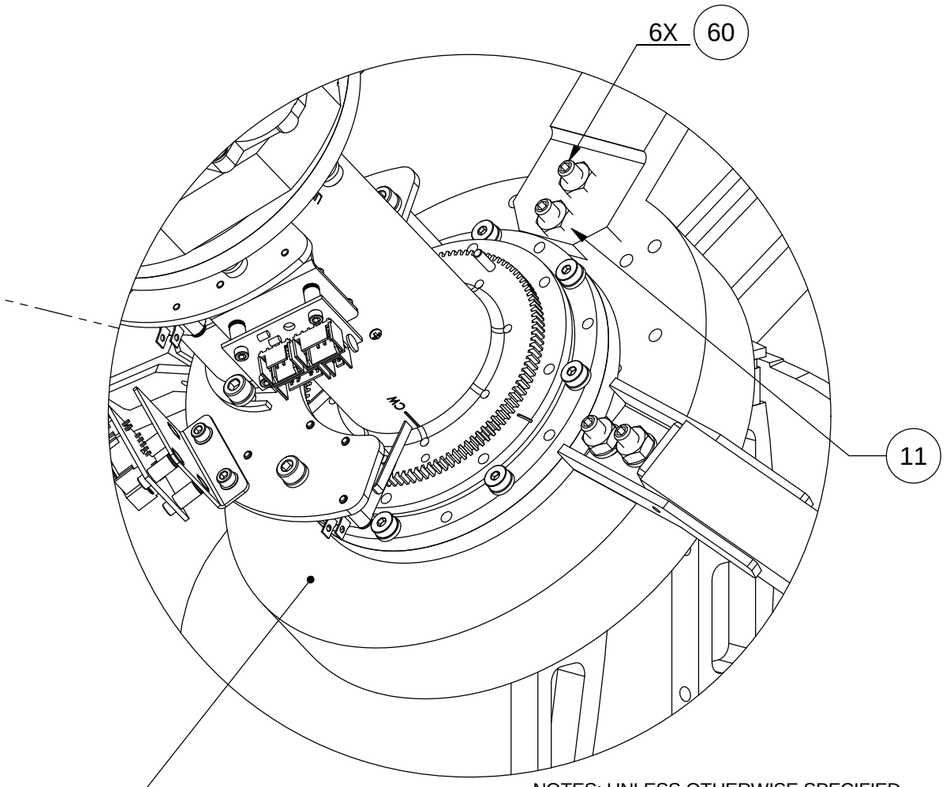
Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	1		97-140856-A	A DCO-00018272	ANTENNA ASSY, 2.4M OFFSET, 9711 IMA-SW	
1	1	ea	41-144658-A	02 ECO-00021692	REFLECTOR, OFFSET, 1.38 IN THICK, 2.4M	
2	1	pcs	62-149035	A MCO-00025305	KIT, FEED STRUT, SWITCHABLE, 2.4 METER OFFSET	
4	1	ea	140859-1	E.01 ECO-00023778	TOP STRUT ASSY, KU NET	
5	1	ea	123204	04 ECO-00019510	SCALAR PLATE MACHINING, DISHSCAN	
6	1	pcs	62-147931	A.06 ECO-00024924	Feed Assy, C-Band Circ-Lin TX-RX	
10	1	ea	128430-1	B ECO-00008544	HARDWARE KIT, INSTALL OFFSET ANTENNA	
11	1	ea	138897	A ECO-00008547	HARDWARE KIT, SCALAR MOUNTING	
50	8	ea	114593-162	MCO-00012113	SCREW, SOCKET HD, 10-32 x 3/8, SS.	
57	8	ea	114581-011	MCO-00012113	WASHER, LOCK, #10, SS.	
58	8	ea	114580-011	MCO-00012113	WASHER, FLAT, #10, SS.	
60	6	pcs	114590-544	MCO-00015230	SCREW, SOCKET SET-CUP, 1/4-20 x 1-1/4, SS	
		ea	62-151315	A MCO-00025305	ANTENNA ASSY, 2.4M OFFSET, 9711 IMA SW	

Created By: Mike Needham

Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
	00010031	01-08-15	ITEM 1 WAS P/N: 116803, ITEM 2 WAS P/N: 120293, ITEM 3 WAS P/N: 120294, ITEM 12 WAS P/N: 140860-1.	LW
	00014485	11-05-15	ITEM 2 WAS P/N 139330-2	LIND





DETAIL A
SCALE 1 : 2

NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 140856, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: JWM
WEIGHT: 187.1 LBS
MATERIAL: N/A
FINISH: N/A
SURFACE ROUGHNESS:
3rd ANGLE PROJECTION

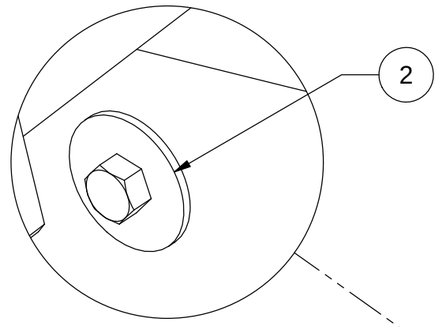
DRAWN BY: K.D.H.
DRAWN DATE: 3-13-14
APPROVED BY:
APPROVED DATE:

Sea Tel
COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

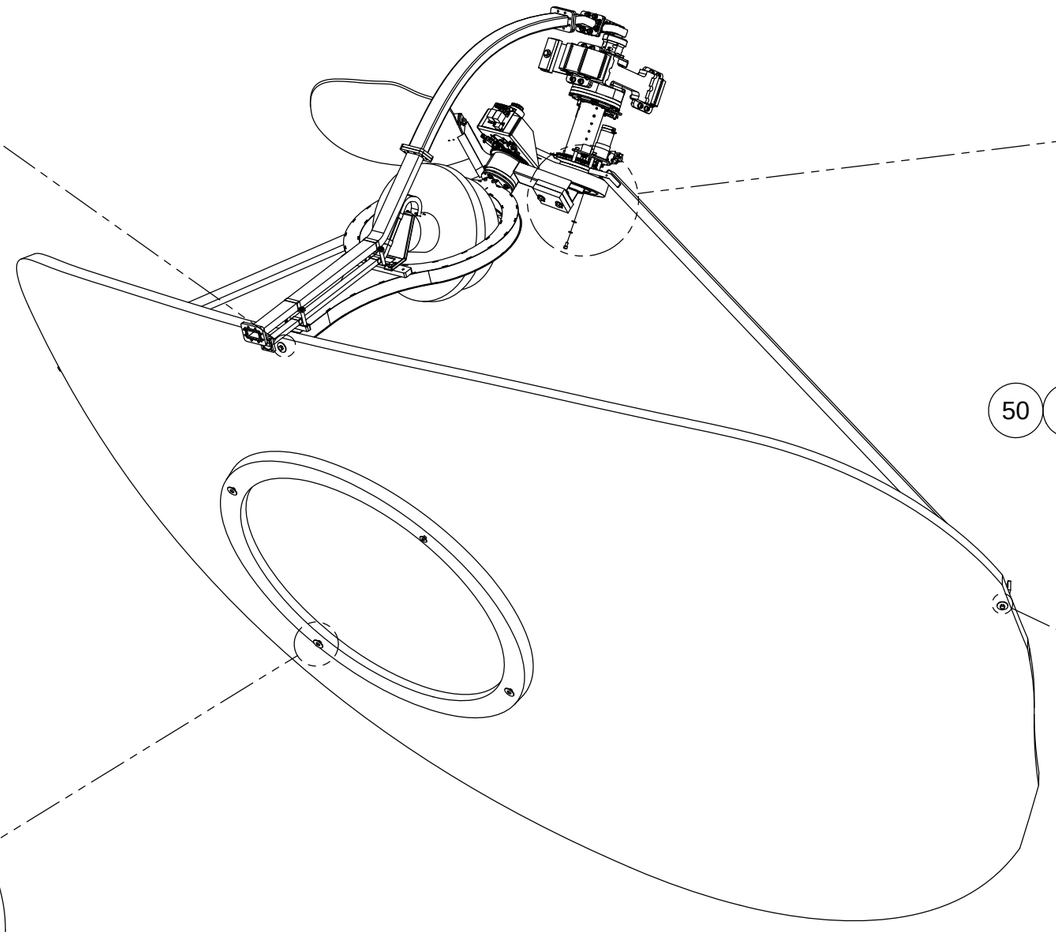
TITLE: ANTENNA ASS'Y, 2.4M OFFSET, 97IMA-SW

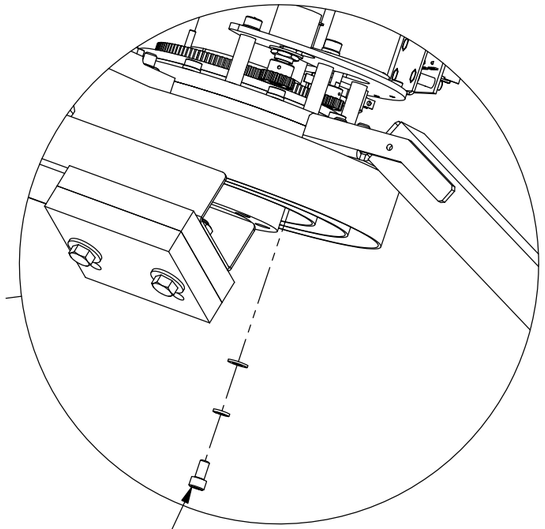
SIZE: B | SCALE: 1:14 | DRAWING NUMBER: 97-140856 | REV: A

FIRST USED: 97IMA | SHEET NUMBER: 1 OF 2

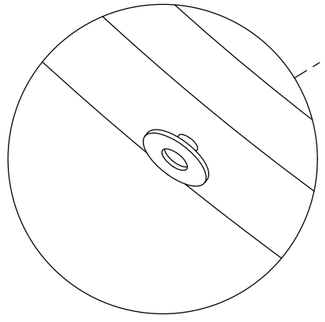


DETAIL B
SCALE 1 : 1

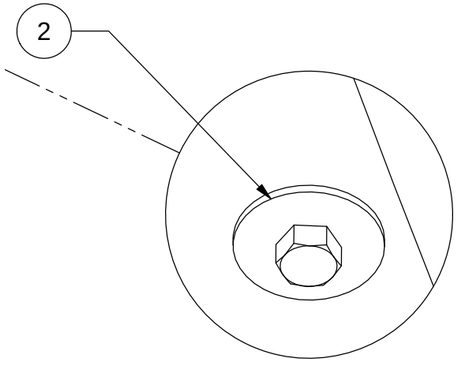




DETAIL E
SCALE 1 : 3



DETAIL D
SCALE 1 : 2



DETAIL C
SCALE 1 : 1

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:14	97-140856	A
		SHEET NUMBER 2 OF 2	

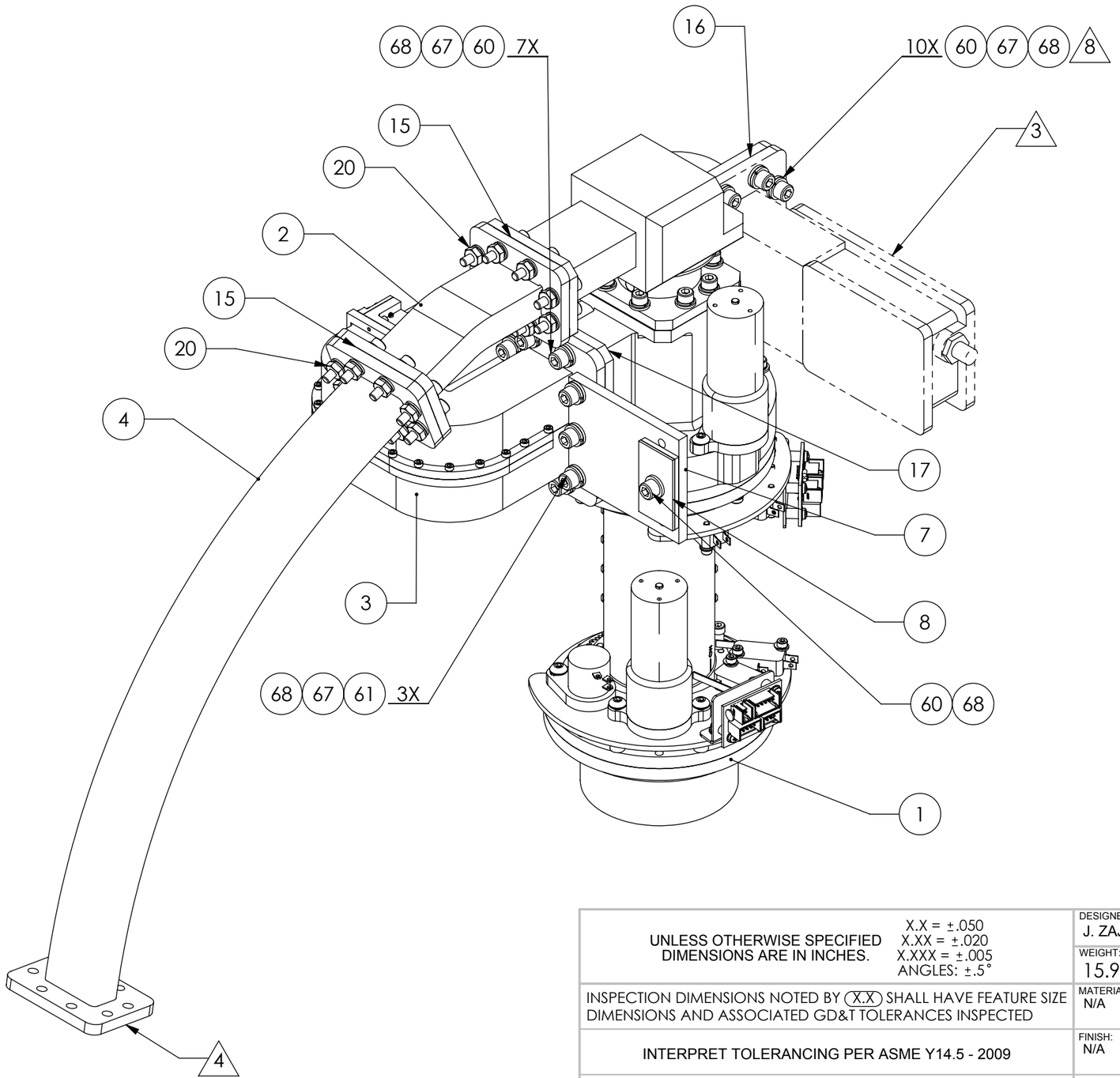
BOM Explosion Report

Item Number: 62-147931
Description: Feed Assy, C-Band Circ-Lin TX-RX
Item Revision: A.06 ECO-00024924
Date as of: 04/11/2018 09:52:51 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	1		97-147931-B	B DCO-00023275	ASSY DWG, C-BAND FEED, CIRC-LIN TX-RX	
1	1	pcs	62-141961	B MCO-00031335	C-BAND FEED ASS'Y, CIRCULAR-LINEAR, TX-RX	
2	1	ea	117507	B ECO-00008542	WAVEGUIDE, WR-137, 20 DEG E-BEND	
3	1	ea	46-157182-A	03 MCO-00036228	Waveguide Filter, BP with Radar Reject	
4	1	ea	112991-2	E.03 ECO-00008542	WAVEGUIDE, WR-137, FLEXGUIDE, 24 IN	
7	1	ea	136475-1	A ECO-00008546	BRACKET, BALANCE WEIGHTS CIRCULAR/LINEAR FEED	
8	1	ea	108517-2	D MCO-00026892	WEIGHT, TRIM 1.0 OZ	
9	1	ea	108517-1	D MCO-00026892	WEIGHT, TRIM 0.5 OZ	
15	2	ea	117218-2	MCO-00012113	GASKET, WR-137, (CPRG FULL)	
16	1	ea	134165-14A	MCO-00012114	GASKET, WR-229, CPR-229, FULL	
17	1	ea	134165-15A	MCO-00012114	GASKET, WR-229, CPR-229, HALF	
20	2	ea	118294-3	B ECO-00008542	HARDWARE KIT, WR-137, CPR FLANGE	
25	1	ea	134837-1	B ECO-00008546	HARNESS KIT, LIN/CIR SELECTABLE FEED, C BAND	(NOT SHOWN)
60	18	ea	114593-207	MCO-00012113	SCREW, SOCKET HD, 1/4-20 x 3/4, SS.	
61	3	ea	114593-209	MCO-00012113	SCREW, SOCKET HD, 1/4-20 x 1, SS.	
67	20	ea	114581-029	MCO-00016035	WASHER, LOCK, 1/4, SS	
68	21	ea	114580-029	MCO-00012113	WASHER, FLAT, 1/4, SS.	
		pcs	62-147931	A.06 ECO-00024924	Feed Assy, C-Band Circ-Lin TX-RX	

Created By: Mike Needham
Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
B	24924	10/24/17	UPDATE WITH Cost Reduced C-Band Filter ADJUST TRIM WEIGHTS	AS



NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 62-141961, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

△3 LNB SHOWN FOR REFERENCE ONLY. REFER TO SYSTEM BOM FOR LNB PART NUMBER.

△4 PROTECT WAVEGUIDE END WITH CAP.

△5 BLUE SHRINK WRAPPED IDC CONNECTS TO LINEAR DRIVE PCB.

△6 RED SHRINK WRAPPED IDC CONNECTS TO LINEAR DRIVE PCB.

△7 PART OF HARNESS KIT 134837-1.

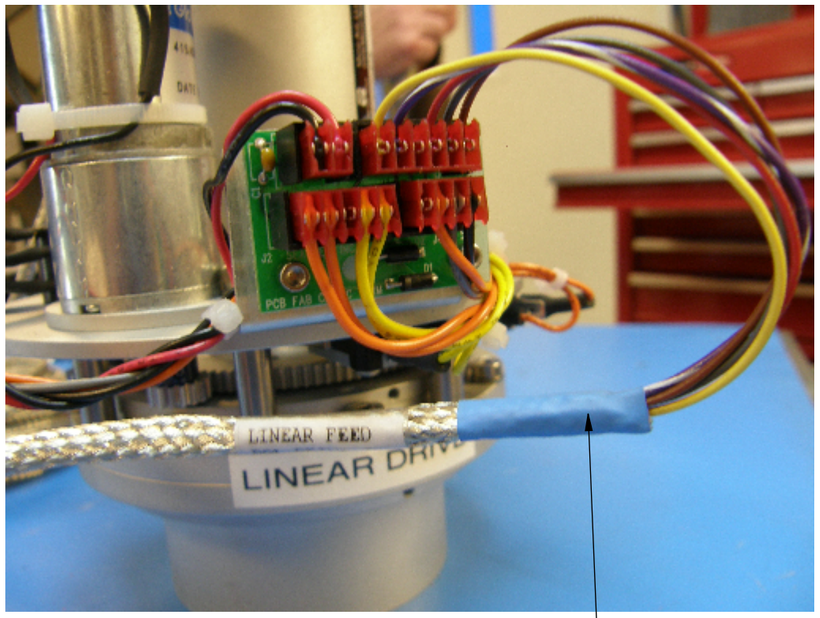
△8 IDENTIFY PER SEATEL SPEC 122930, APP. G AND ATTACH TO ASSEMBLY.

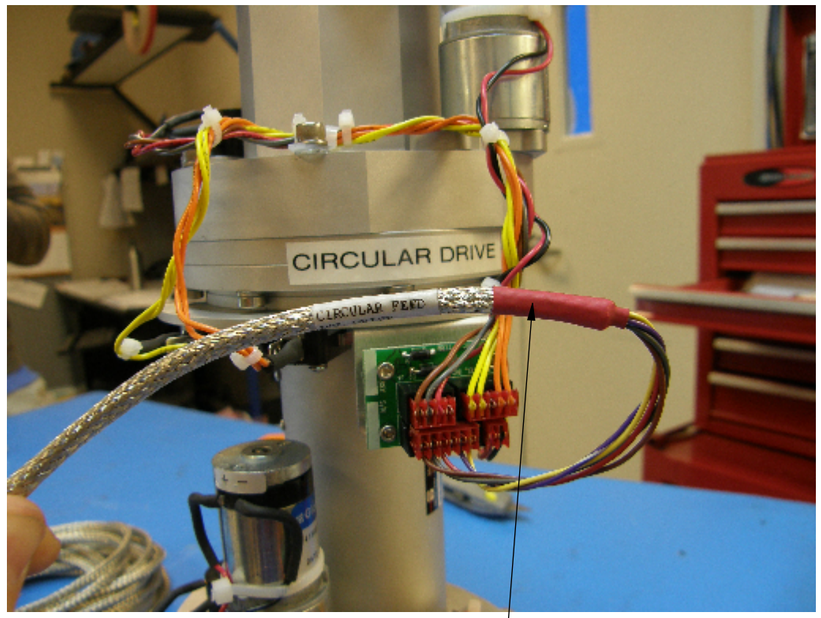
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: J. ZAJAC	DRAWN BY: J. ZAJAC	Sea Tel COBHAM	
WEIGHT: 15.9 lbs	DRAWN DATE: 01/05/2016	Tel. 925-798-7979 Fax. 925-798-7986	
MATERIAL: N/A	APPROVED BY:	TITLE: ASSY DWG, C-BAND FEED CIRC-LIN TX-RX	
FINISH: N/A	APPROVED DATE:		
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:2.5	DRAWING NUMBER: 97-147931	VER: B
3rd ANGLE PROJECTION	FIRST USED: 9711	SHEET NUMBER: 1 OF 2	





SIZE	SCALE:	DRAWING NUMBER	VER
B	1:2	97-147931	B
		SHEET NUMBER 2 OF 2	

DOCUMENT N0. 99-149137-A

BOM Explosion Report

Item Number: 140859-1
Description: TOP STRUT ASSY, KU NET
Item Revision: E.01 ECO-00023778
Date as of: 04/11/2018 09:53:05 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-140859	A ECO-00022918	TOP STRUT ASSY, KU NET	
0	1		96-149243-A	A DCO-00014077	Ku-Net Feed Motor Current Measurement Procedure	
0	1		97-149225-A	A DCO-00018272	PROCEDURE, CHECK AND FIX, WAVEGUIDE ROTARY JOINT	
1	1	ea	140140-1	A ECO-00008547	TOP STRUT ASSY	
2	1	ea	140861-1	A ECO-00008547	HARDWARE KIT, SUB-REFELECTOR INSTALL	
3	1	pcs	41-147866-A	02 MCO-00023313	BRACKET, COUNTER WEIGHT	
4	1	pcs	62-156574	A.04 ECO-00026390	FEED ASSY, KU-NET, LOW POWER	
5	1	ea	139744-1	01 ECO-00015942	FEED HORN, KU NET SUB-REFLECTOR	
6	1	ea	141047-1	A ECO-00008547	BRACKET, KU RJ, LOW POWER	
8	1	ea	41-155962-A	01 MCO-00030858	BARRIER KAPTON, KU NET, FEED HORN	
10	1	ea	140291-2	A.01 ECO-00008547	WAVEGUIDE, WR-75, RIGID W/FLEX, 97IMA, LONG	
11	1	ea	140290-1	A.01 ECO-00008547	WAVEGUIDE, WR-137, RIGID, 97IMA	
20	1	ea	112573-2	D ECO-00008542	WEIGHT, TRIM, 1/2 x 2.75 x 3, 1.17 LBS	
21	2	ea	108519-3	H MCO-00017275	WEIGHT, TRIM 6.0 OZ	
22	4	ea	121226-7173	MCO-00012113	SPACER, #10 X .31 OD X 1.50, ALUM, ALODINE	
23	2	ea	117747	B ECO-00008542	PLATE, RIGID WAVEGUIDE	
24	2	ea	115998-10	J.06 ECO-00008542	STRAP, RIGID WAVEGUIDE, WR-75	

Created By: Mike Needham
Create Time: 04/11/2018 09:55:14 AM PDT

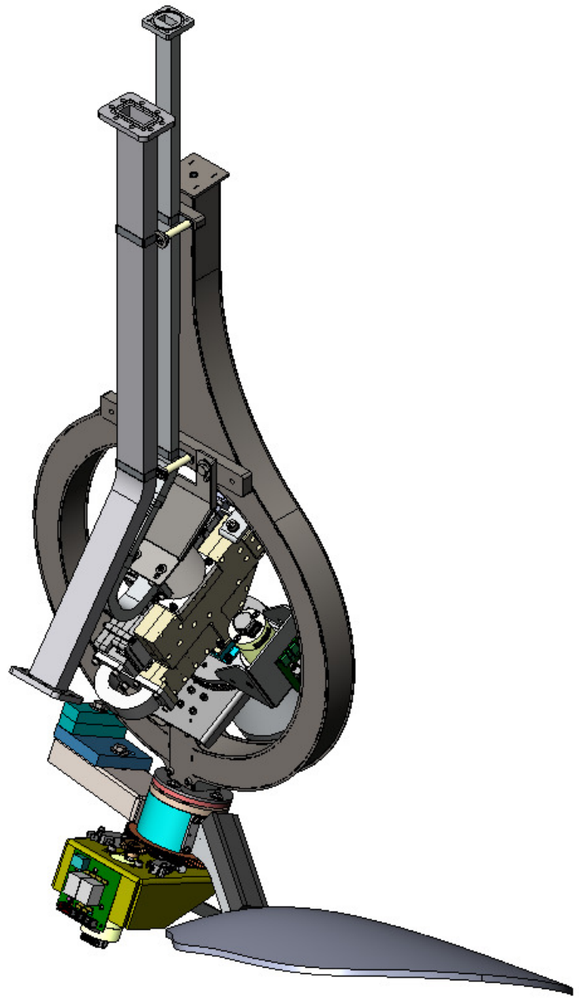
BOM Explosion Report

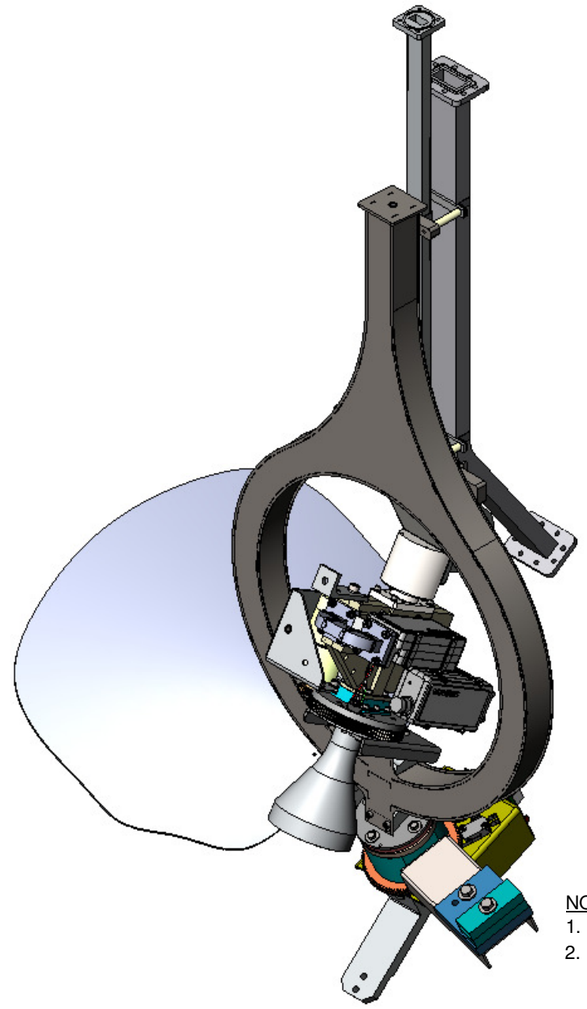
Item Number: 140859-1
Description: TOP STRUT ASSY, KU NET
Item Revision: E.01 ECO-00023778
Date as of: 04/11/2018 09:53:05 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
25	2	ea	115998-1	J.06 ECO-00008542	STRAP, RIGID WAVEGUIDE, WR-137	
26	1	ea	140877-1	A MCO-00013953	ABSORBER, RF, AN-74, CUT	
27	1	ea	119269-1	MCO-00030953	GASKET, WR-75, (UG HALF)	
30	1	ea	130521-96ORG	B ECO-00008545	CABLE ASSY, SMA(M) 90 TO N(M) 90, 96 IN, ORG	NOT SHOWN
31	1	ea	130521-108YEL	B ECO-00008545	CABLE ASSY, SMA(M) 90 TO N(M) 90, 108 IN, YEL	NOT SHOWN
32	1	ea	140059-124	A ECO-00008547	HARNESS ASSY,REFLECTOR,KU NET, CASSEGRAIN,124 IN	NOT SHOWN
50	4	ea	114593-124	MCO-00012113	SCREW, SOCKET HD, 6-32 x 1/2, SS.	
51	10	ea	114593-126	MCO-00012113	SCREW, SOCKET HD, 6-32 x 5/8, SS.	
56	2	ea	119952-007	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, #6, SS.	
57	12	ea	114581-007	MCO-00012113	WASHER, LOCK, #6, SS.	
58	14	ea	114580-007	MCO-00028139	WASHER, FLAT, #6, SS.	
60	4	ea	114593-143	MCO-00012114	SCREW, SOCKET HD, 8-32 x 3/8, SS.	
68	4	ea	114580-009	MCO-00012113	WASHER, FLAT, #8, SS.	
70	4	ea	114588-838	MCO-00012113	SCREW, PAN HD, PHIL, 10-32 x 2, SS.	
78	4	ea	114580-011	MCO-00012113	WASHER, FLAT, #10, SS.	
80	2	ea	114586-536	MCO-00012113	SCREW, HEX HD, 1/4-20 x 5/8, SS.	
82	1	ea	114586-538	MCO-00012113	SCREW, HEX HD, 1/4-20 x 1, SS.	
83	1	ea	114586-543	MCO-00012113	SCREW, HEX HD, 1/4-20 x 2, SS.	
88	6	ea	114580-029	MCO-00012113	WASHER, FLAT, 1/4, SS.	
89	2	ea	114583-029	MCO-00012113	NUT, HEX, 1/4-20, SS.	
90	1	pcs	88-207267-000	A.01 MCO-00017308	Box,Blue Plastic,Corrugated, 50.25X18.63X17.63	NOT SHOWN
		ea	140859-1	E.01 ECO-00023778	TOP STRUT ASSY, KU NET	

Created By: Mike Needham
Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	N/A	5-26-17	THIS DOCUMENT REPLACES 97-144312-C ON ECO-00022027, SEE 97-144312-C FOR REVISION HISTORY	K.D.H.





NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 140859, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: jwm

WEIGHT: 26.8 LBS

MATERIAL: N/A

FINISH: N/A

SURFACE ROUGHNESS:

3rd ANGLE PROJECTION

DRAWN BY: JPB

DRAWN DATE: 7-22-14

APPROVED BY:

APPROVED DATE:

SIZE: B

SCALE: 1:6

Sea Tel
COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

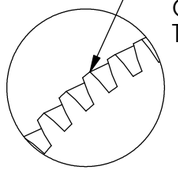
TITLE: TOP STRUT ASSY, KU NET

DRAWING NUMBER: 97-140859

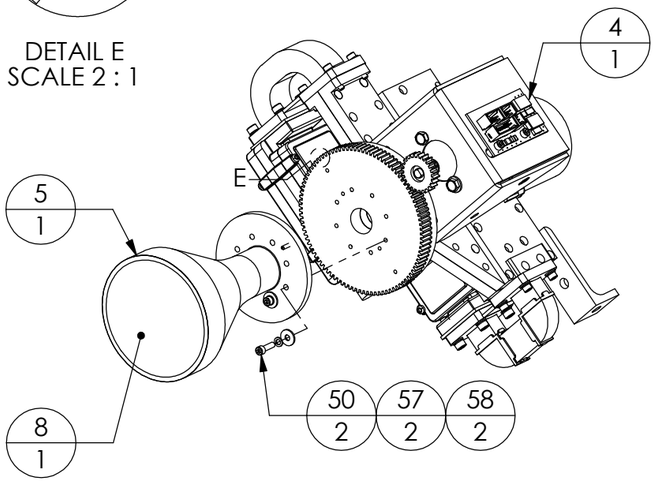
REV: A

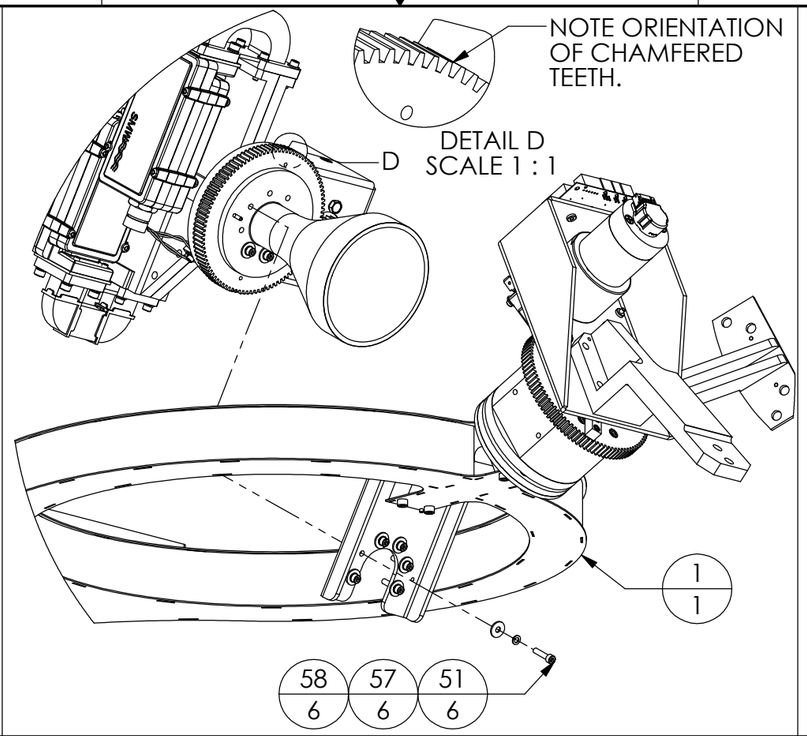
FIRST USED: 97IMA UPGRADE

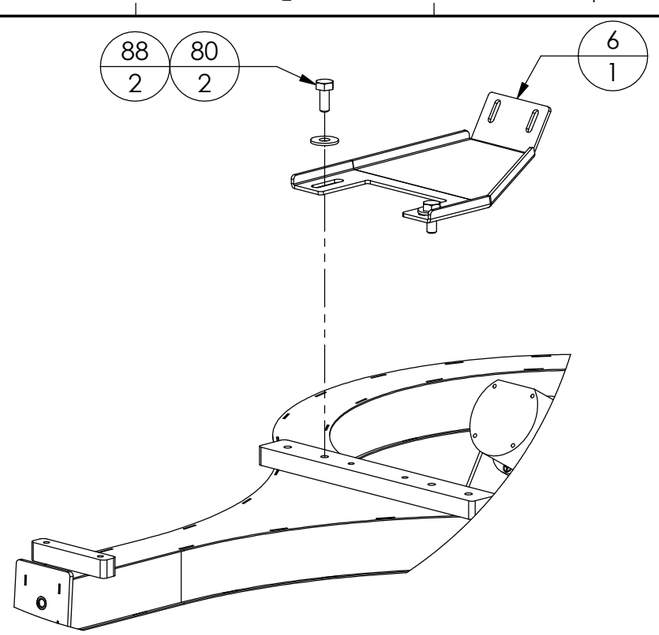
SHEET NUMBER: 1 OF 3



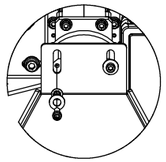
DETAIL E
SCALE 2 : 1



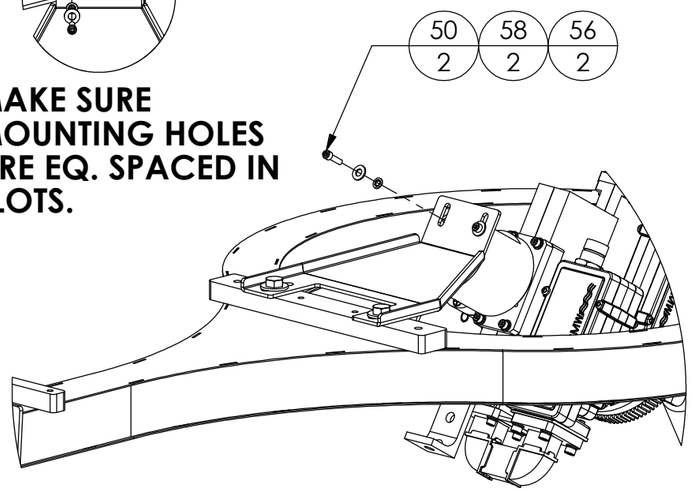




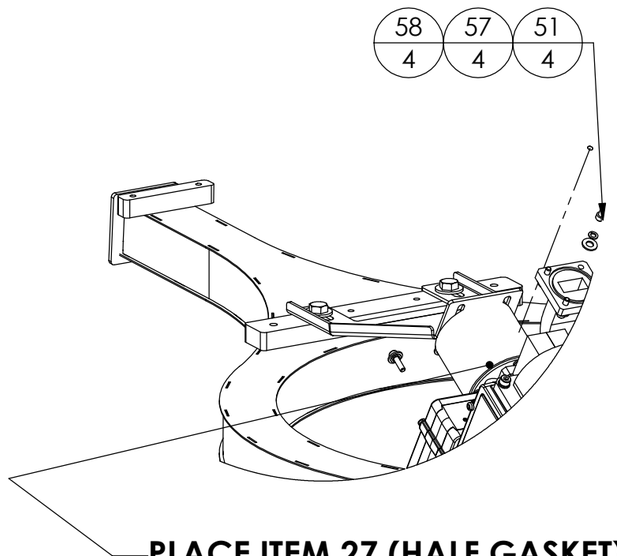
PLACE ITEM 6 FLAT ON THE BAR OF ITEM 1 FIRST AND HAND TIGHTEN HARDWARE.



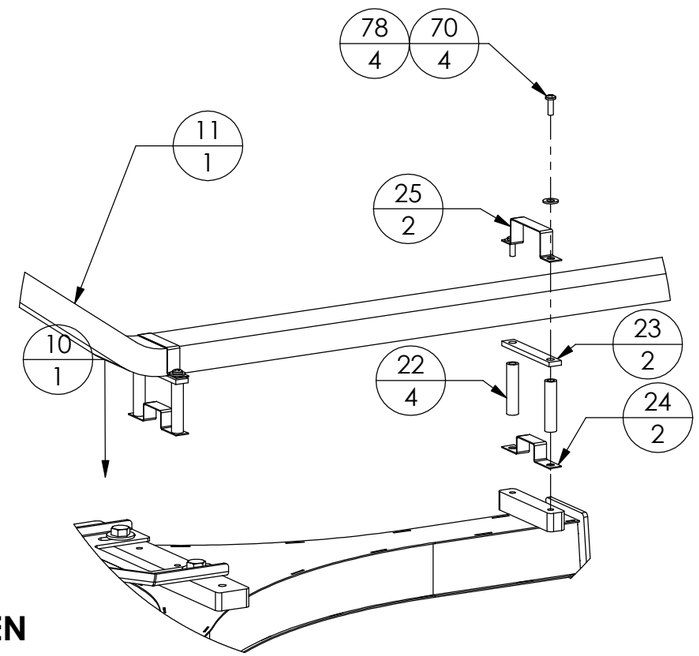
MAKE SURE MOUNTING HOLES ARE EQ. SPACED IN SLOTS.



SLIDE ITEM 6 TOWARDS THE ROTARY JOINT OF ITEM 4 UNTIL IT MAKES CONTACT. LOCTITE AND TORQUE ALL HARDWARE.

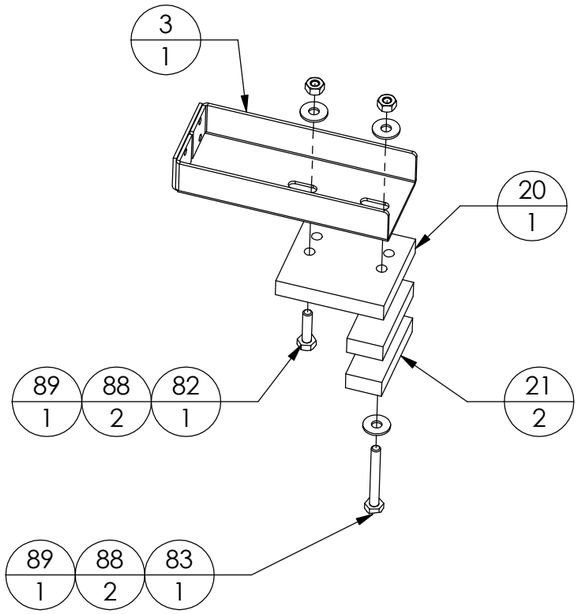


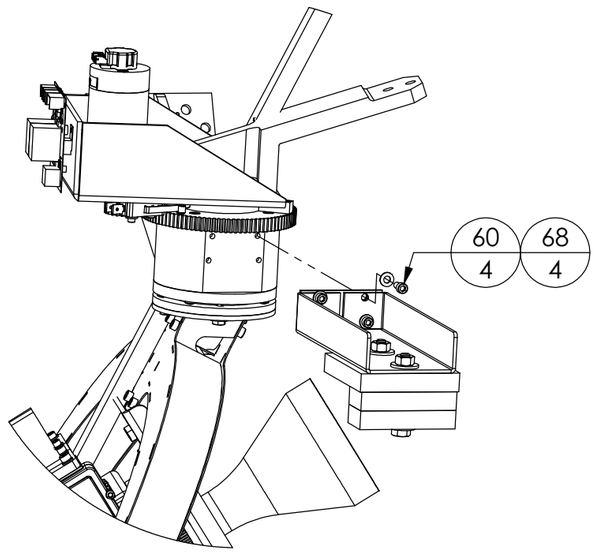
PLACE ITEM 27 (HALF GASKET) BETWEEN WAVEGUIDE AND ROTARY JOINT.



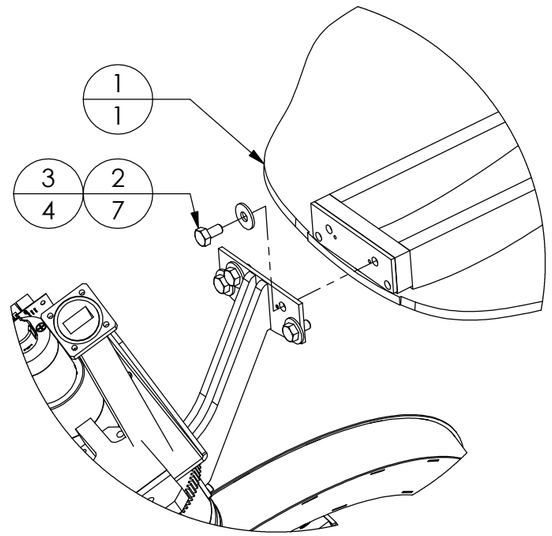
SIZE	SCALE:	DRAWING NUMBER	REV
B	1:4	97-140859	A
		SHEET NUMBER 2 OF 3	

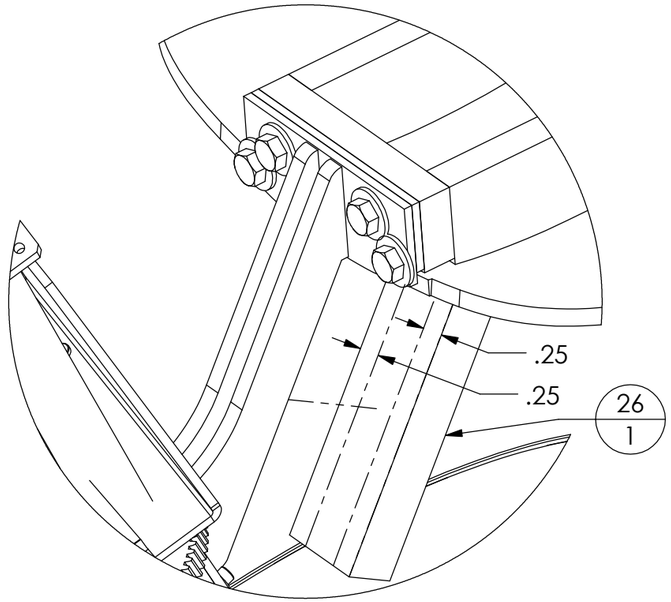
DOCUMENT N0. 99-149137-A



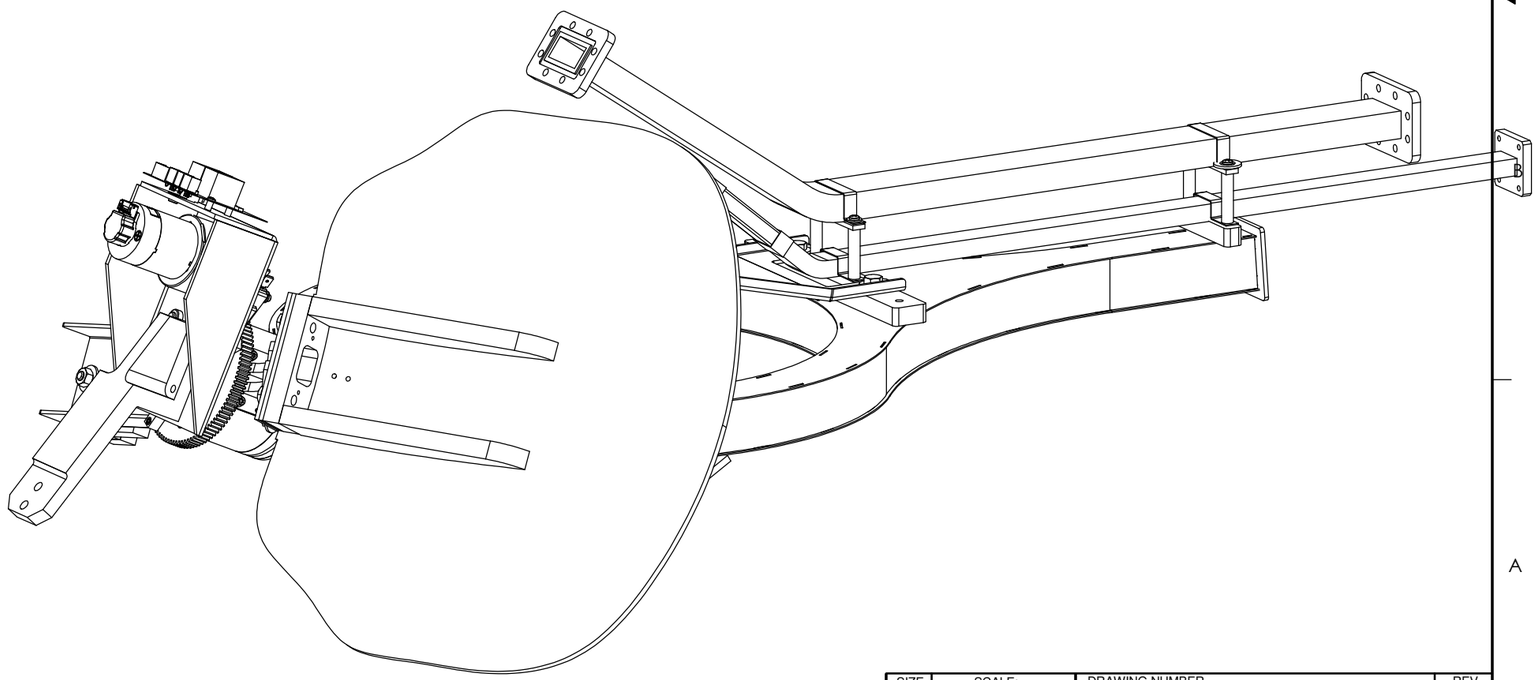


REFER TO ITEM 2 BOM.





CUT TWO LINES IN THE PAPER OF ITEM 26, APPROX. 1/4" FROM THE EDGE. REMOVE THE CENTER PIECE AND ATTACH AS SHOWN.



SIZE	SCALE:	DRAWING NUMBER	REV
B	1:4	97-140859	A
		SHEET NUMBER 3 OF 3	

DOCUMENT N0. 99-149137-A

BOM Explosion Report

Item Number: 62-156574
Description: FEED ASSY, KU-NET, LOW POWER
Item Revision: A.04 ECO-00026390
Date as of: 05/10/2018 10:17:29 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-156574	B ECO-00023983	FEED ASSY, KU-NET, LOW POWER	
0	REF		96-146126-D	D DCO-00022366	Procedure, Ku-Net Feed Assembly Test	
0	REF		96-149243-A	A DCO-00014077	Ku-Net Feed Motor Current Measurement Procedure	
0	REF		97-149224-A	A DCO-00018272	PROCEDURE, KU NET, GEAR ENGAGEMENT	
1	1	ea	138666-1	A.02 ECO-00026390	GEAR ASSY, KU-NET	
3	1	ea	138675-1	A.02 ECO-00008547	MOTOR MOUNTING ASSY, KU-NET	
4	1	ea	128290-1	A.01 ECO-00008544	WAVEGUIDE, WR-75, 180 DEG H-BEND W/BRACE, 2.00L	
5	1	ea	126144-1	D.01 ECO-00008544	WAVEGUIDE, WR-75, 180 DEG E-BEND	
6	1	ea	139034-1	A.01 ECO-00008547	ROTARY JOINT, WR-75, KU-NET	
7	1	ea	134561-12	A ECO-00008546	SENSOR ASSY, POL HOME FLAG, 12 IN	
8	1	ea	138884-1	A ECO-00008547	BRACKET, HOME SENSOR MOUNT, KU-NET	
11	1	pcs	88-152796-A	06 MCO-00030482	ASM, KUNET COMBO DIPLEXER TRF OMT	
13	1	ea	138933-1	01 ECO-00009289	ADAPTER, KU-NET STAGE TO STD OMT	
14	3	ea	119269-1	MCO-00030953	GASKET, WR-75, (UG HALF)	
16	2	ea	118294-26	A.01 ECO-00008542	HARDWARE KIT, WR-75, UG FLANGE, M4, NO GASKET	
50	3	ea	114593-103	MCO-00012113	SCREW, SOCKET HD, 4-40 x 5/16, SS.	
56	3	ea	119952-005	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, #4, SS.	
58	3	ea	114580-006	MCO-00012113	WASHER, FLAT, #4, SMALL PATTERN, SS.	
61	8	ea	114593-124	MCO-00012113	SCREW, SOCKET HD, 6-32 x 1/2, SS.	
63	6	ea	114593-121	MCO-00012113	SCREW, SOCKET HD, 6-32 x 5/16, SS.	

Created By: Mike Needham
Create Time: 05/10/2018 10:18:22 AM PDT

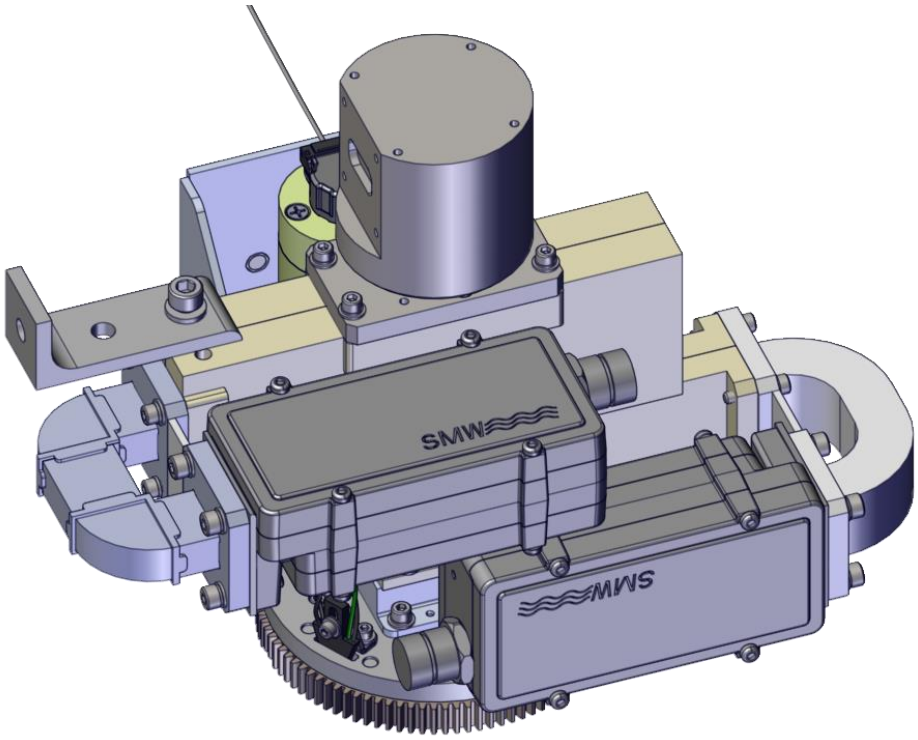
BOM Explosion Report

Item Number: 62-156574
Description: FEED ASSY, KU-NET, LOW POWER
Item Revision: A.04 ECO-00026390
Date as of: 05/10/2018 10:17:29 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
64	8	ea	114593-125	MCO-00012113	SCREW, SOCKET HD, 6-32 x 9/16, SS.	
67	22	ea	114581-007	MCO-00012113	WASHER, LOCK, #6, SS.	
68	22	ea	114580-008	MCO-00012113	WASHER, FLAT, #6, SMALL PATTERN, SS.	
70	3	ea	114593-162	MCO-00012113	SCREW, SOCKET HD, 10-32 x 3/8, SS.	
76	3	ea	119952-011	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, #10, SS.	
78	3	ea	114580-012	MCO-00012113	WASHER, FLAT, #10, SMALL PATTERN, SS.	
		pcs	62-156574	A.04 ECO-00026390	FEED ASSY, KU-NET, LOW POWER	

Created By: Mike Needham
Create Time: 05/10/2018 10:18:22 AM PDT

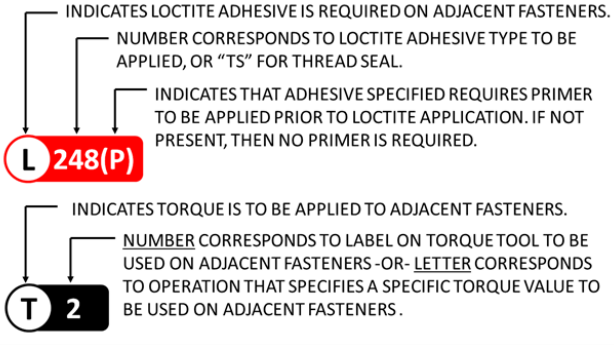
REVISION HISTORY				
REV	ECO	DESCRIPTION	DATE	BY
B	23983	INITIAL DRAWING	8/22/17	MS



FULL ASSEMBLY VIEW

THESE INSTRUCTIONS GOVERN THE ASSEMBLY OF THE PARTS LISTED BELOW, REGARDLESS OF REVISION.	
PART NUMBER	DESCRIPTION
62-156574	FEED ASSY, KU-NET, LOW POWER

SYMBOL KEY



NOTES: UNLESS OTHERWISE SPECIFIED:

1. MANUFACTURE PER SEA TEL STANDARD 99-122298.

REFERENCE DOCUMENTS

- 99-122305 FASTENER TORQUE VALUE SPECIFICATION
- 99-121730 PROCEDURE, LOCTITE APPLICATION

FOR INTERNAL USE ONLY

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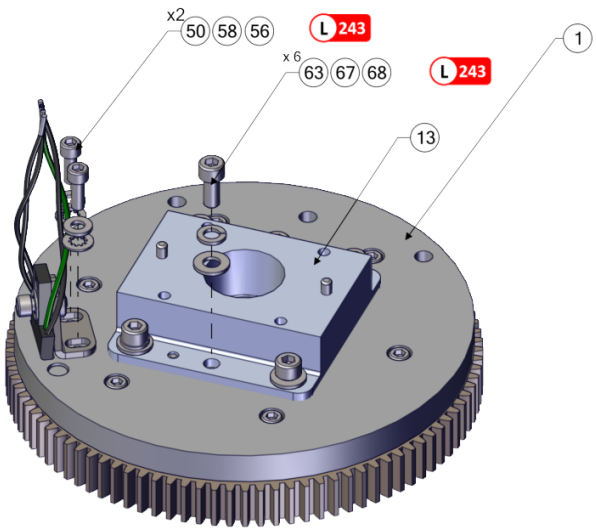
COBHAM
Sea Tel, Inc., dba Cobham SATCOM, Concord
Tel: 925-798-7979 Fax: 925-798-7986

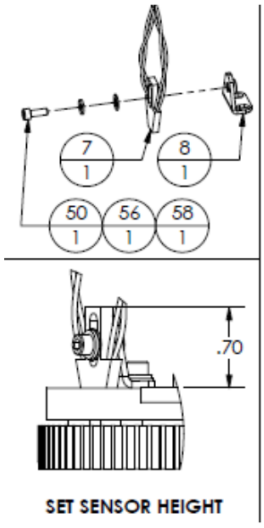
ENGINEER	TITLE:	
INIT.	ASSEMBLY INSTRUCTION FEED ASSY, KU-NET, LOW POWER	
DRAWN BY	INSTRUCTION NUMBER:	REV.
INIT.	97-156574	B
	SHEET 1 OF 4	

STEP 1

A. INSTALL HOME FLAG & ADJUST GAP.

B. INSTALL OMT ADAPTOR BLOCK.

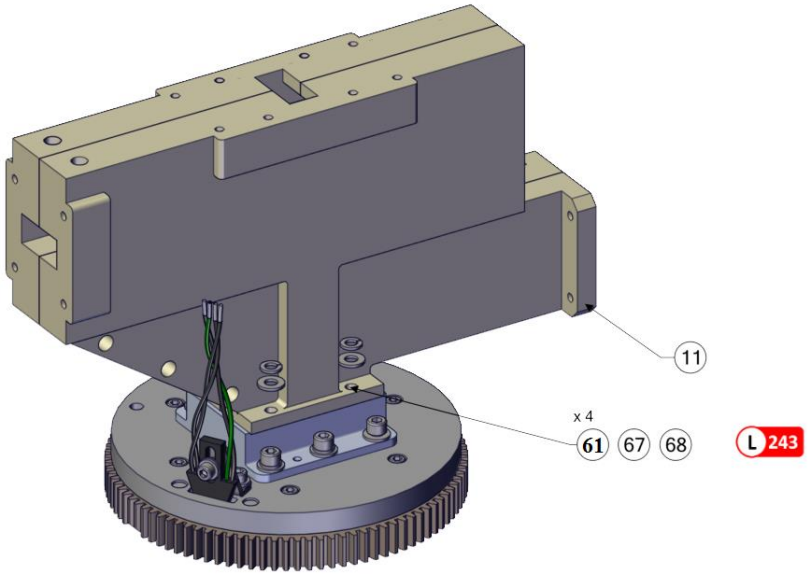




STEP 2

C. INSTALL OMT.

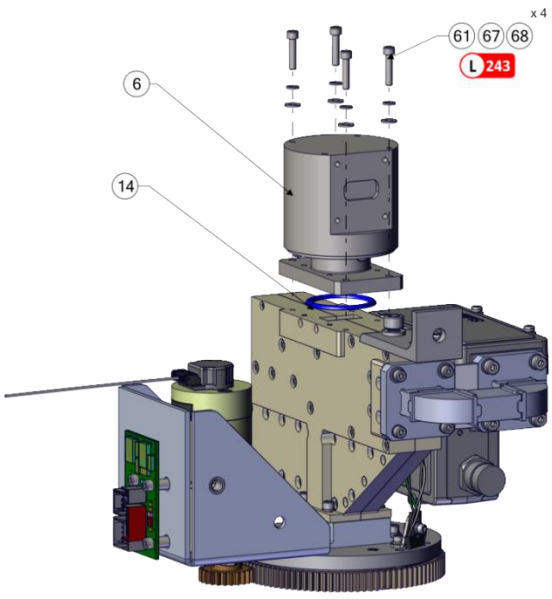
D. NOTE ORIENTATION.



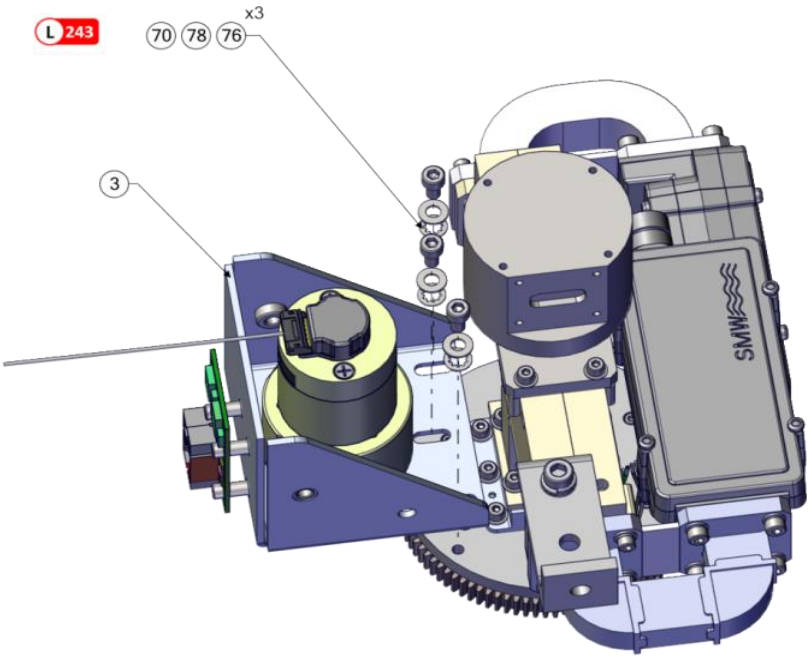
INSTRUCTION NUMBER:	REV:
97-156574	B
SHEET 2 OF 4	

STEP 3

E. INSTALL ROTARY JOINT.



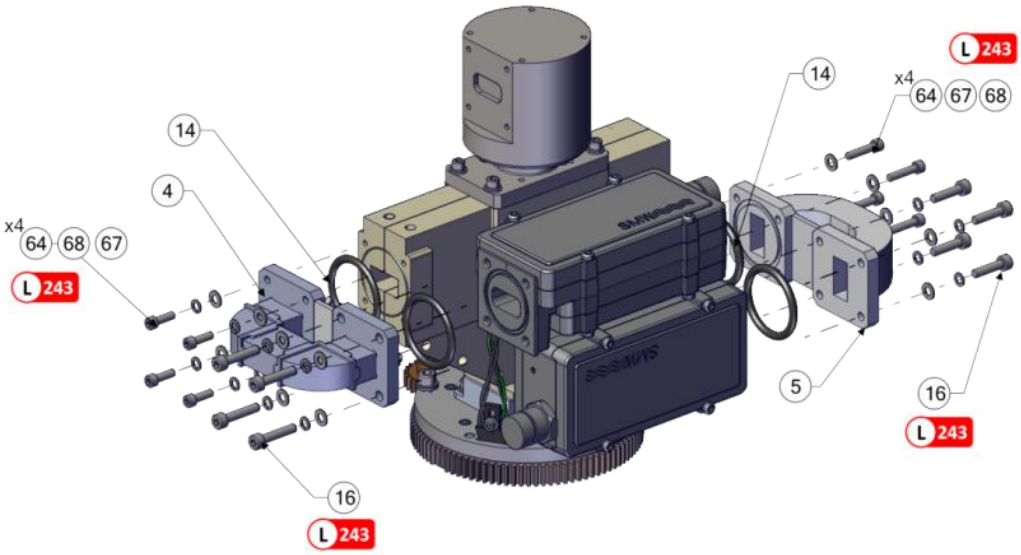
STEP 4



F. INSTALL POLANG MOTOR ASSY.

INSTRUCTION NUMBER:	REV:
97-156574	B
SHEET 3 OF 4	

STEP 5



G. INSTALL WAVE GUIDE 180 DEGREE “E” & “H” BEND PIECES.

H. INSTALL LNBS USING VENDOR SUPPLIED O-RING SEALS.

I. INSTALL WEIGHT BRACKET.

BOM Explosion Report

Item Number: 62-156922
Description: WAVEGUIDE RUN, 9711-56 IMA-SW
Item Revision: A.02 ECO-00026077
Date as of: 04/19/2018 07:23:36 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	REF	pcs	97-156922	A ECO-00023971	WAVEGUIDE RUN, 9711-56 IMA-SW	
1	1	ea	112991-6	MCO-00012113	WAVEGUIDE, WR-137, FLEXGUIDE, 48 IN	
5	4	ea	118294-3	B ECO-00008542	HARDWARE KIT, WR-137, CPR FLANGE	
6	4	ea	117218-1	MCO-00012113	GASKET, WR-137, (CPRG HALF)	
11	1	ea	110171-7	E.03 ECO-00008542	WAVEGUIDE, WR-75 FLEXIBLE, 48 IN	
15	2	ea	118294-1	A.03 ECO-00008542	HARDWARE KIT, WR-75, UG FLANGE, 6-32, 1/2 GASKET	
16	2	ea	119269-1	MCO-00030953	GASKET, WR-75, (UG HALF)	
20	2	ea	140982-1	A ECO-00008547	PLATE, TIE ROD	
21	2	ea	140981-1	A ECO-00008547	CLAMP BAND, FLEXGUIDE	
22	1	ea	140980-1	A.01 ECO-00008547	CLAMP, FLEXGUIDE, RUBBER, WR-75	
23	1	ea	140980-2	A.01 ECO-00008547	CLAMP, FLEXGUIDE, RUBBER, WR-137	
24	2	ea	112507-6	MCO-00012114	ROD END, .3750 BORE, FEMALE	
25	1	ea	140983-10	A ECO-00008547	TIE ROD, 3/8-24, 10 IN	
26	1	ea	140983-16	A ECO-00008547	TIE ROD, 3/8-24, 16 IN	
50	4	ea	114586-544	MCO-00012113	SCREW, HEX HD, 1/4-20 x 2-1/4, SS.	
57	4	ea	119952-029	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, 1/4 IN, SS.	
58	8	ea	114580-029	MCO-00012113	WASHER, FLAT, 1/4, SS.	
59	4	ea	114583-029	MCO-00012113	NUT, HEX, 1/4-20, SS.	
60	2	ea	114586-625	MCO-00012113	SCREW, HEX HD, 3/8-16 x 1-1/4, SS.	
65	4	ea	119952-031	MCO-00012114	WASHER, STAR, INTERNAL TOOTH, 3/8, SS.	
66	4	ea	114580-034	MCO-00012113	WASHER, FLAT, 3/8 SMALL PATTERN, SS.	
67	4	ea	114580-038	MCO-00012114	WASHER,FLAT,3/8,SS. (7/8 OD X 13/32 ID) .075 THK	

Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

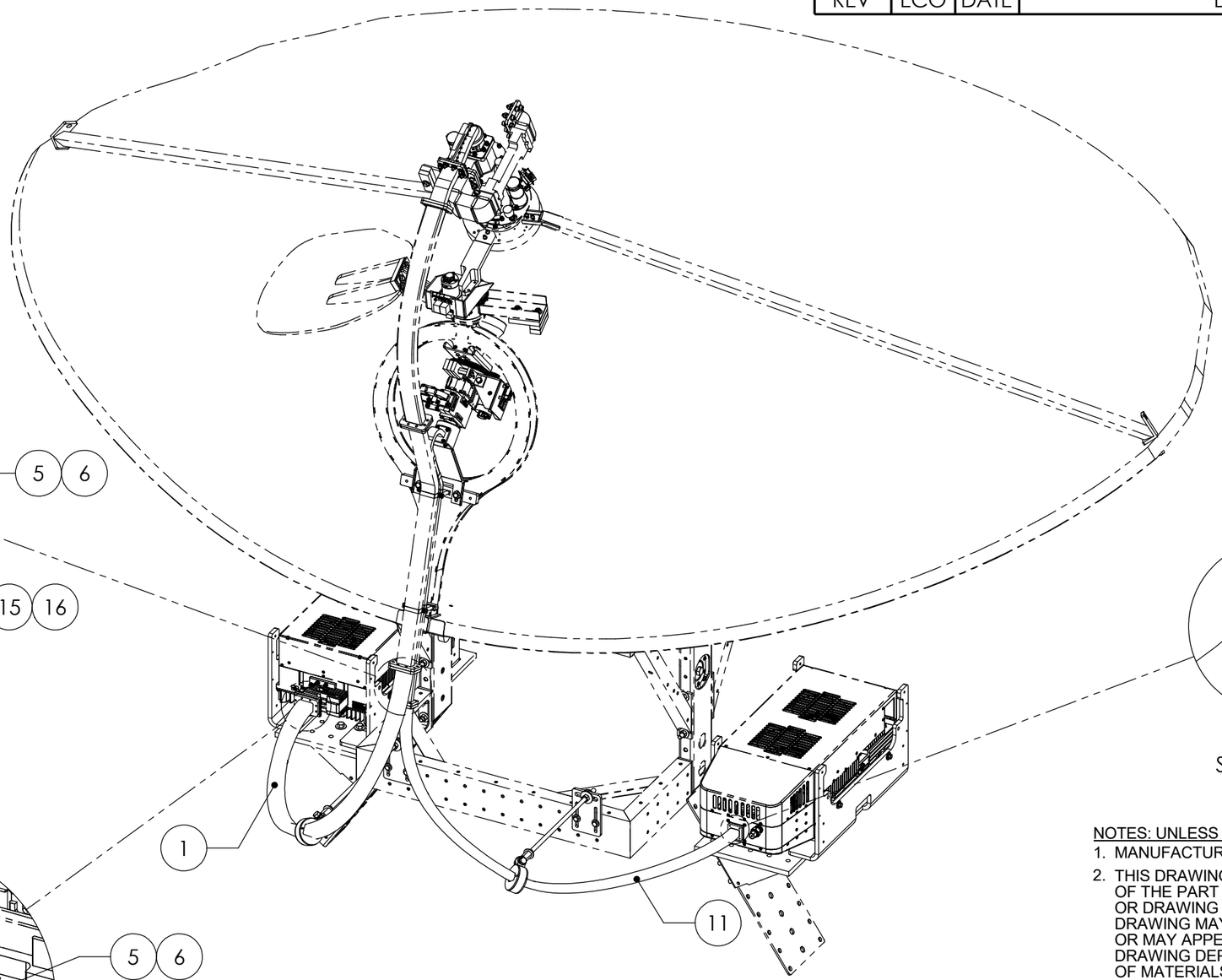
BOM Explosion Report

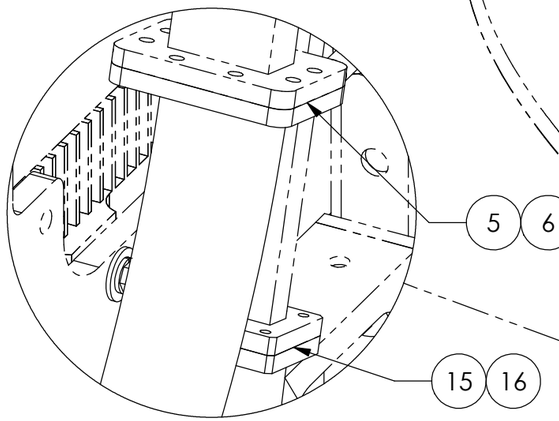
Item Number: 62-156922
Description: WAVEGUIDE RUN, 9711-56 IMA-SW
Item Revision: A.02 ECO-00026077
Date as of: 04/19/2018 07:23:36 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
68	2	ea	114580-031	MCO-00012114	WASHER, FLAT, 3/8, SS.	
69	6	ea	114583-131	MCO-00012113	NUT, HEX, 3/8-24, SS.	
		pcs	62-156922	A.02 ECO-00026077	WAVEGUIDE RUN, 9711-56 IMA-SW	

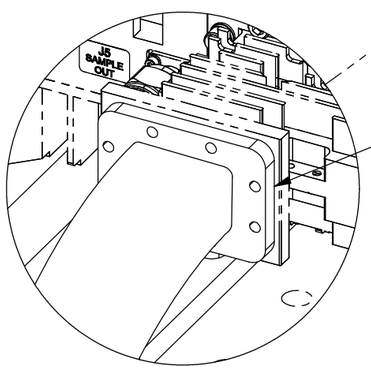
Created By: Mike Needham
Create Time: 04/19/2018 07:23:54 AM PDT

REVISION HISTORY				
REV	ECO	DATE	DESCRIPTION	BY

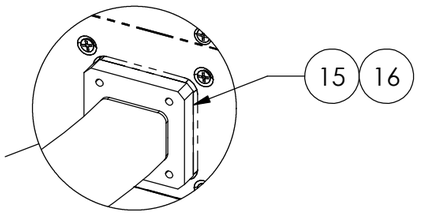




DETAIL A
SCALE 1 : 2



DETAIL B
SCALE 1 : 2



DETAIL C
SCALE 1 : 2

NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. THIS DRAWING GOVERNS THE ASSEMBLY OF ALL VARIANTS OF THE PART NUMBER 62-156922, REGARDLESS OF ASSEMBLY OR DRAWING REVISION. SOME ITEMS SHOWN ON THIS DRAWING MAY NOT BE INCLUDED ON THE BILL OF MATERIAL, OR MAY APPEAR IN A DIFFERENT ORIENTATION THAN THE DRAWING DEPICTS FOR SOME VARIANTS. REFER TO THE BILL OF MATERIALS FOR THE VARIANT NUMBER SHOWN ON THE WORK ORDER.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER: JWM
WEIGHT:
MATERIAL: N/A
FINISH: N/A
SURFACE ROUGHNESS:
3rd ANGLE PROJECTION

DRAWN BY: K.D.H.
DRAWN DATE: 1/30/18
APPROVED BY:
APPROVED DATE:

COBHAM
Sea Tel, Inc., dba Cobham SATCOM, Concord
Tel. 925-798-7979 Fax. 925-798-7986

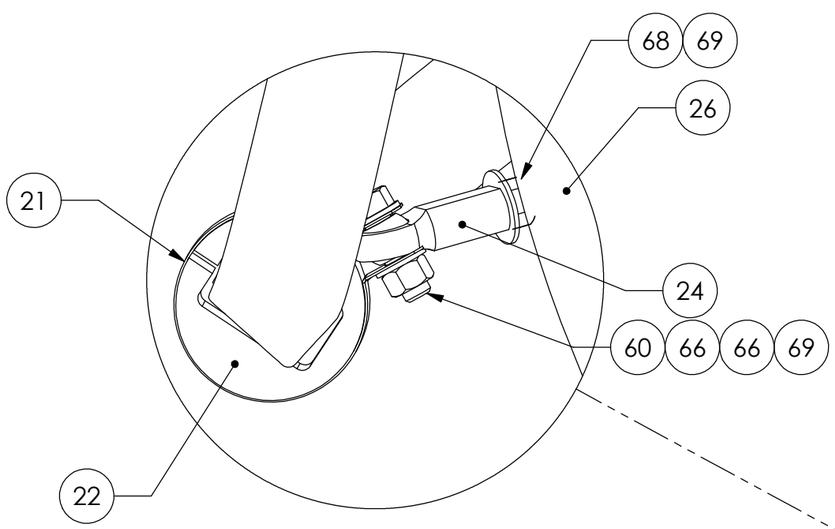
TITLE: WAVEGUIDE RUN, 9711-56 IMA-SW

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:12	97-156922	A

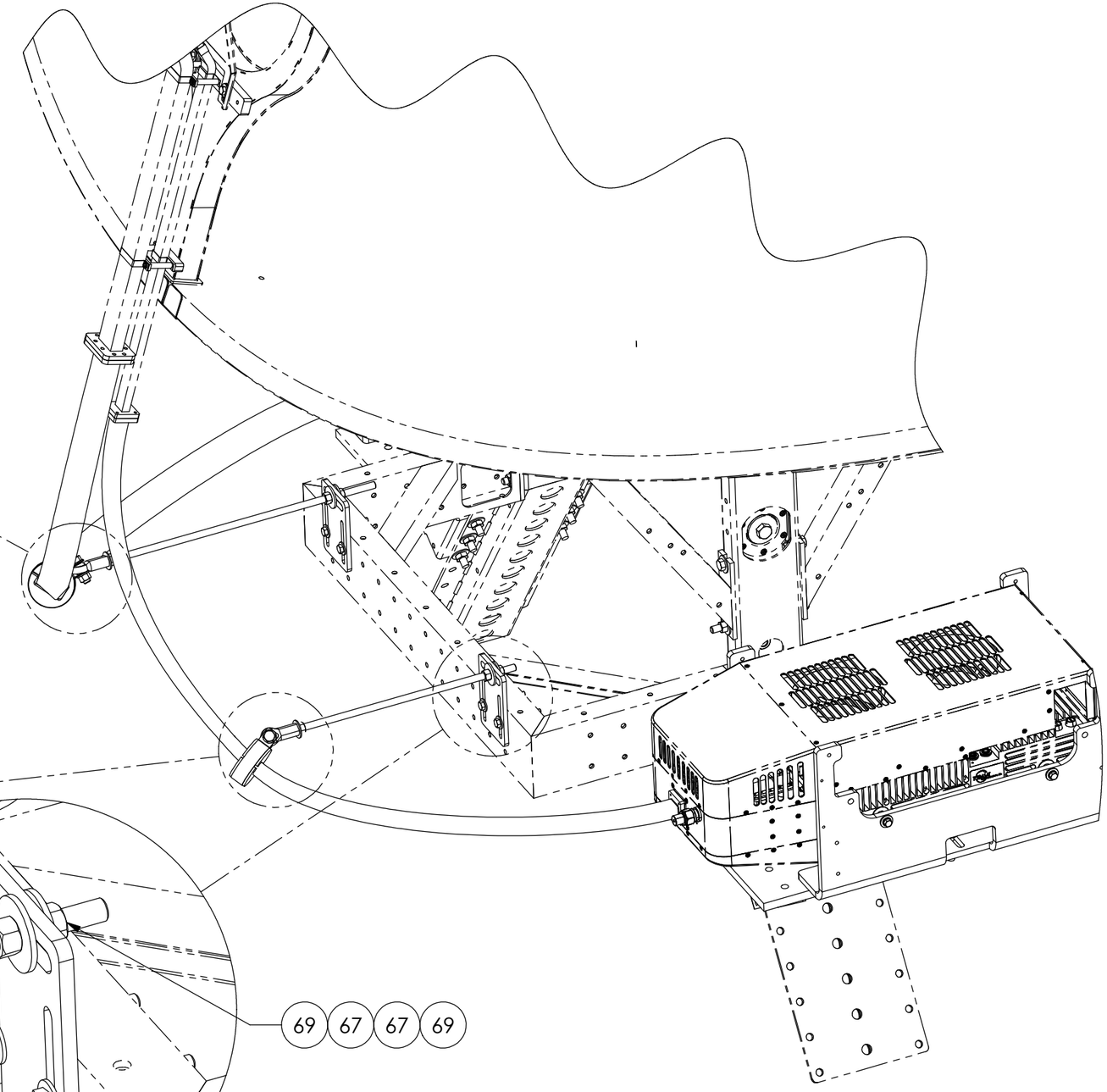
FIRST USED: 9711-56 IMA-SW

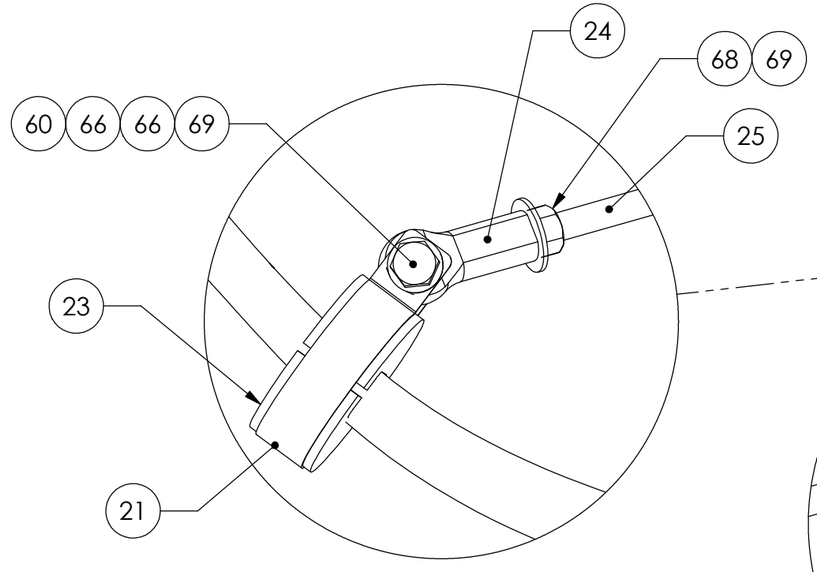
SHEET NUMBER 1 OF 2

DOCUMENT N0. 99-148645-A

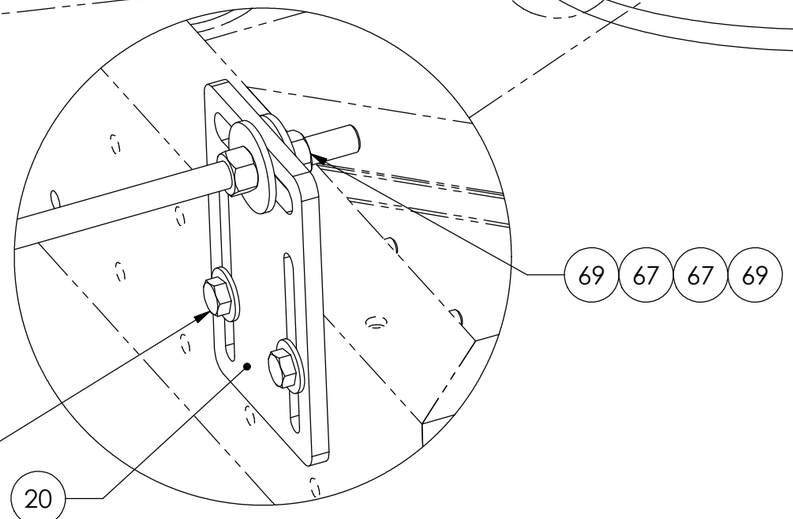


DETAIL D
SCALE 1 : 2





DETAIL E
SCALE 1 : 2



2X DETAIL F
SCALE 1 : 2

SIZE	SCALE:	DRAWING NUMBER	VER
B	1:7	97-156922	A
		SHEET NUMBER 2 OF 2	

DOCUMENT N0. 99-149137-A

BOM Explosion Report

Item Number: 88-207377-HAAA

Description: RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE

Item Revision: A.01 ECO-00024777

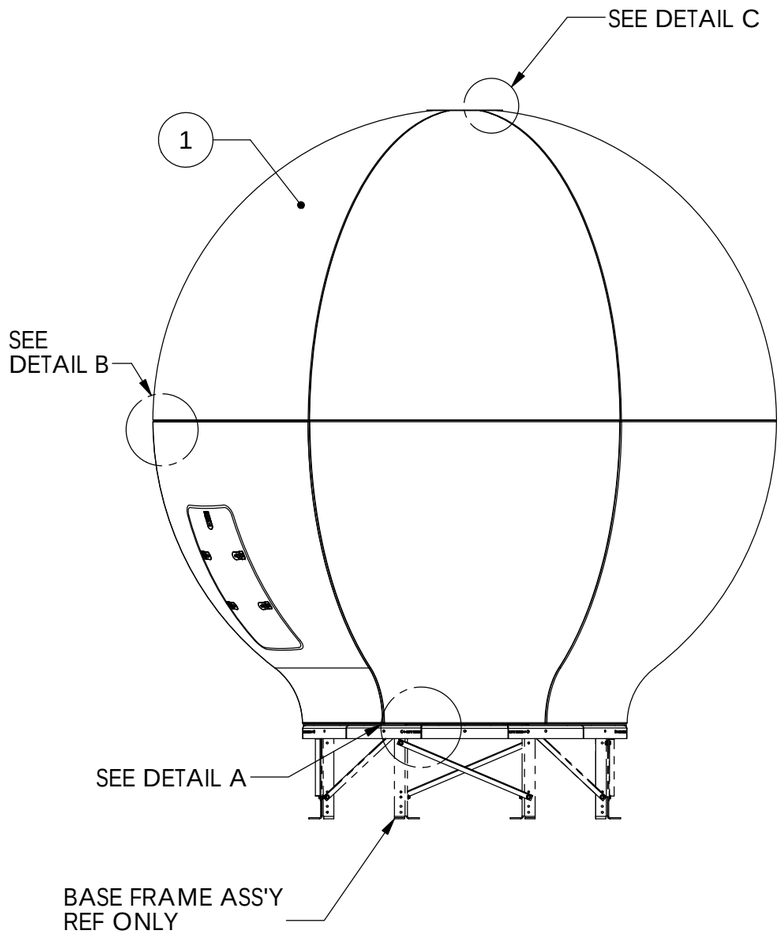
Date as of: 04/11/2018 09:53:24 AM PDT

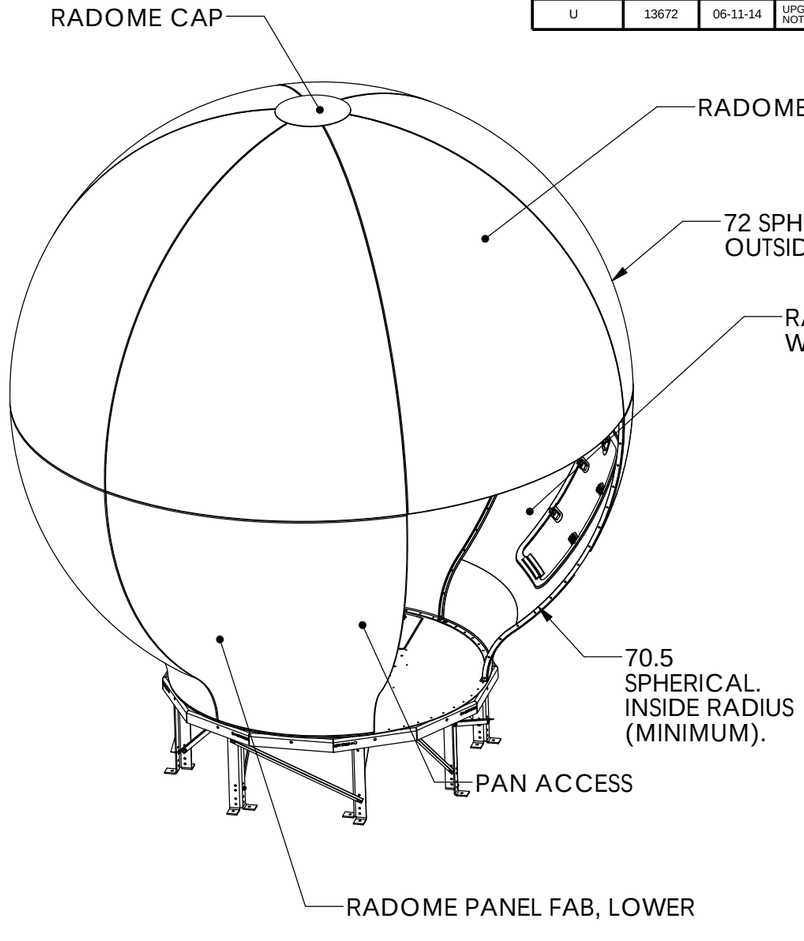
Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	
0	1		97-111365-U	U DCO-00009898	ASSY DWG, RADOME, 144 IN	
1	1	pcs	88-109119-HAAA	03 ECO-00026102	RADOME FAB ASSY, 144 IN, KUTX, SIDE ACCESS, WHITE	
2	1	ea	140637-13	C.02 ECO-00026448	HARDWARE KIT,MULTI-PANEL RADOME,144IN, 18MM WASHERS	NOT SHOWN. F 97-111365 FOR
3	12	ea	117762-1	B MCO-00030658	SILICONE ADHESIVE, WHT RTV 122, 10.1 OZ.	NOT SHOWN. F 97-111365 FOR
4	1	pcs	48-148285-A	02 ECO-00018976	CRATE, RADOME, 144 INCH	NOT SHOWN, F Radome_Crate
		pcs	88-207377-HAAA	A.01 ECO-00024777	RADOME ASSY, 144 IN, C/KU, SIDE ACCESS, WHITE	

Created By: Mike Needham

Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
N1	N/A	10-17-07	ADDED DASH 27	CK
P	7046	02-10-10	UPDATE BOM PER RED LINES. UPDATE VIEW TO SHOW DETAIL ASSY. UPDATE DASH TABLE AND RE-NUMBERS FOR NOTES PER RED LINES. UPDATE UNITS FOR NOTE 5.	SL
P1	N/A	09-02-10	ADD -28; UPDATE TITLE BLOCK.	K.D.H.
Q	9799	01-02-13	ADD SHIPPING CRATE	K.D.H.
R	10778	09-17-13	SHIPPING CRATE WAS 126602	K.D.H.
S	13438	03-18-14	HW KIT WS 124818-3; DETAIL VIEWS REVISED TO HAVE GENERIC HARDWARE DESCRIPTIONS; INTER-PANEL WASHER SIZE WS 25 MM OD, (NOW 18 MM OD). RE-NUMBERED NOTES IN LOGICAL SEQUENCE: 2 WS 5, 3 WS 6, 4 WS 8, 5 WS 7, 6 WS 4, 7 WS 2, 8 WS 3, RE-WORDED NOTES 3,4,6,7,8 FOR CLARITY.	AMN
T	12578	04-15-14	OBSOLETE UNUSED DUPLICATES -2, -18, (FOR -2 USE -29, FOR -18 USE -17); ADDED NOTE 9; INTER-PANEL FLANGE WIDTH REDUCED VIA PANEL KIT 109119; DASH-28 ADDED DOOR ASSY TO MATCH ITS EXTRA PANEL.	AMN
U	13672	06-11-14	UPGRADED SIDE DOOR HAS 5 EA. COMPRESSION LATCHES, (WS 7-TOGGLE & 10-SPRING LATCHES). NOTE: UPGRADED PANEL (& DOOR) IS NOT DOWNWARDS COMPATIBLE. ADDED DETAIL D, NOTE 10.	AMN





NOTES: UNLESS OTHERWISE SPECIFIED

1. SELECT RADOME FAB ASS'Y 109119 AS PER SPECIFICATIONS IN CUSTOMER SALES ORDERS.
2. BASED ON WIND VELOCITY OF 100 MPH:
   HORIZONTAL WIND SHEAR: 870 LBS.
   VERTICAL LIFT EACH LEG MAX.: 580 LBS.
   OVERTURNING MOMENT: 6,380 FT. LBS.
3. USE DRAWING IN CONJUNCTION WITH: "HARDWARE KIT, MULTI-PANEL RADOME, 144 IN".
4. RADOME HW KIT CONTAINS EXTRA HW, (SEE HW KIT BOM COMMENTS).

△5 ORIENT RADOME PANEL FAB W/SIDE ACCESS SO A SIDE SEAM IS INLINE WITH THE PAN ACCESS (AFT).

6. AT TIME OF FINAL ASSEMBLY, APPLY ADHESIVE PER SEA TEL SPEC 121730 TO ALL THREADED FASTENERS AND TORQUE TO SEA TEL SPEC. 122305.
7. PRIOR TO CAULKING, APPLY MASKING TAPE ALONG VERTICAL AND HORIZONTAL EDGES OF ALL PANELS .
8. "CAULKING": USE SILICONE ADHESIVE TO SEAL VERTICAL AND HORIZONTAL EDGES OF ALL PANELS, RADOME CAP, AND BASE PAN UNDER PANELS.
9. MANUFACTURE PER SEA TEL STANDARD 122298.

△10 WHEN INSTALLED ON BASE FRAMES WITH LEGS, USE ONLY 52 SETS OF HARDWARE. PERMITED TO POPULATE ALL 60X LOCATIONS ONLY W/FLUSH MOUNT BASE FRAME.

DASH TABLE		
DASH NO.	CONFIGURATION (ALL ARE "FOAM")	
	COLOR	SIDE ACCESS
-17	WHITE	YES
-21	US NAVY (USN) GREY	YES
-26	DANISH NAVY (RDN) GREY	YES
-27	SNOW WHITE	YES
-28	DANISH NAVY (RDN) GREY	YES/NO
-29	WHITE	NO

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5°

INSPECTION DIMENSIONS NOTED BY (X.X) SHALL HAVE FEATURE SIZE DIMENSIONS AND ASSOCIATED GD&T TOLERANCES INSPECTED

INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER:

WEIGHT: 627.079 LBS.

MATERIAL: N/A

FINISH: N/A

SURFACE ROUGHNESS:

3rd ANGLE PROJECTION

DRAWN BY: MAB

DRAWN DATE: 6/13/1997

APPROVED BY:

APPROVED DATE:

SIZE: B SCALE: 1:35

FIRST USED:

Sea Tel
COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

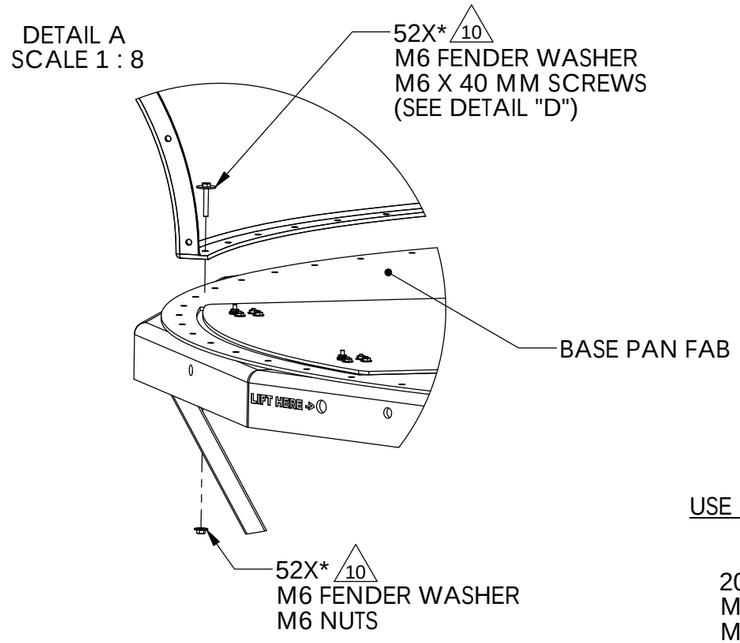
TITLE: RADOME ASS'Y, 144 IN

DRAWING NUMBER: 97-111365 VER: U

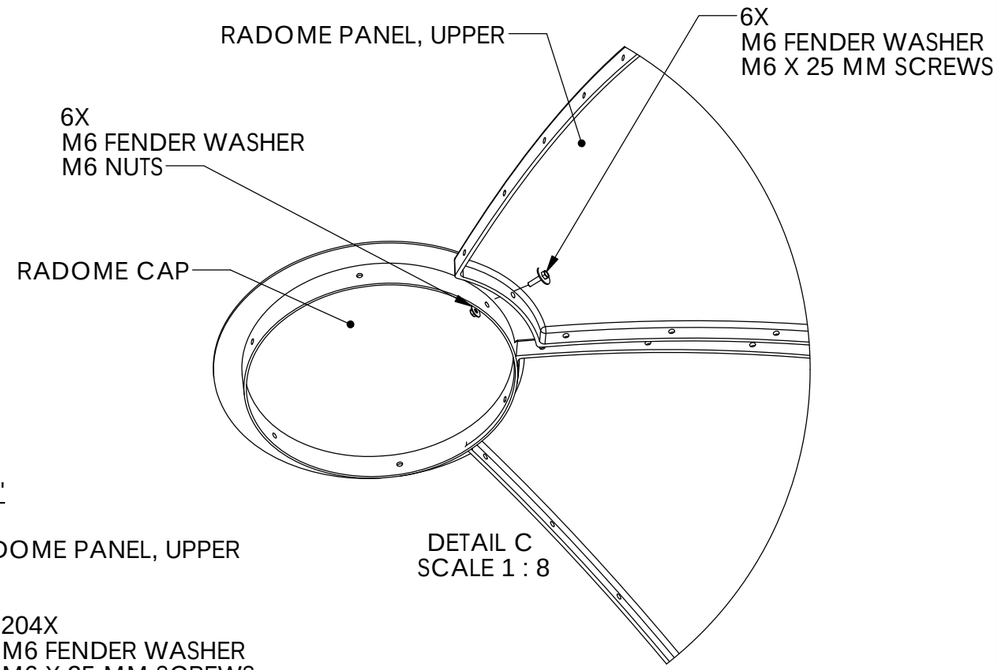
SHEET NUMBER: 1 OF 2

INDIVIDUAL HARDWARE KITS ARE PART OF "HARDWARE KIT, MULTI-PANEL RADOME, 144 IN"

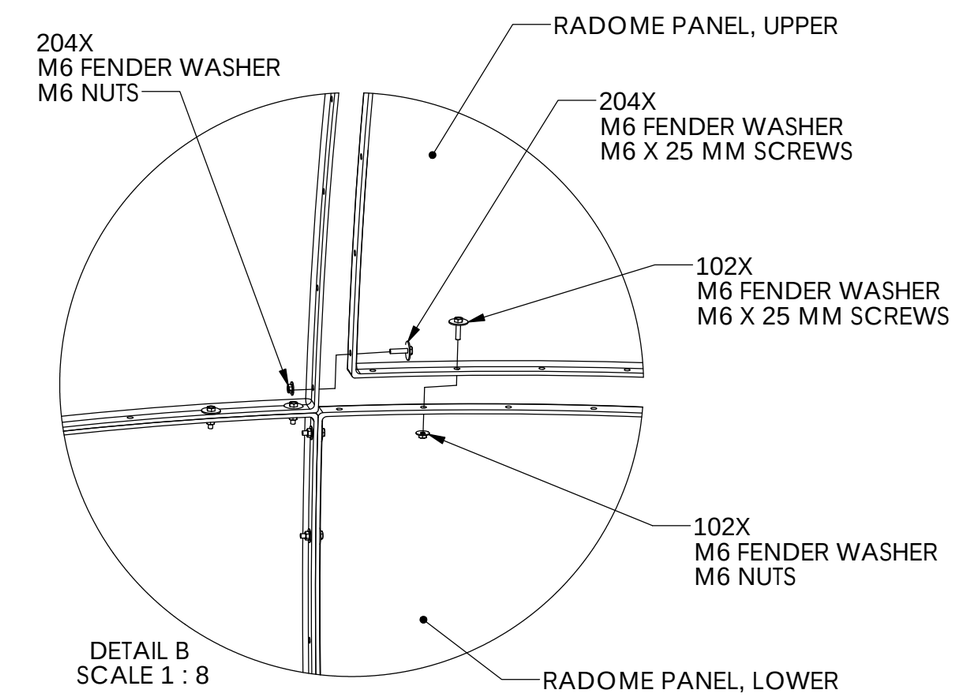
USE OF: "HARDWARE KIT, RADOME PANEL TO BASE FRAME, 75 IN"

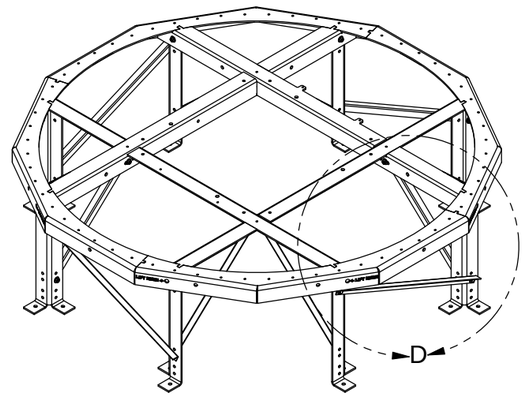


USE OF "HARDWARE KIT, RADOME CAP, 126, 144 IN"

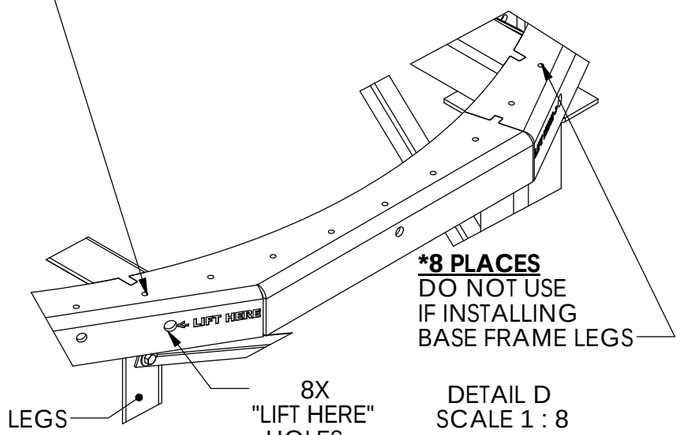


USE OF "HARDWARE KIT, RADOME PANELS, 144 IN"





WHEN ASSEMBLING THE RADOME ONTO BASE FRAMES WHICH HAVE OR WILL HAVE LEGS, DO NOT POPULATE THE 8X BASE FRAME HOLES (ADJACENT TO THE "LIFT HERE" HOLES) OR INTERFERENCE WITH THE TOP OF THE BASE FRAME LEGS WILL OCCUR.



SIZE	SCALE:	DRAWING NUMBER	VER
B	1:64	97-111365	U
		SHEET NUMBER 2 OF 2	

SINGLE LEVEL MFG BILL OF MATERIAL

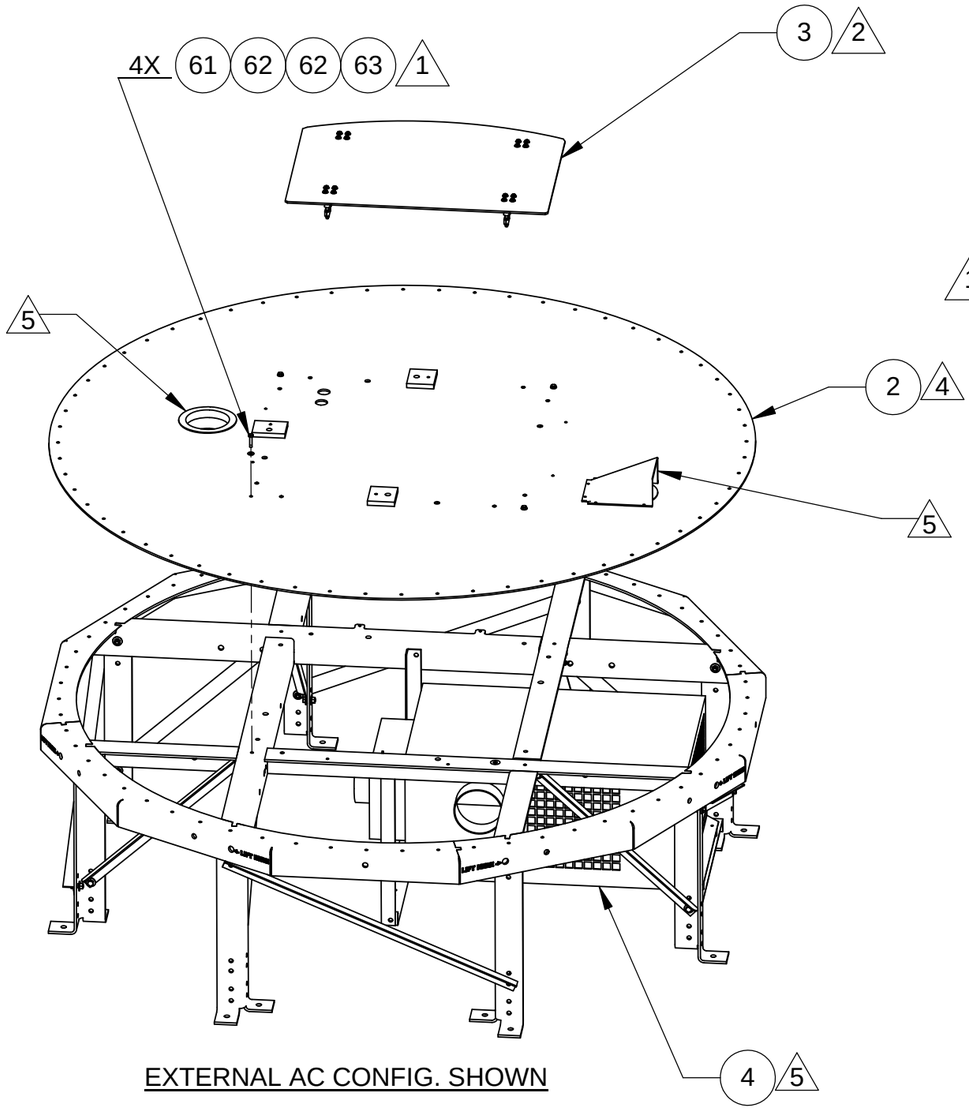
FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	123724-1	E	RADOME BASE FRAME ASSY, 75 IN, STEEL	
2	1 EA	123726-31	G	RADOME BASE PAN, 75 IN W/INTERNAL A/C	
3	1 EA	123728-1	C	RADOME PAN ACCESS ASSY, WHITE	
4	1 EA	122508	G	A/C INSTALL ASSY, INTERNAL, 75" BASE	
61	4 EA	114586-540		SCREW, HEX HD, 1/4-20 x 1-1/4, SS.	
62	8 EA	114580-029		WASHER, FLAT, 1/4, SS.	
63	4 EA	114583-029		NUT, HEX, 1/4-20, SS.	

Sea Tel
COBHAM

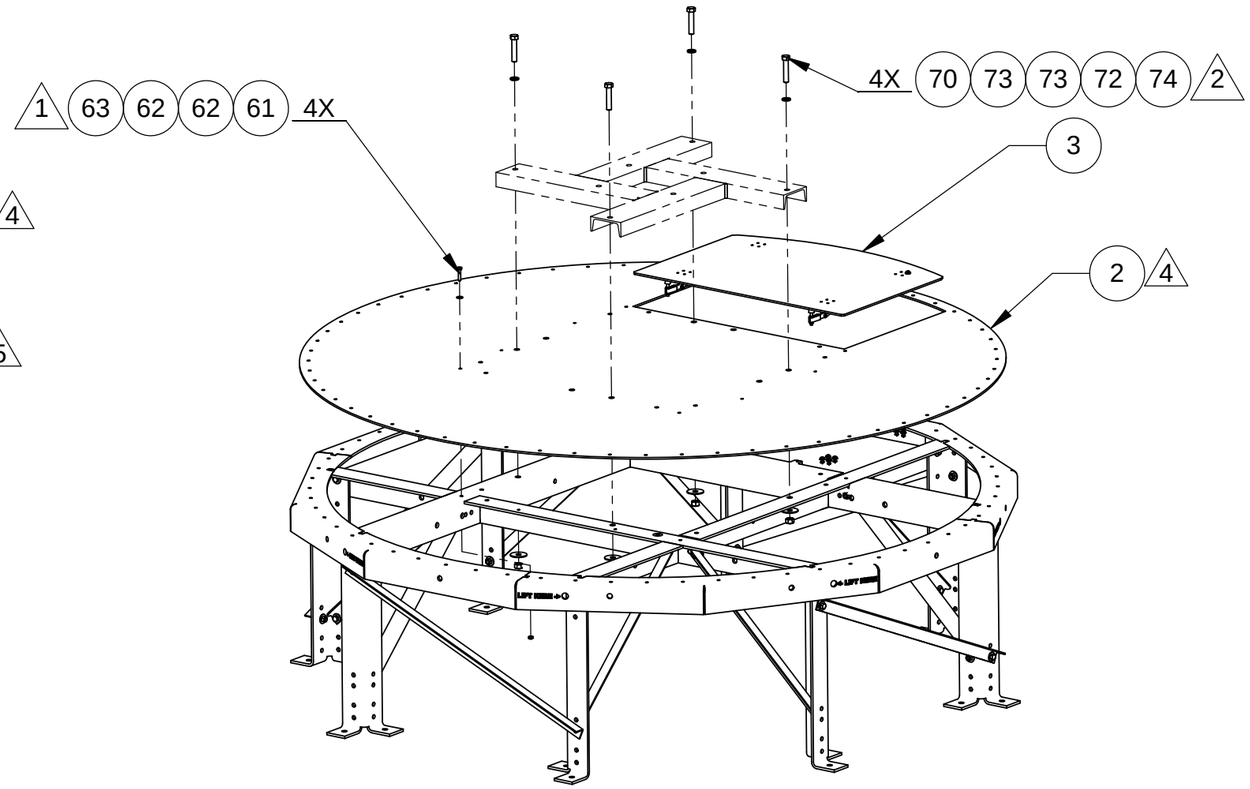
RADOME BASE ASSY,75 IN.,STL,INTERNAL AC,WHT PAN

PROD FAMILY	EFF. DATE	SHT	DRAWING NUMBER	REV
COMMON	5/5/2014	1 OF 1	**123723-9**	**E1**

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
C	7046	02-04-10	REMOVE -2 & -6 FR DASH TABLE. UPDATE HARDWARE KIT. ADD NOTE 2, 3 & 4. ADD BASE CROSS VIEW AND SHT 2.	SL
D	8242	01-05-11	BALLOONS 80-83 WERE 71-74. ADD TRIANGLES TO NOTES 2 & 6.	SL
E	9174	07-13-12	UPDATE NOTE 3 & REMOVE NOTE 6. CORRECT ITEM NUMBERS AS BUILD. ITEM 61 & 63 QTY WERE 6, ITME 62 QTY WS 12.	SL
E	"	"	REMOVE REF PART, SPACER BASE STAND AND UPDATE DRAWING VIEWS.	SL
E1	N/A	12-18-13	ADD -10	K.D.H.



EXTERNAL AC CONFIG. SHOWN



NO AC CONFIG. SHOWN

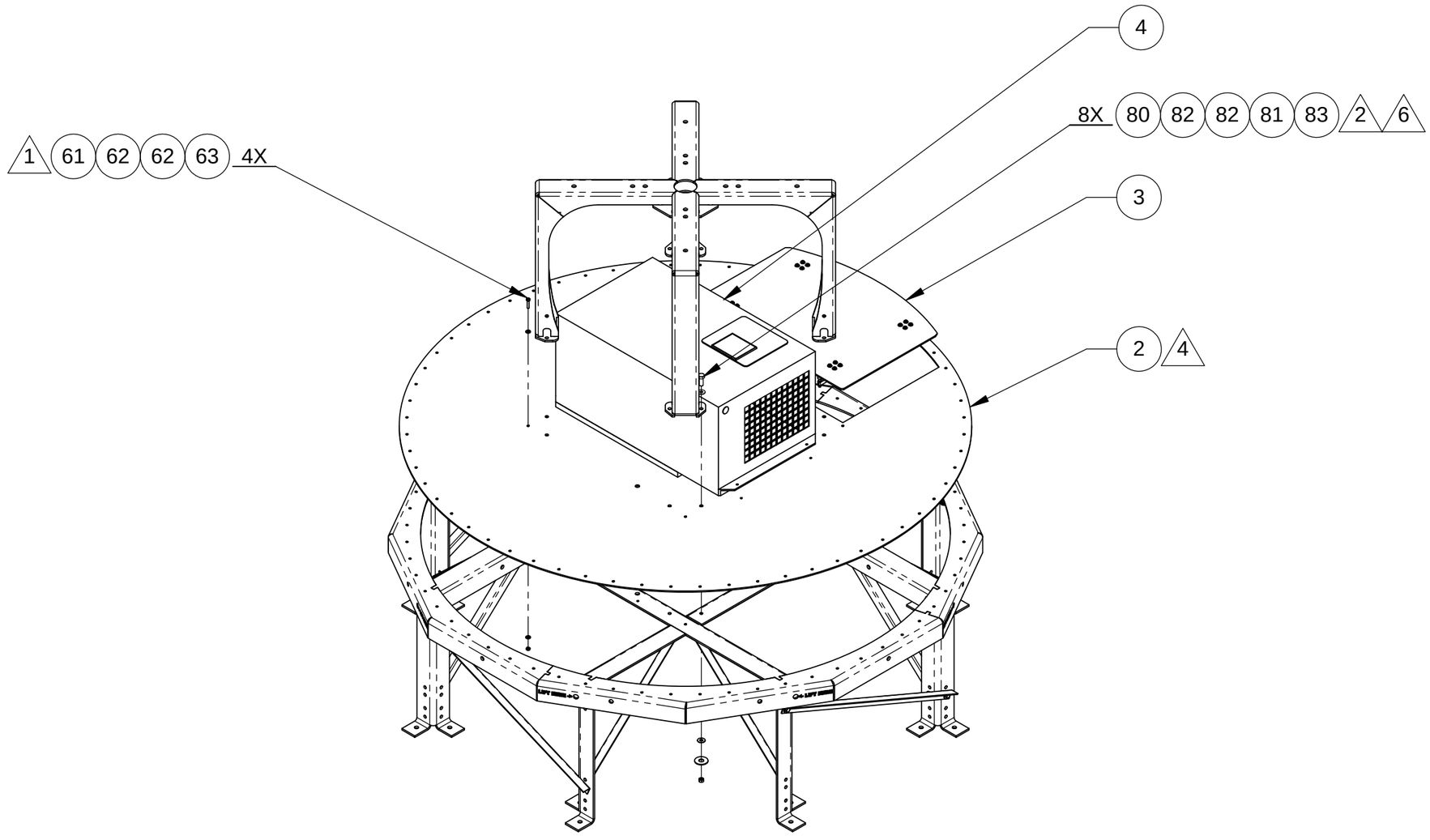
DASH #	LEG MOUNT HOLE	A/C	COLOR	BASE PAN	ACCESS ASSY
-1	0.56	NO	WHITE	123726-21	123728-1
-3	0.56	NO	US NAVY GREY	123726-22	123728-2
-4	0.56	NO	BRIT GREY	123726-23	123728-3
-5	0.56	EXT	WHITE	123726-41	123728-1
-7	1.25	NO	WHITE	123726-21	123728-1
-8	1.25	EXT	WHITE	123726-41	123728-1
-9	0.56	INT	WHITE	123726-31	123728-1
-10	0.56	INT	US NAVY GREY	123726-32	123728-2

NOTES: UNLESS OTHERWISE SPECIFIED

1. INSTALLED WITH ITEM 2 AT SEA TEL.
2. USE DRAWING INCONJUNCTION WITH P/N: 131733-1 IN P/N: 124822-6.
3. MANUFACTURE PER SEA TEL STAND ARD 122298.
4. ORIENT DOOR SO IT IS ACCESIBLE.
5. SHOWN WITH EXTERNAL AC KIT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°
INTERPRET TOLERANCING PER ASME Y14.5 - 2009

DESIGNER/ENGINEER:	DRAWN BY: SCC	Sea Tel COBHAM	
WEIGHT:	DRAWN DATE: 12-14-04	Tel. 925-798-7979 Fax. 925-798-7986	
MATERIAL:	APPROVED BY:	TITLE: RADOME BASE ASSY, 75 IN.	
FINISH:	APPROVED DATE:		
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:1	DRAWING NUMBER: 123723	REV: E1
3rd ANGLE PROJECTION	FIRST USED: XX97	SHEET NUMBER: 1 OF 2	



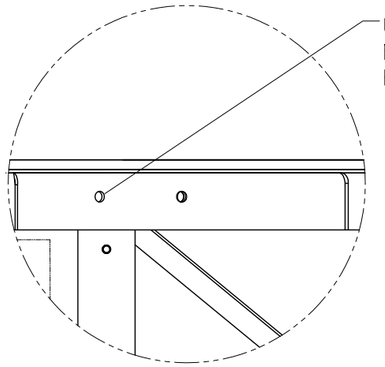
INTERNAL AC (SPIDER MOUNTING BASE)

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:8	123723	E1
		SHEET NUMBER 2 OF 2	

NOTES: (UNLESS OTHERWISE SPECIFIED)

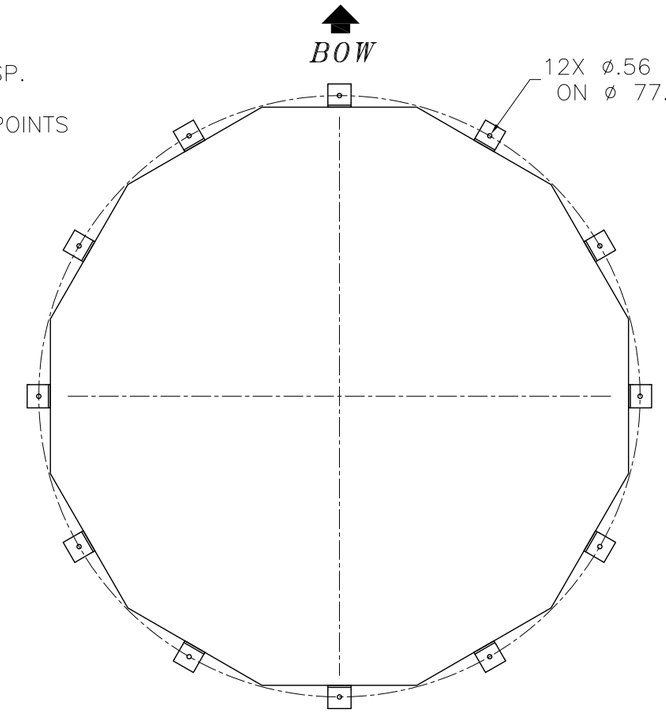
1. ALL WEIGHTS GIVEN ARE FOR INFORMATION ONLY. DO NOT USE FOR DESIGN. REFER TO 121910.
2. SEATEL DOES NOT PROVIDE LIFTING HARDWARE OR STRAPS.
3. SECONDARY UNITS ARE IN CENTIMETERS.

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
B5	9075	12–17–13	SHT 1: CORRECT SECONDARY UNITS; ADD NOTE 3	K.D.H.
B6	N/A	12–18–13	ADD 2X DIM 3.07 PER CUSTOMER REQUEST	K.D.H.

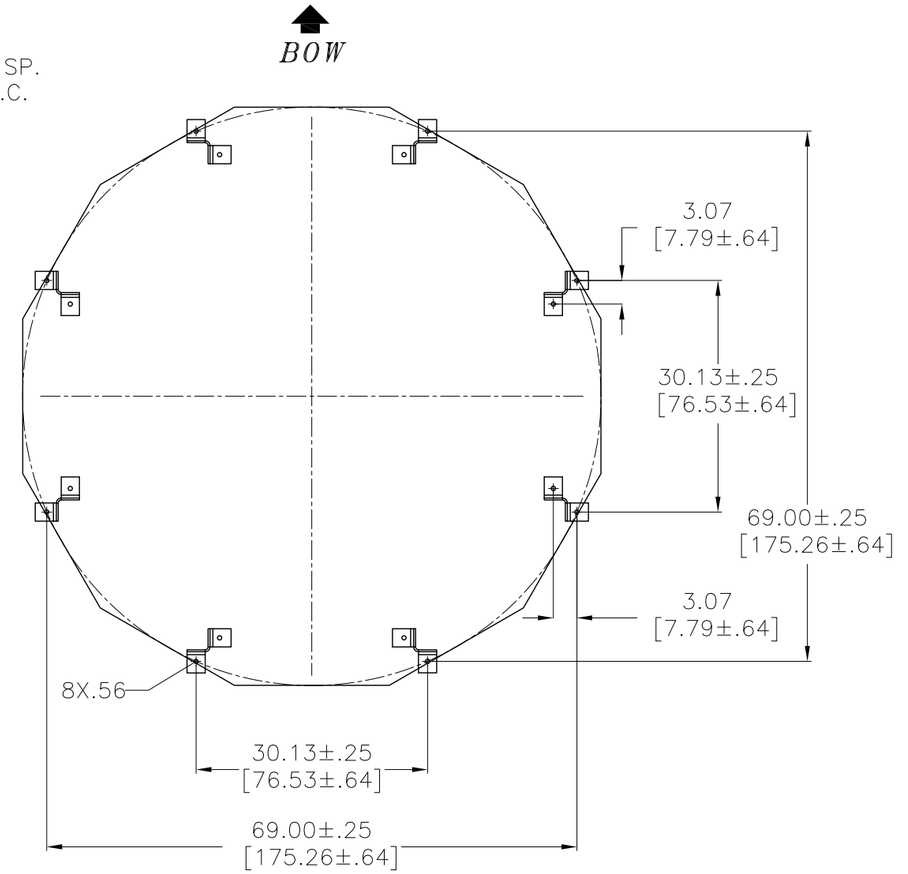


DETAIL A

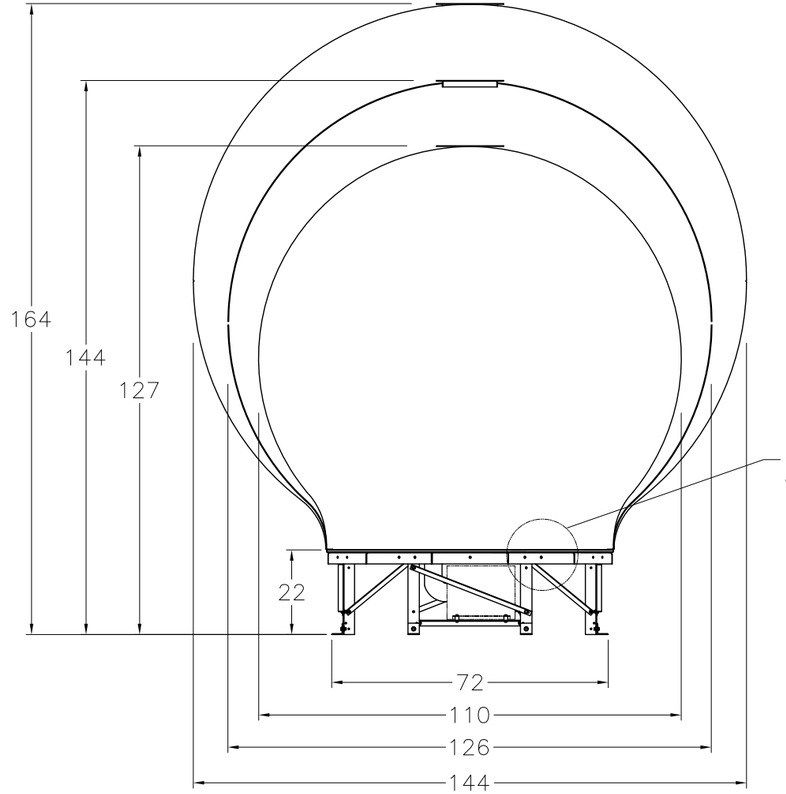
SCALE: NONE



FLUSH MOUNT RADOME
MOUNTING HOLE PATTERN



MOUNTING HOLE PATTERN
W/LEGS



SEE DETAIL A

SCALE: NONE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°

INTERPRET TOLERANCING PER ASME Y14.5M – 1994

DESIGNER/ENGINEER:	DRAWN BY: SCC	Sea Tel COBHAM Tel. 925–798–7979 Fax. 925–798–7986
WEIGHT:	DRAWN DATE: 01–03–05	
MATERIAL:	APPROVED BY:	TITLE: INSTALLATION ARRANGEMENT
FINISH:	APPROVED DATE:	
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:20	DRAWING NUMBER: 123908 / REV: B6
3rd ANGLE PROJECTION	FIRST USED: XX97A	SHEET NUMBER 1 OF 2

DOCUMENT NO. 124225–4_A

TABLE 1: GENERAL ASSEMBLY WEIGHT

ITEM DESCRIPTION	NET* WEIGHT (LB.)
9797A–09	455
9797A–11	565
9797A–21	555
9797A–27	575
9797A–32	625
9797A–38	615
9797A–40	545
9797A–43 (Dual C–Band)	720
9797A–45	545
9797A–46	625
9797A–49	485
9797A–50	565
9797A–51	685
9797A–53	695
9797A–59	545
12097A–2	585
9797A–56	565
8797A–29	645
9797A–66	555
9797A–62	685
8897B–11	420

ITEM DESCRIPTION	NET* WEIGHT (LB.)
9497A–19	284
9797A–20	565
9797A–61	635
9797A–64	565
9797A–65	605
9797A–67	565
9797A–70	520
9797A–72	565
9797A–73	605
9797D–70	535
9797D–87	546
9797B–71	560
9797B–77	675
9797B–TROPO	730
9711QOR–69	660
9711–67	550
9711QOR–64	655

*NET WEIGHT EXCLUDES SHIPPING PALLET WEIGHT OF APPROX. 25 LB.

TABLE 2: BASE ASSEMBLY WEIGHT

ITEM DESCRIPTION	WEIGHT (Lb.) **
BASE ASSEMBLY: STEEL BASE, 21" LEGS	368
BASE ASSEMBLY: AL BASE, 21" LEGS	OBSOLETE
BASE ASSEMBLY: STEEL BASE, FLUSH MOUNT	100
BASE ASSEMBLY: AL BASE, FLUSH MOUNT	OBSOLETE

**ADD 100lbs FOR AIR CONDITIONER ASSEMBLY.

TABLE 3: RADOME ASSEMBLY WEIGHT

ITEM DESCRIPTION	WEIGHT (Lb.) ***
RADOME ASSEMBLY: 110" (DRY WEIGHT)	450
RADOME ASSEMBLY: 126" (DRY WEIGHT)	475
RADOME ASSEMBLY: 144" (DRY WEIGHT)	550

***WEIGHT GIVEN IS APPROXIMATE DRY WEIGHT. RADOME PANELS CAN ABSORB UP TO 50% MOISTURE BY WEIGHT.

SIZE	SCALE:	DRAWING NUMBER:	REV:
B	NONE	123908	B6
		SHEET NUMBER:	2 OF 2

DOCUMENT NO. 124225–4_A

SINGLE LEVEL MFG BILL OF MATERIAL

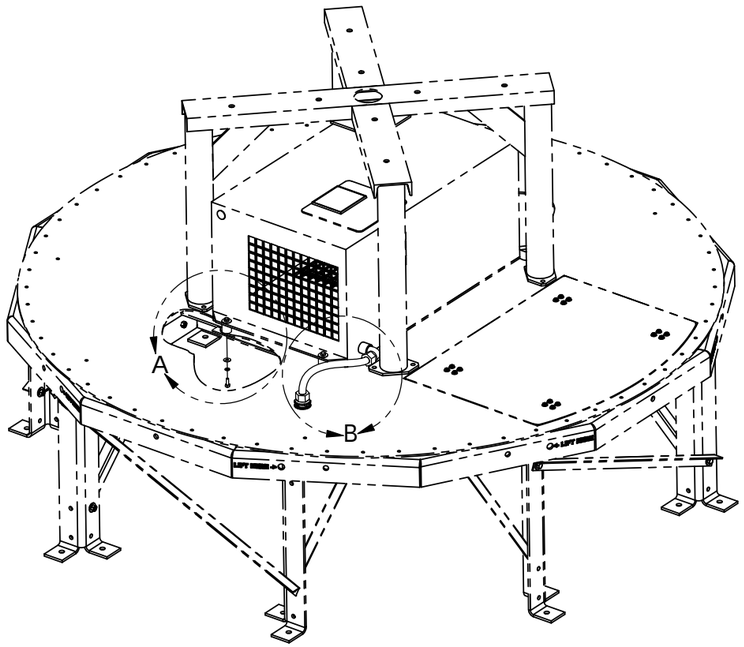
FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	116941	A	STREET ELBOW, 1/2 IN	
2	1 EA	116938	A	FLEX HOSE, 1/2 IN	
3	1 EA	124903-1	B3	STRAIN RELIEF ASSY (CABLE GLAND)	
4	1 EA	121008-72	D2	CABLE ASSY, AC INPUT, 72 IN. (SPADE T	(NOT SHOWN) ,
6	4 EA	120470	A1	ISOLATORS, BUMPER	
20	1 EA	DOCUMENT		DOCUMENT(S) REQUIRED, SEE COMMENTS	LASTEST DOCUMENT 136505 INCLUDED ,
50	4 EA	114586-535		SCREW, HEX HD, 1/4-20 x 1/2, SS.	
51	4 EA	114586-537		SCREW, HEX HD, 1/4-20 x 3/4, SS.	
52	2 EA	121323-544		SCREW, FLAT HD, SKT DRV, 1/4-20 X 1 1	
55	10 EA	114581-029		WASHER, LOCK, 1/4, SS	
56	4 EA	114625-107		WASHER, FENDER, 1/4, (1 IN OD), SS.	
57	6 EA	114580-029		WASHER, FLAT, 1/4, SS.	
58	2 EA	114583-029		NUT, HEX, 1/4-20, SS.	

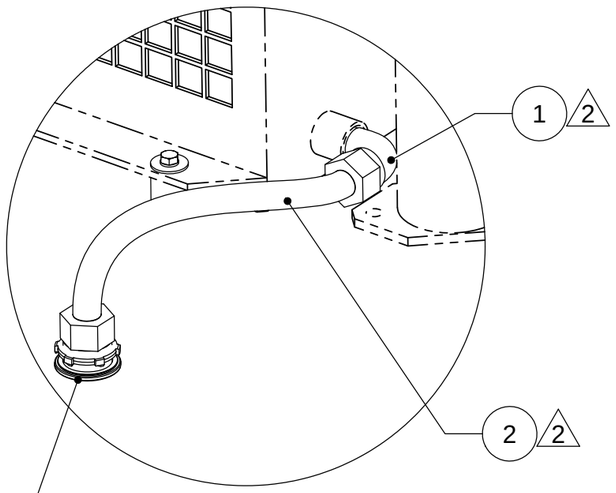
Sea Tel
COBHAM

A/C INSTALL ASSY, INTERNAL, 75" BASE

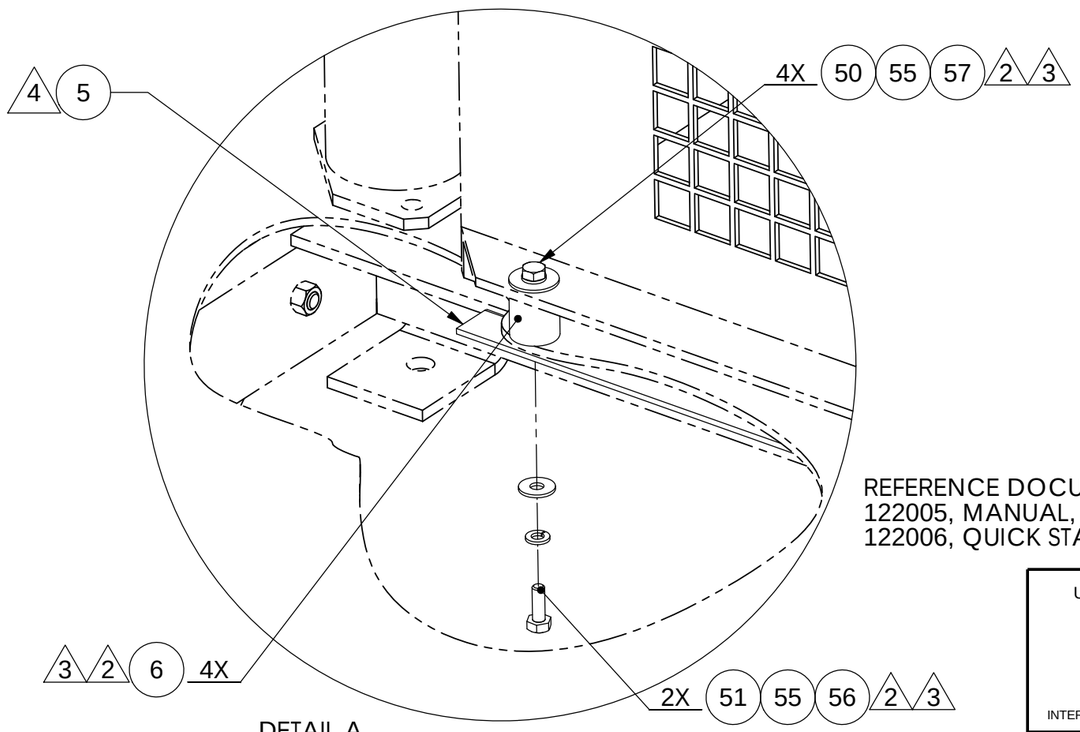
PROD FAMILY COMMON	EFF. DATE 5/5/2014	SHT 1 OF 1	DRAWING NUMBER **122508**	REV **G**

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
E	6475	12-4-08	REMOVED ITEMS 5, 50, 51,52 & NOTE 4; ADDED ITEMS 6, 60 THRU 63; NOTE 3 WAS "BAG AND ATTACH POWER CORD AND STRAIN RELIEF"; ADD EXPLODE VIEW.	K.D.H.
F	TBD	12-13-11	REDRAWN IN SW WITH UPDATED BASE FRAME; REORDERED ITEM 60 TO 50, 61 TO 51, 62 TO 55 AND 63 TO 56; ADDED ITEM 5, 52, 57 & 58. CHANGED NOTE 1, REMOVED NOTE 2, CHANGED NOTE 3 TO 2, ADDED NEW NOTE 3.	JZ
G	9174	05-31-12	ADD DASH 2. ITEM 3 QTY WAS 2. ADD ITEM 20. BOLLOON NO. 56 WAS 57 ON ZONE A6 AND B5 SHEET 1. BOLLOON NO. 57 WAS 56 IN ZONE A6 SHEET 2. REMOVE ITEM 5 FROM NON DASH.	SL





DETAIL B
SCALE 1 : 4



DETAIL A
SCALE 1 : 3

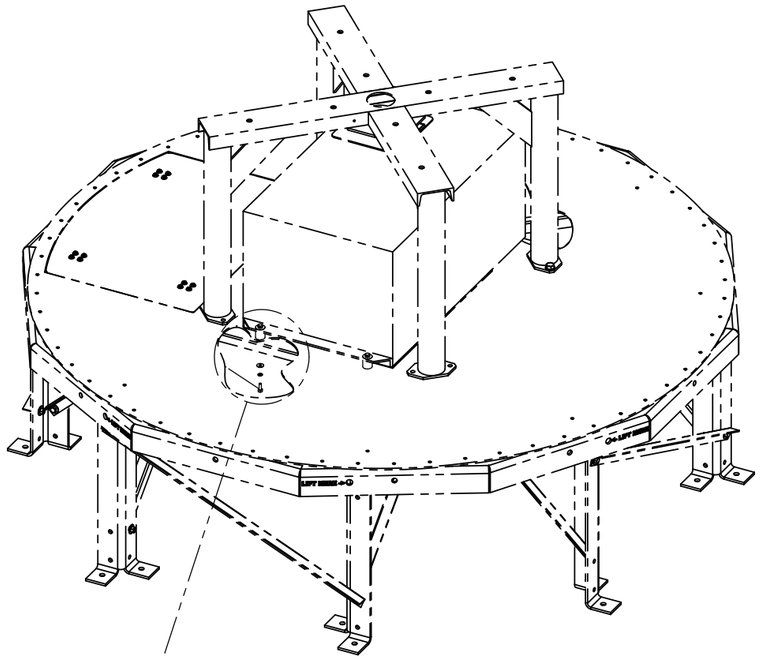
NOTES: UNLESS OTHERWISE SPECIFIED

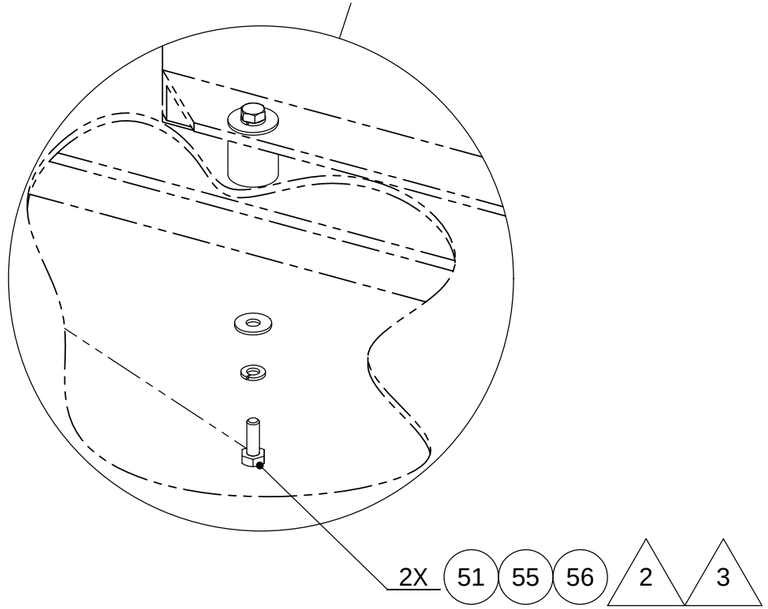
1. MANUFACTURE PER SEATEL STANDARD 122298.
2. TO BE INSTALLED BY CUSTOMER. BAG & TAG ALL ITEMS ON BOM AND INCLUDE W/BASE FRAME ASS'Y.
3. USE ONLY HARDWARE FROM KIT 122508 FOR INSTALL.
4. ITEM 5 USED WITH OLD STYLE BASE FRAME; PART OF 122508-2

REFERENCE DOCUMENTS:
122005, MANUAL, RADOME A/C
122006, QUICK START CARD, RADOME A/C

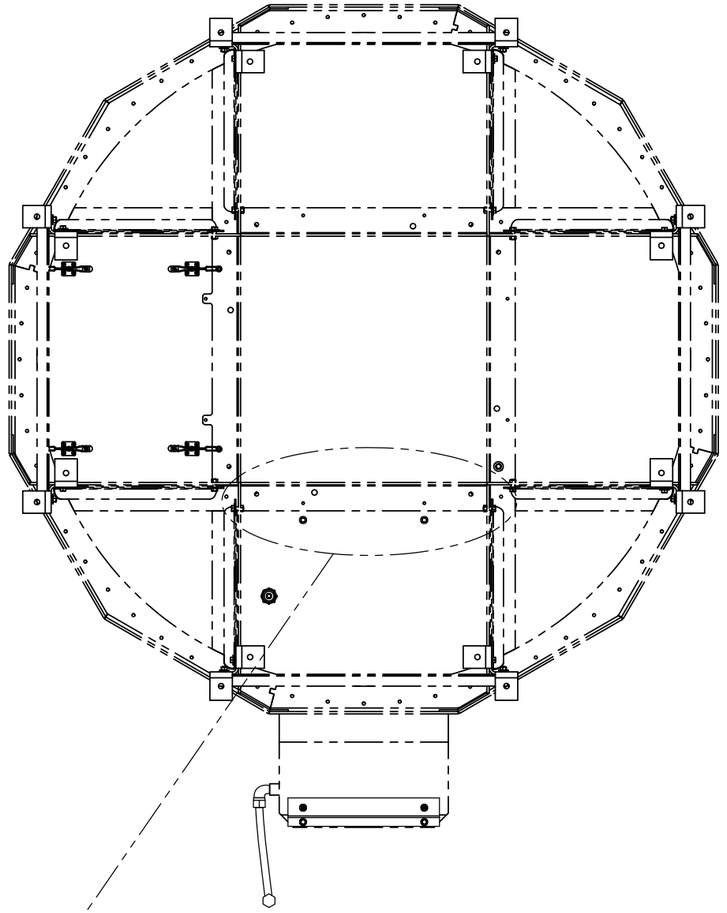
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°
INTERPRET TOLERANCING PER ASME Y14.5 - 2009

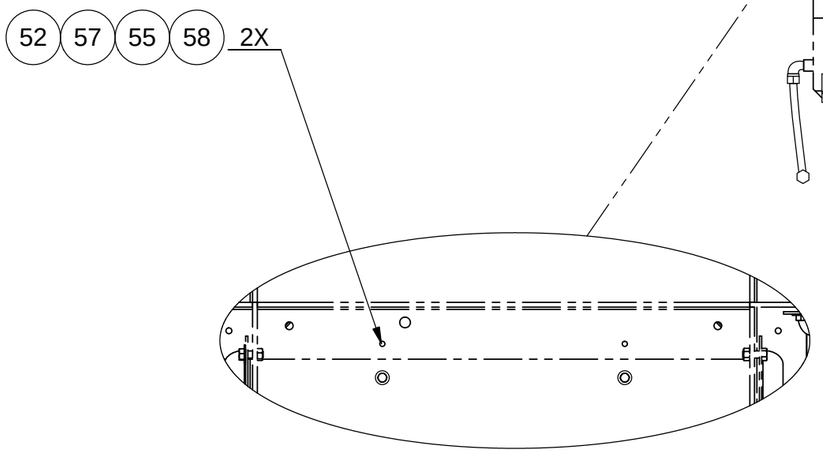
DESIGNER/ENGINEER: J. ZAJAC	DRAWN BY: J. ZAJAC	Sea Tel COBHAM	
WEIGHT: 426.7 LBS.	DRAWN DATE: 12-13-11	Tel. 925-798-7979 Fax. 925-798-7986	
MATERIAL: N/A	APPROVED BY:	TITLE: A/C INSTALL ASS'Y, INTERNAL, 75" BASE	
FINISH: N/A	APPROVED DATE:		
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:16	DRAWING NUMBER: 122508	REV: G
3rd ANGLE PROJECTION	FIRST USED: XX97	SHEET NUMBER: 1 OF 2	





DETAIL C
SCALE 1 : 3

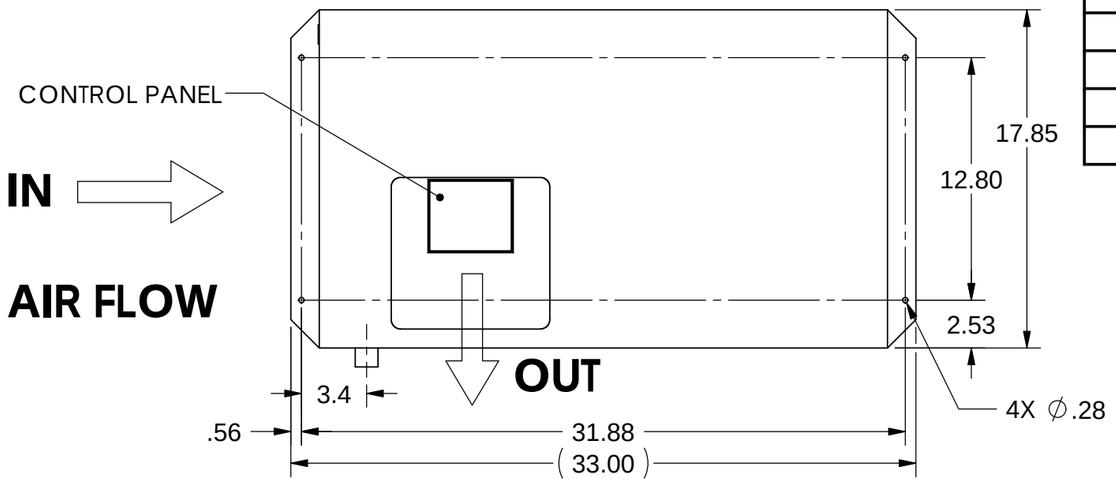


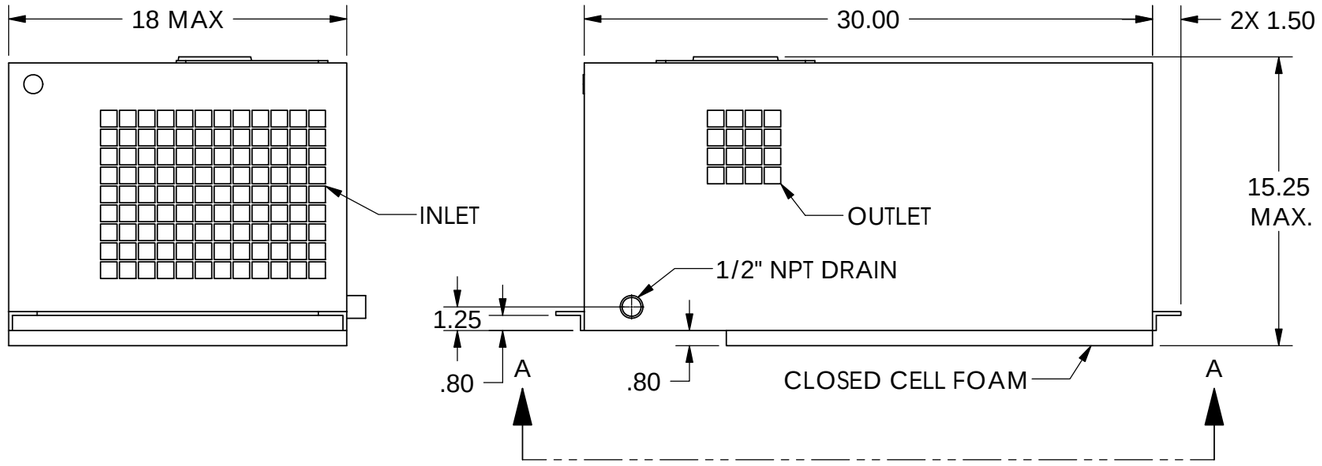


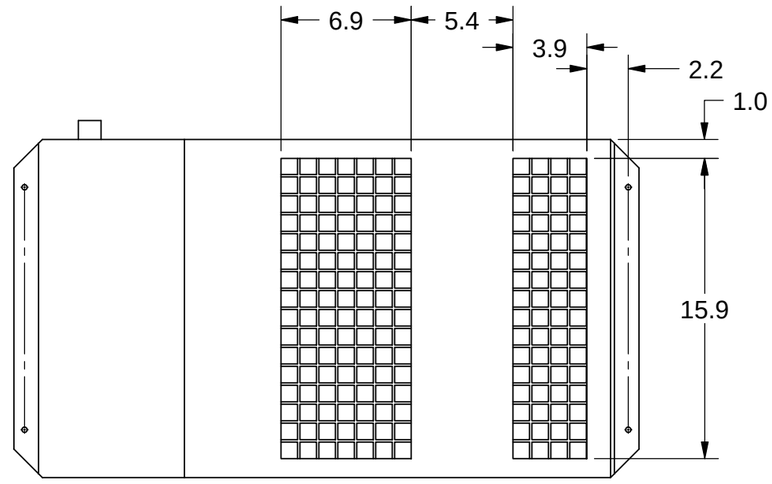
DETAIL D
SCALE 1 : 8

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:16	122508	G
		SHEET NUMBER 2 OF 2	

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	4609	10-05-04	RELEASED TO PRODUCTION	AMN
B	4858	5-5-05	ADD REFERENCE 121113	LR
C	N/A	3-2-06	CHANGED TO TABLE FORMAT	V.S.
C1	N/A	1-9-07	CREATED CAD OUTLINE DRAWING	RJW
C2	N/A	04/18/14	ADDED INRUSH/STARTUP CURRENT FIELD TO DASH TABLE.	KRB







VIEW A-A

BOTTOM VIEW

Dash	Rated Cooling Capacity (BTU)	Voltage (VAC)	Inrush/ Startup Current	Run Current	Frequency (Hz)	Refrigerant	System Controller	Manufacturer	Manufacturers Part Number	Manufacturers Description
-1	16,000	110	-	20A	60	R417A	Digital	Dometic	202000307	HSA16KC/2 417A RADOME 115V
-2	16,000	220	18A	12A	50/60	R417A	Digital	Dometic	202000304	HSA16KCZ/2 417A RADOME 230/1
-3	16,000	230	18A	12A	60	R417A	Digital	Dometic	TBD	TBD
-4	16,000	230	18A	12A	50	R417A	Digital	Dometic	202000354	HSA16KCZ50 417A 220V/50/1

DRAWN BY: RJW
DRAWN DATE: 1/8/2007
APPROVED BY:
APPROVED DATE:

Sea Tel
COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: AIR CONDITIONER, INTERNAL

SIZE: B | SCALE: NONE | DRAWING NUMBER: 123496 | REV: C2

FIRST USED:

SHEET NUMBER 1 OF 1

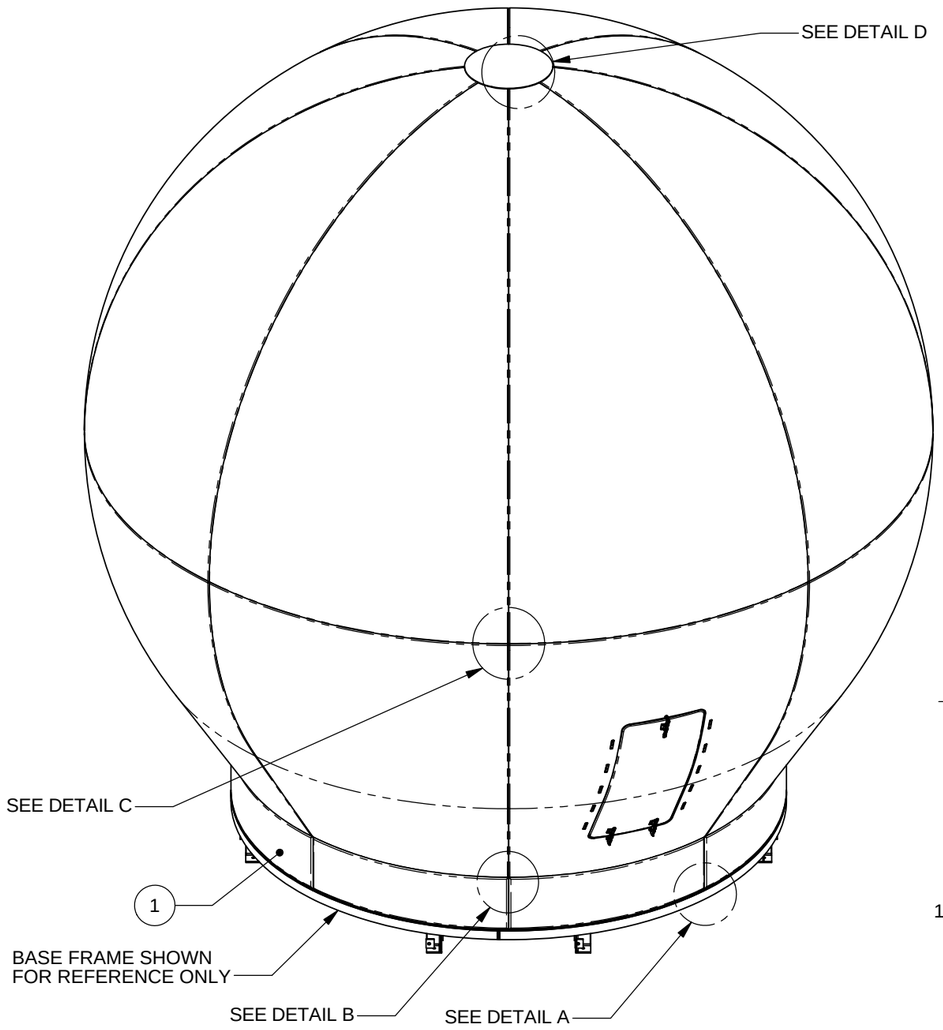
BOM Explosion Report

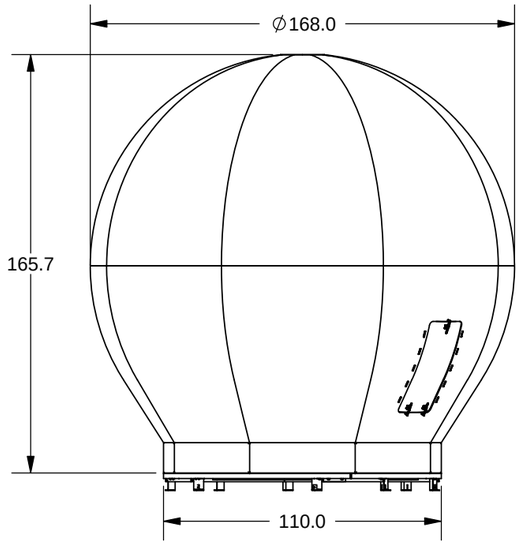
Item Number: 111849-9
Description: RADOME ASSY, 168 IN, WHITE/FOAM/SIDE
Item Revision: W.01 MCO-00021338
Date as of: 04/11/2018 09:54:00 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	1		97-111849-W	W DCO-00009897	ASSY DWG, RADOME, 168 IN	
1	1	pcs	115915-9	C ECO-00008542	RADOME FAB ASSY, 168 IN, WHT/SIDE/PAN ACCESS	
40	1	ea	124818-4	D.01 ECO-00026448	HARDWARE KIT, MULTI-PANEL RADOME, 168 IN	
41	24	ea	117762-1	B MCO-00030658	SILICONE ADHESIVE, WHT RTV 122, 10.1 OZ.	NOT SHOWN
42	1	ea	131434-2	C ECO-00008545	CRATE ASSY, DOME 168	NOT SHOWN
		ea	111849-9	W.01 MCO-00021338	RADOME ASSY, 168 IN, WHITE/FOAM/SIDE	

Created By: Mike Needham
Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
R	R	R	R	R
S	6417	10-27-08	THE "MAX. WINLOAD" WAS 100MPH. ADDED -12 TO DASH TABLE.	HT
T	7046	02-09-10	UPDATE "HARDWARE KIT TABLE" AND RELATIVE VIEWS PER RED LINES. ADD NOTE3.	SL
U	8345	03-24-11	ITEM 1 WAS 112118-3, REMOVE ITEMS 2-6 IN DASH 12 ONLY. COLOR IN DASH 12 WAS GREY.	SL
V	9799	1-2-13	ADD SHIPPING CRATE, ITEM 42; UPDATE TITLE BLOCK	K.D.H.
W	10778	9-17-13	ITEM 42 WAS 131434	K.D.H.





RADOME SPECIFICATIONS:

RF ATTENUATION: 1.5 dB @ 6 GHz, DRY
1.5 dB @ 12 GHz, DRY
1.5 dB @ 14 GHz, DRY

MAX. WINDLOAD: 125 MPH

ASSEMBLED WEIGHT, DRY: TBD
(DOES NOT INCLUDE BASEFRAME)

NOTE: RADOME PANELS CAN ABSORB UP TO 50% MOISTURE BY WEIGHT. SOAKED PANELS WILL HAVE HIGHER ATTENUATION.

DASH	COLOR	FOAM	SIDE ACCESS
-9	WHITE	YES	YES
-12	WINDOW GREY (RAL 7040)	YES	YES

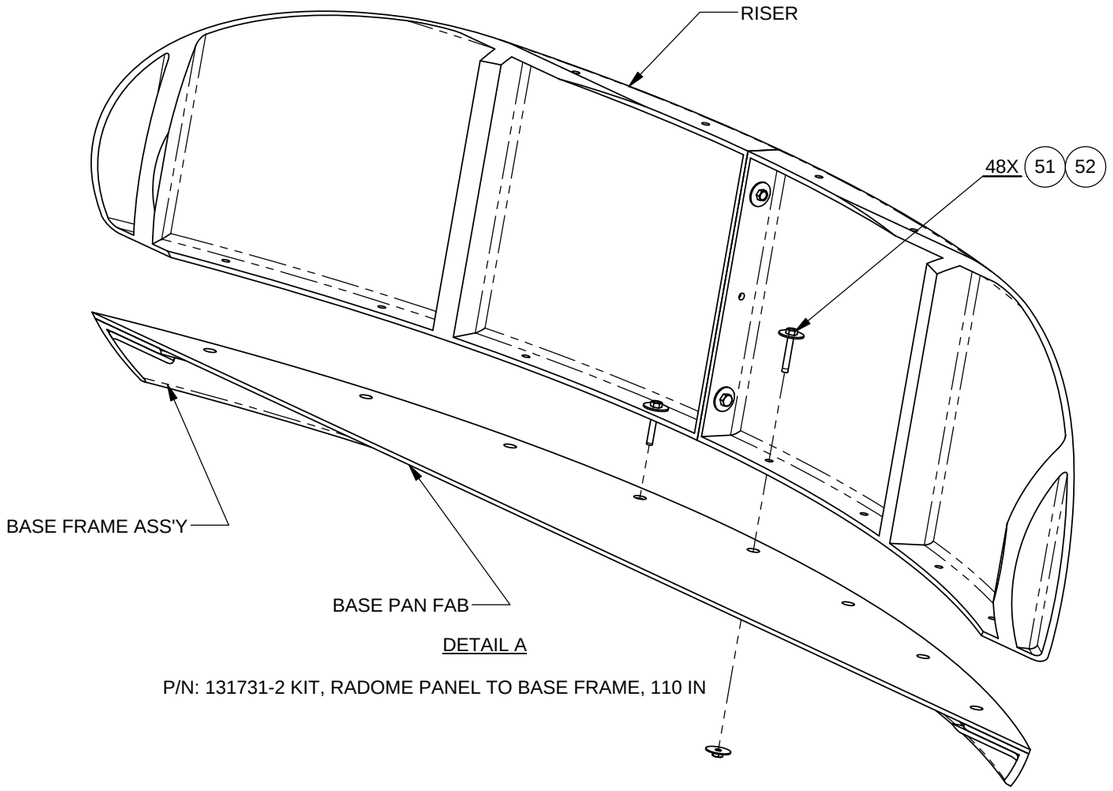
NOTES, UNLESS OTHERWISE SPECIFIED:

1. APPLY MASKING TAPE ALONG VERTICAL; AND HORIZONTAL EDGES OF ALL PANELS PRIOR TO CAULKING.
2. USE SILICON ADHESIVE TO SEAL VERTICAL AND HORIZONTAL EDGES OF ALL PANELS, RADOME CAP, AND BASE PAN UNDER PANELS.
3. APPLY ADHESIVE PER SEA TEL SPEC. 121730 TO ALL THREADED FASTENERS AT TIME OF FINAL ASSEMBLY AND TORQUE TO SEA TEL SPEC. 122305.
4. USE DRAWING IN CONJUNCTION WITH P/N: 124818-4.
5. RADOME HW KIT (P/N: 124818-4) CONTAINS EXTRA HW.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°
INTERPRET TOLERANCING PER ASME Y14.5 - 2009

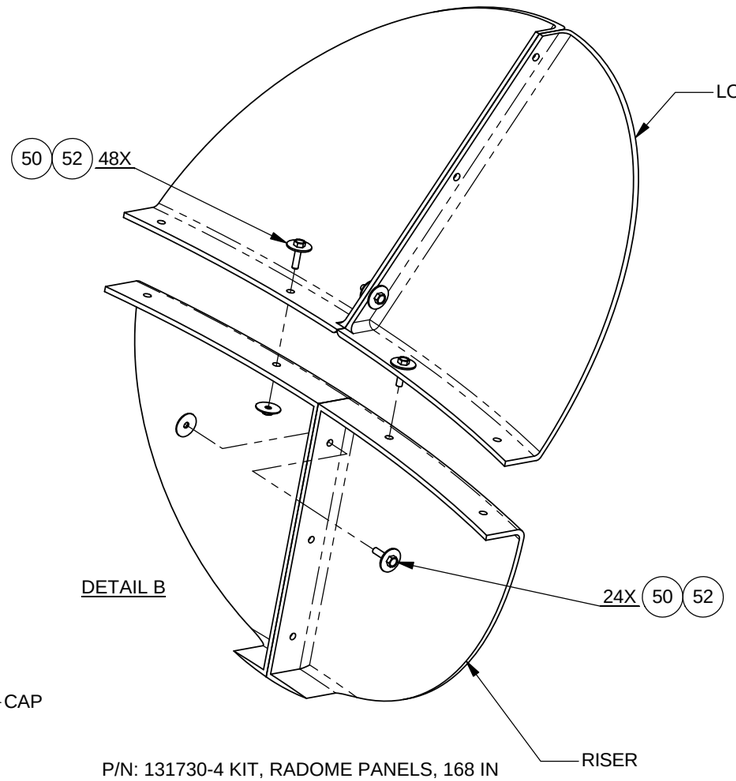
SCALE 1 : 60

DESIGNER/ENGINEER:		DRAWN BY: SCC	Sea Tel COBHAM Tel. 925-798-7979 Fax. 925-798-7986
WEIGHT: 822.204 LBS		DRAWN DATE: 5/4/2005	
MATERIAL: N/A		APPROVED BY:	TITLE: RADOME ASS'Y, 168 IN
FINISH: N/A		APPROVED DATE:	
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:30	DRAWING NUMBER: 111849	REV: W
3rd ANGLE PROJECTION		FIRST USED:	SHEET NUMBER: 1 OF 2



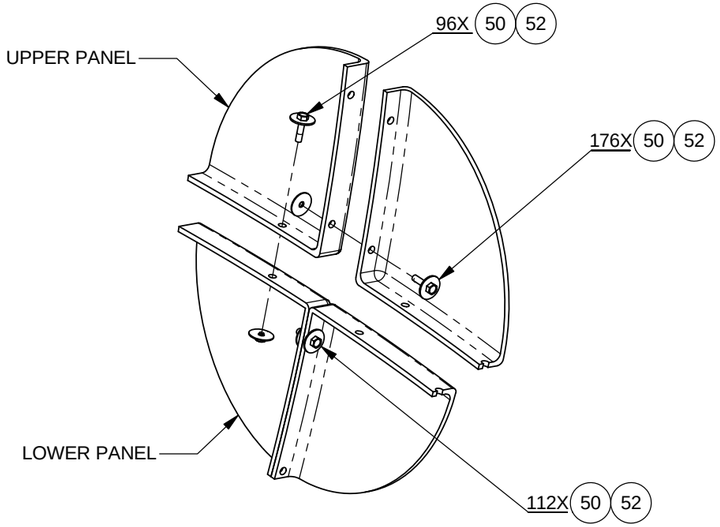
DETAIL A

P/N: 131731-2 KIT, RADOME PANEL TO BASE FRAME, 110 IN



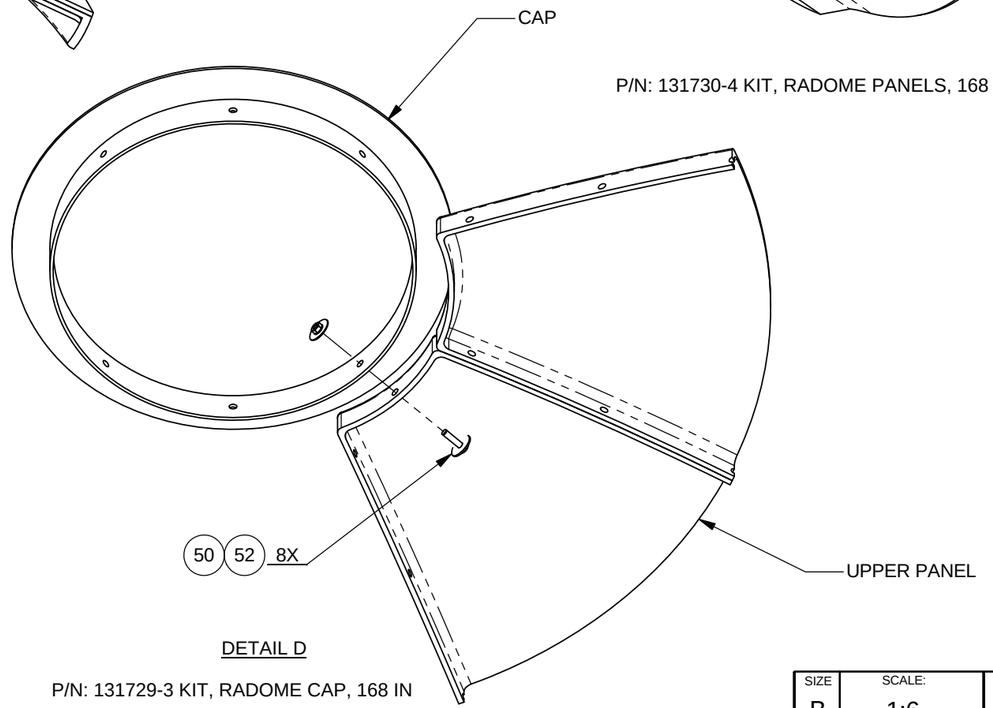
DETAIL B

P/N: 131730-4 KIT, RADOME PANELS, 168 IN



DETAIL C

P/N: 131730-4 KIT, RADOME PANELS, 168 IN



DETAIL D

P/N: 131729-3 KIT, RADOME CAP, 168 IN

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:6	111849	W
		SHEET NUMBER 2 OF 2	

BOM Explosion Report

Item Number: 115912-1

Description: BASE FRAME ASSY, 110 IN, W/PAN ACCESS, STEEL

Item Revision: H.02 ECO-00024353

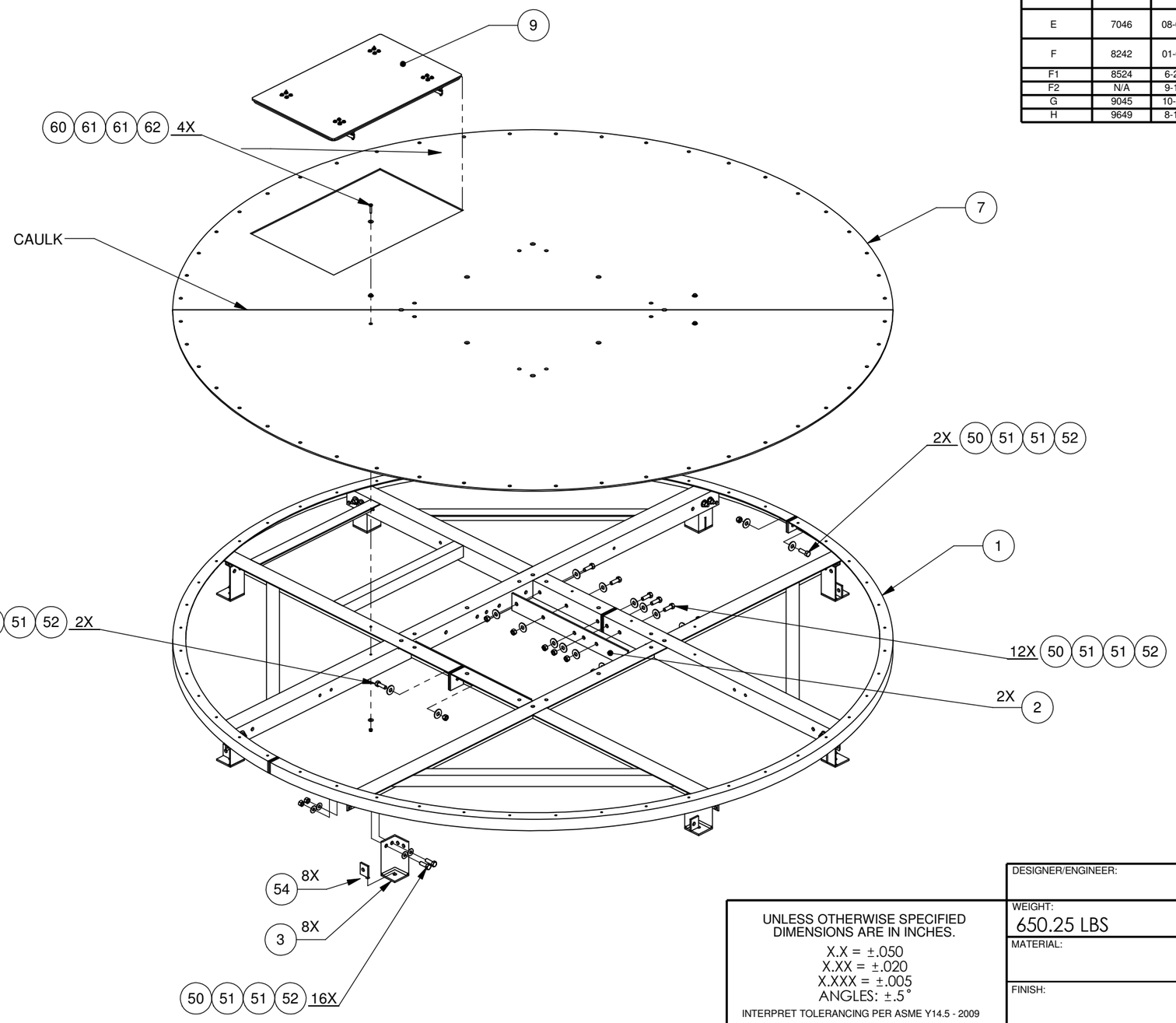
Date as of: 04/11/2018 09:54:15 AM PDT

Find Num	Qty	Inventory Unit (LN6)	Number	Rev	Description / Title	BOM Notes
0	1		97-115912-H	H DCO-00009894	ASSY DRAWING, BASE FRAME, 110 IN	
1	1	ea	111811-2	N MCO-00035074	BASE FRAME WELDMENT, STEEL	
2	2	ea	111812-1	B ECO-00008542	PLATE, SPLICE, STEEL	
3	8	ea	111814-1	C ECO-00008542	BASE FRAME FOOT, 6-INCH, STEEL	
7	1	ea	111787-2	K.01 MCO-00035074	RADOME BASE PAN FAB, 168 IN, W/DOOR	
9	1	ea	120191-2	C.04 ECO-00008543	RADOME PAN ACCESS ASSY, WHITE	
10	1	ea	124822-3	H.02 ECO-00026448	HARDWARE KIT, BASE FRAME ASSY, 110 IN	
11	1	ea	131433	A ECO-00008545	CRATE, 14400-168 BASE, OD: 116X63X19	
		ea	115912-1	H.02 ECO-00024353	BASE FRAME ASSY, 110 IN, W/PAN ACCESS, STEEL	

Created By: Mike Needham

Create Time: 04/11/2018 09:55:14 AM PDT

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
D1	N/A	01-31-06	ADDED -3 NOTE TO DASH TABLE	K.D.H.
D2	N/A	7/10/07	MODIFED DASH NUMBER BLOCK, REMOVED STL, 6 IN FT FROM ALL DESCRIPTIONS	LAE
E	7046	08-02-10	ADD NOTE S 1 & 2. UPDAT " HW KIT, ITEM 10, LOM TABLE" PER RED LINES. TITLE WAS " BASE FRAME ASS'Y, 168 IN RADOME". ADD SHEET 2 TO SHOW BASE STAND CONFIGURATIONS.	SL
F	8242	01-05-11	ADD ITEMS 80-83 ON HARDWARE KIT, ITEM 10, LIST OF MATERIALS TABLE	SL
F1	8524	6-20-11	UPDATE STANDARD NOTES & TITLE BLOCK; ADD DWG REFERENCE 128223-1 TO NOTE 2 ADD VIEW FOR 14600-70 (SHEET 2)	K.D.H.
F2	N/A	9-13-11	ADD -5	K.D.H.
G	9045	10-28-11	-5 ONLY, ADD ITEM 4; SHEET 2, ADD VIEW OF -5	K.D.H.
H	9649	8-13-14	ADDED ITEM 55,75; ITEM 52 CHANGED QTY 32; ITEMS 71,72,73,74 CHANGED QTY 4	MT



SEE SHEET 2 FOR
BASE STANDS CONFIGURATIONS

HARDWARE KIT, ITEM 10, LIST OF MATERIALS		
ITEM	QTY	DESCRIPTION
50	32	SCREW, HEX HD, 1/2-13 X 1-1/2, S.S.
51	64	WASHER, FLAT, 1/2, S.S.
52	32	NUT, HEX, 1/2-13, S.S.
54	8	WASHER, STAND, OFFSET
55	4	WASHER, STAND, (CNTR) P/O 11
60	4	SCREW, HEX HD, 1/4-20 X 1-1/4, S.S.
61	8	WASHER, FENDER, 1/4, (1 IN OD), S.S.
62	4	NUT, HEX, 1/4-20, S.S.
70	4	SCREW, HEX HD, 1/2-13 X 3, S.S.
71	4	SCREW, HEX HD, 1/2-13 X 1-3/4, S.S.
72	4	WASHER, LOCK, 1/2, S.S.
73	4	WASHER, FLAT, 1/2, S.S.
74	4	NUT, HEX, 1/2-13, S.S.
75	4	SCREW, HEX HD, 1/2-13 X 2, S.S. P/O 11
80	8	SCREW, HEX HD, 3/8-16 X 1-1/2, S.S.
81	8	WASHER, LOCK, 3/8, S.S.
82	8	WASHER, FLAT, 3/8, S.S.
83	8	NUT, HEX, 3/8-16, S.S.

DASH	DESCRIPTION
-1	W/ PAN ACCESS
-2	W/O PAN ACCESS
-3	W/O BASE PAN
-4	W/PAN ACCESS, 14600
-5	W/PAN ACCESS, INT AC

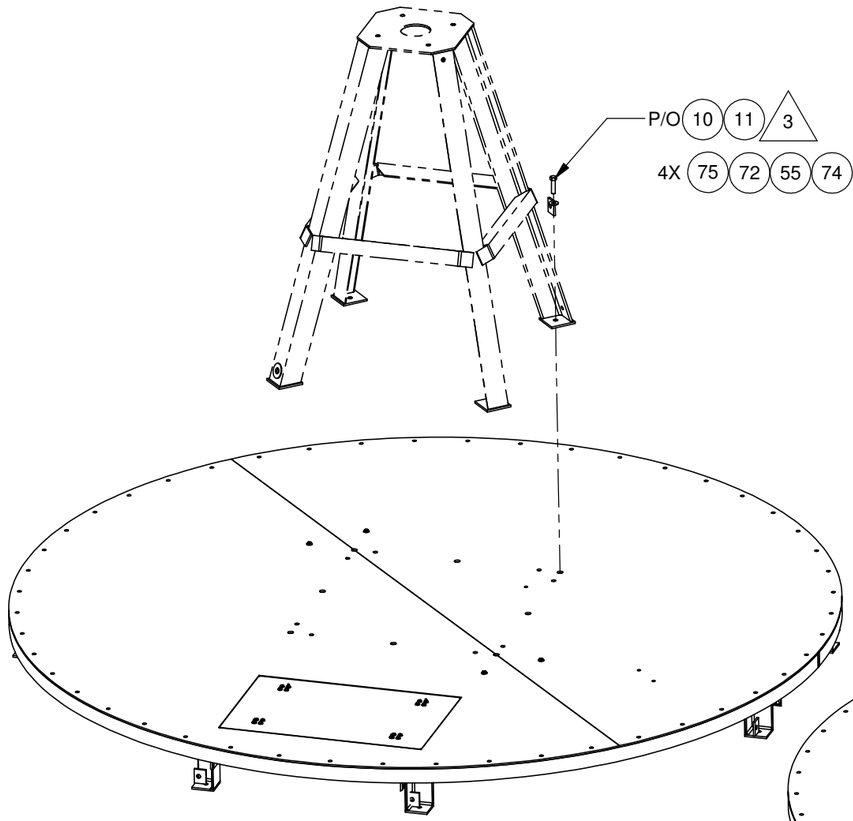
NOTES: UNLESS OTHERWISE SPECIFIED

1. MANUFACTURE PER SEATEL STANDARD 122298.
2. USE DRAWING IN CONJUNCTION WITH P/N: 124822-3, AND 128223-1 FOR 14600.

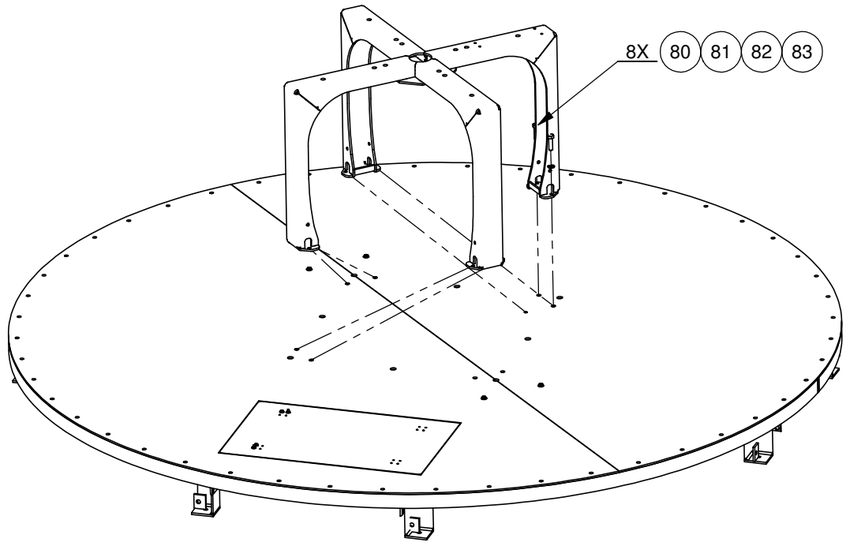
3 USE ONLY FOR -4. P/O 10 11

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
X.X = ±.050
X.XX = ±.020
X.XXX = ±.005
ANGLES: ±.5°
INTERPRET TOLERANCING PER ASME Y14.5 - 2009

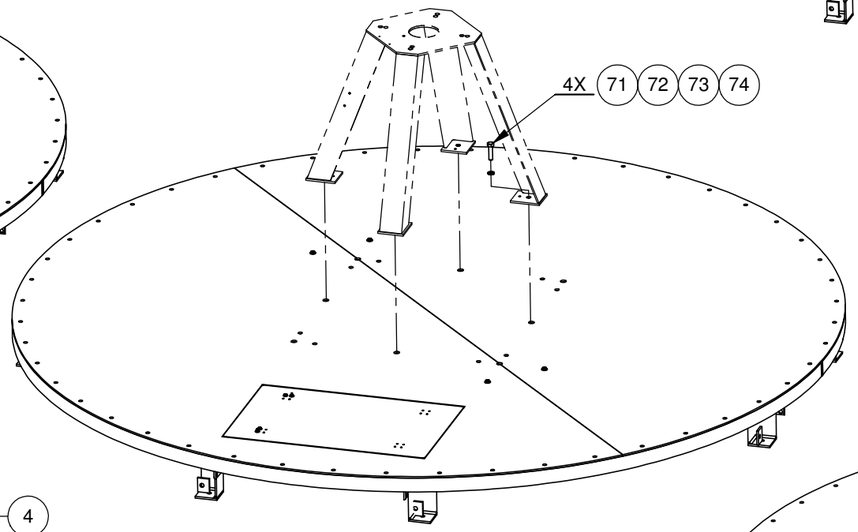
DESIGNER/ENGINEER:		DRAWN BY: MAB	Sea Tel COBHAM Tel. 925-798-7979 Fax. 925-798-7986
WEIGHT: 650.25 LBS		DRAWN DATE: 6/27/2000	
MATERIAL:		APPROVED BY:	TITLE: BASE FRAME ASS'Y, 110 IN
FINISH:		APPROVED DATE:	
SURFACE ROUGHNESS:	SIZE: B / SCALE: 1:18	DRAWING NUMBER: 115912	REV: H
3rd ANGLE PROJECTION		FIRST USED:	SHEET NUMBER: 1 OF 2



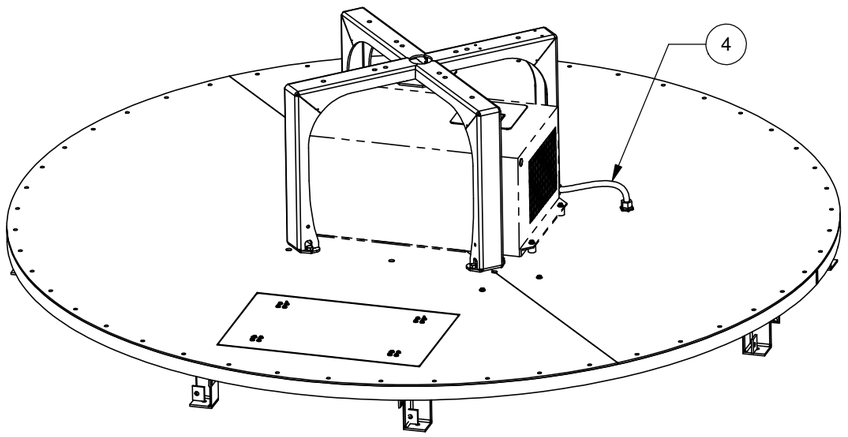
14600 BASE



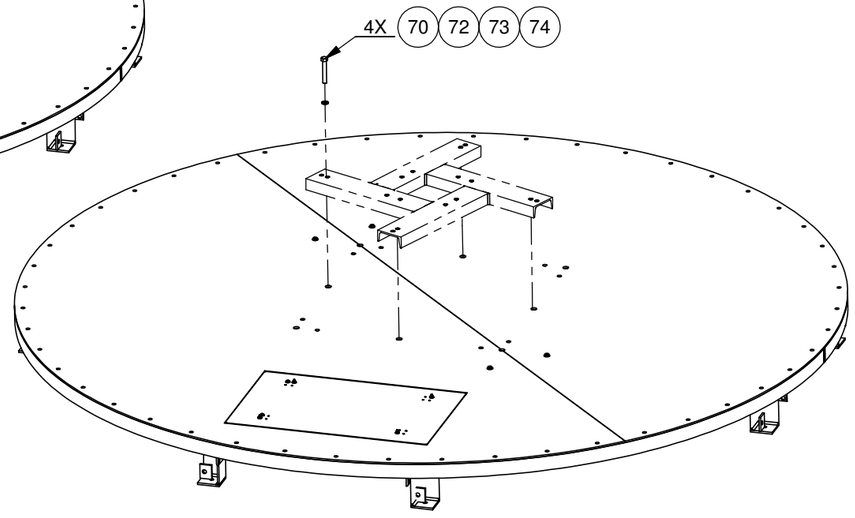
SPIDER MOUNTING BASE



SPACER BASE STAND



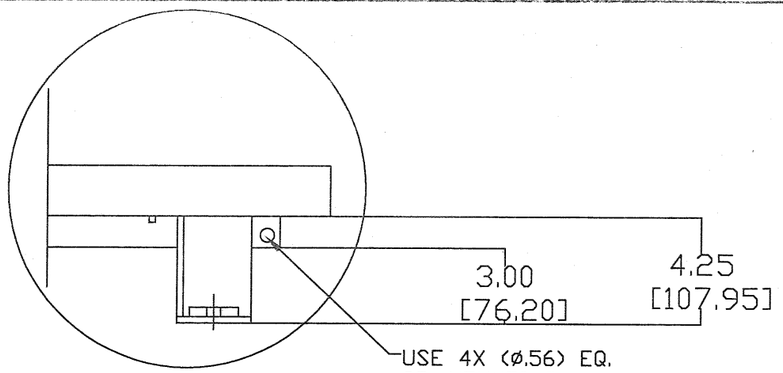
-5



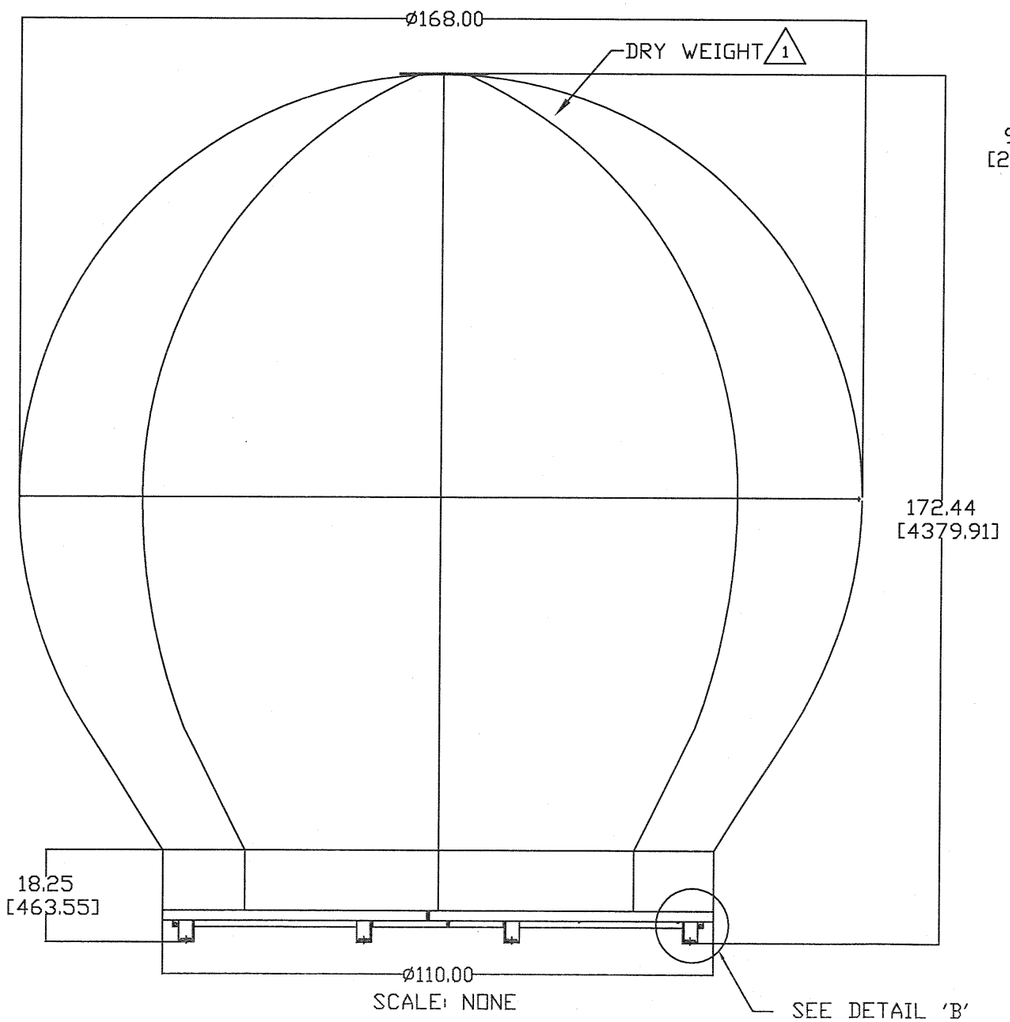
BASE CROSS

SIZE	SCALE:	DRAWING NUMBER	REV
B	1:20	115912	H
		SHEET NUMBER 2 OF 2	

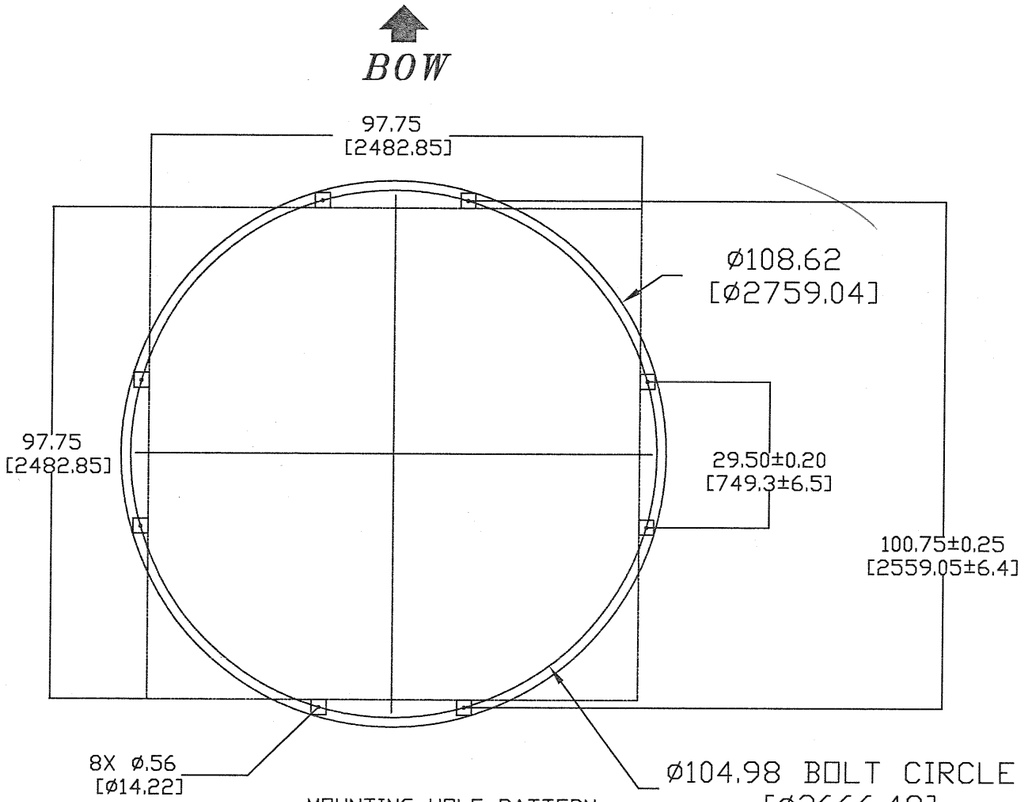
REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A1	N/A	09-22-04	SHT2; ADDED WEIGHTS, A/C WS 116908-4	AKN
A2	N/A	3-7-08	ADDED MISSING DIMENSIONS	KDH
B	7028	12-21-09	DIM DIA.2666.49] WAS DIA. 2662.93] DIMS. 29.50±0.20 WAS 29.0±0.25 & 749.3±6.5] WAS [736.6±6.5]	MSF



DETAIL A
SCALE: 5X



SCALE: NONE



MOUNTING HOLE PATTERN

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. FIBERGLASS MAY ABSORB UP TO 50% BY WEIGHT, OF MOISTURE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5° INTERPRET TOLERANCING PER ASME Y14.5M - 1994	DRAWN BY: LK	Sea Tel COBHAM Tel. 925-798-7979 Fax. 925-798-7986	
	DRAWN DATE: 7-28-04		
	APPROVED BY: CM	TITLE: INSTALLATION ARRANGEMENT	
MATERIAL: N/A	APPROVED DATE: 12/21/09		
FINISH: N/A	SIZE: C / SCALE: 1:20	DRAWING NUMBER: 123381	REV: B
3rd ANGLE PROJECTION	FIRST USED:	SHEET NUMBER: 1 OF 2	

TABLE 1: GENERAL ASSEMBLY WEIGHT

ITEM DESCRIPTION	NET WEIGHT (LB.)
14400–2	855
14400–4	855
14600–11	1255

TABLE 2: BASE ASSEMBLY WEIGHT

ITEM DESCRIPTION	WEIGHT (Lb.)
BASE ASSEMBLY: P/N115912–1 (STEEL BASE, 6 IN FOOT)	___
BASE ASSEMBLY: P/N119569 (21 IN LEGS)	–

TABLE 3: RADOME ASSEMBLY WEIGHT

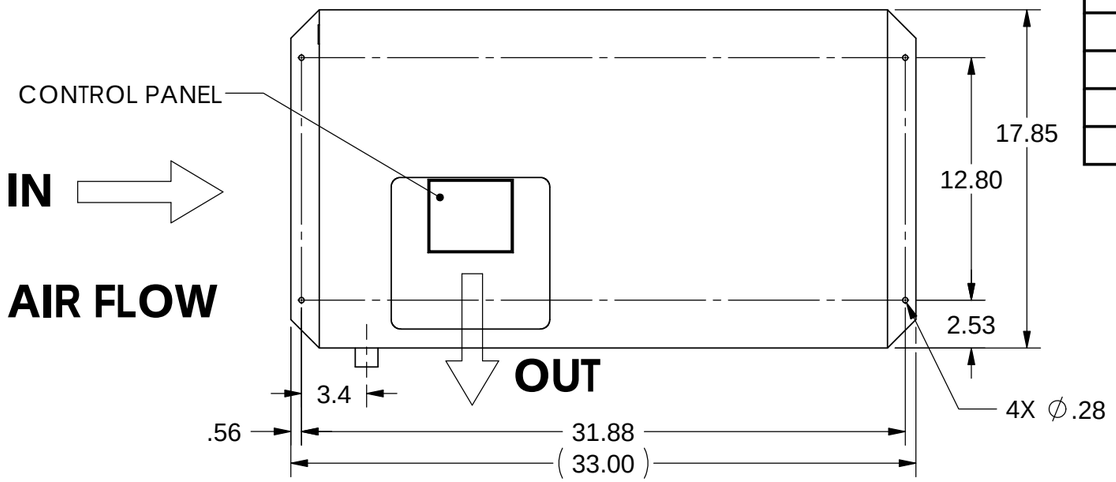
ITEM DESCRIPTION	WEIGHT (Lb.)
RADOME ASSEMBLY: P/N 111849 (DRY WEIGHT)	TBD
	TBD

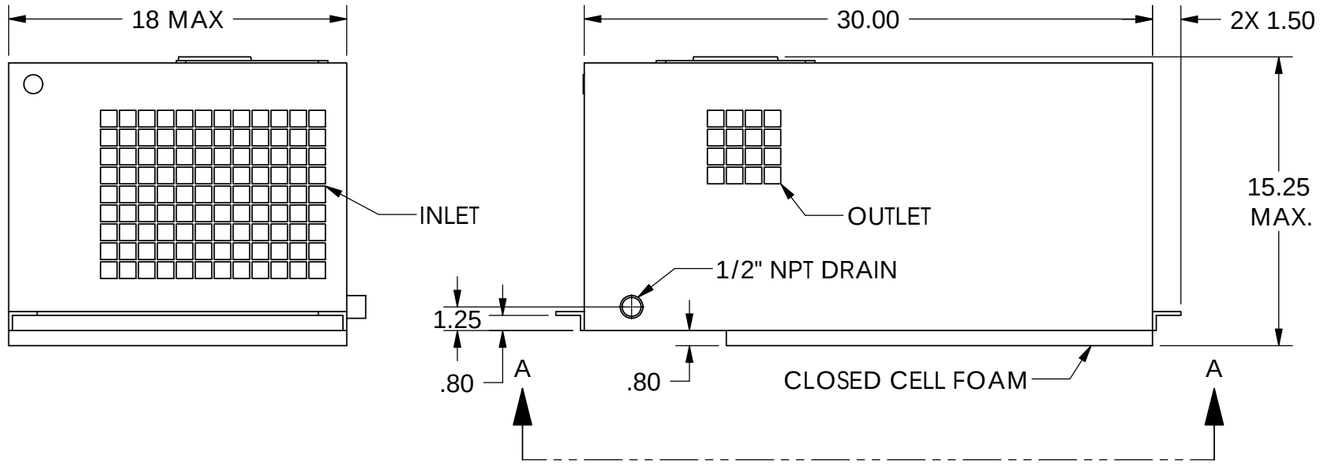
TABLE 4: A/C WEIGHT

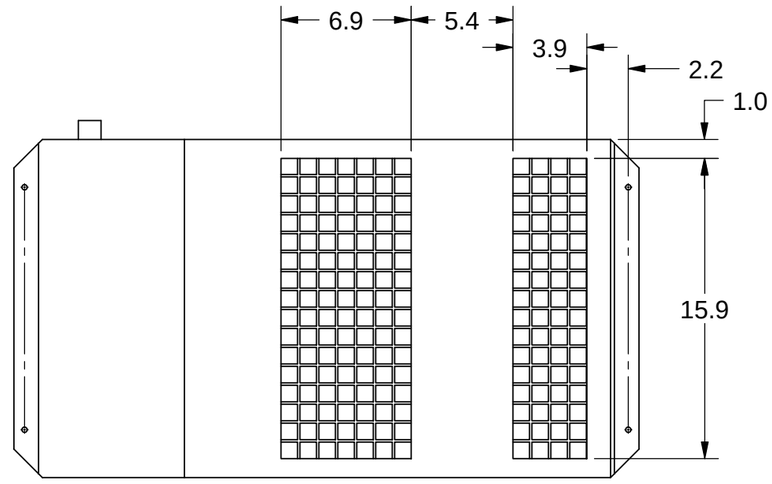
ITEM DESCRIPTION	WEIGHT (Lb.)
AIR COOLED ENVIRONMENT UNIT: P/N 123496	95

SIZE	SCALE:	DRAWING NUMBER:	REV:
B	1:20	123381	B
		SHEET NUMBER:	2 OF 2

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	4609	10-05-04	RELEASED TO PRODUCTION	AMN
B	4858	5-5-05	ADD REFERENCE 121113	LR
C	N/A	3-2-06	CHANGED TO TABLE FORMAT	V.S.
C1	N/A	1-9-07	CREATED CAD OUTLINE DRAWING	RJW
C2	N/A	04/18/14	ADDED INRUSH/STARTUP CURRENT FIELD TO DASH TABLE.	KRB







VIEW A-A

BOTTOM VIEW

Dash	Rated Cooling Capacity (BTU)	Voltage (VAC)	Inrush/ Startup Current	Run Current	Frequency (Hz)	Refrigerant	System Controller	Manufacturer	Manufacturers Part Number	Manufacturers Description
-1	16,000	110	-	20A	60	R417A	Digital	Dometic	202000307	HSA16KC/2 417A RADOME 115V
-2	16,000	220	18A	12A	50/60	R417A	Digital	Dometic	202000304	HSA16KCZ/2 417A RADOME 230/1
-3	16,000	230	18A	12A	60	R417A	Digital	Dometic	TBD	TBD
-4	16,000	230	18A	12A	50	R417A	Digital	Dometic	202000354	HSA16KCZ50 417A 220V/50/1

DRAWN BY: RJW
DRAWN DATE: 1/8/2007
APPROVED BY:
APPROVED DATE:

Sea Tel
COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: AIR CONDITIONER, INTERNAL

SIZE: B | SCALE: NONE | DRAWING NUMBER: 123496 | REV: C2

FIRST USED:

SHEET NUMBER 1 OF 1

1.0 Purpose. To define the installation procedure for installing strain reliefs in the base pan of the radome.

2.0 Scope. This installation procedure applies to fiberglass base pans used in Sea Tel's 75", 81" and 110" base frames.

3.0 Tools/materials.

1. Electric drill.
2. Small drill bit 1/8" dia. (3-4mm dia.).
3. Hole saw, 1 3/8" dia. (35 mm), with mandrel and ¼" dia. pilot drill.
4. Medium file.
5. Two 1-1/2" (38 mm) adjustable pliers.
6. Fiberglass resin & catalyst, (marine grade) - at least 2 oz (50 cc).
   Such as Tap Plastics Marine Vinyl Ester Resin with MEKP Catalyst.
   Note: Use liquid resin, instead of paste type, due to better penetration.
7. Mixing cup – 4 oz (100 cc).
8. Disposable brush.
9. Strain Relief Assembly 124903-1, (one per cable).

4.0 Responsibilities. It is the responsibility of the installer to observe all standard safety precautions, including eye, slip, and chemical protection when performing this procedure.

5.0 Procedure.

5.1 Planning

Strain reliefs should be installed near center of the base pan so that cable installed will not cause a tripping hazard inside the radome. Only one cable may be installed in each strain relief. Center-to-center spacing of the holes for the strain reliefs must not be less than 1.80".

- Typical Transmit/Receive systems will need up to 4 strain reliefs; TXIF coax, RXIF coax, Pedestal Power and Marine Air Conditioner Power.
- Typical TVRO antennas may require up to 7 strain reliefs; 2 C-band coaxes, up to 4 Ku-band coaxes and Pedestal Power.

5.2 Measure, mark and drill pilot holes

Accurately measure and mark the hole locations on the base pan from the inside of the radome. Drill a pilot hole through each planned location using the small drill bit (~1/8" dia) and only light pressure.

5.3 Use the hole saw from the outside with light pressure.

CAUTION: Using the hole saw from the inside is likely to damage the Gel Coat on the underside of the base pan.

CAUTION: Heavy pressure on the hole saw from the inside is likely to damage the Gel Coat and splinter the fiberglass.

Working from the outside at each pilot hole, use a 1-3/8" hole saw to make the holes for each of the planned strain reliefs.

After holes are drilled, CAREFULLY use a file to clean the edges of the the holes.

Test fit the strain reliefs in each location, then, make adjustments as necessary. Do NOT install strain reliefs at this time.

5.4 Sealing the hole edges

CAUTION: Cut edges can allow water and/or ice ingress and weaken the fiberglass laminate or structural foam. It is essential to seal all cut edges thoroughly with fiberglass resin to preserve the base pans structural strength.

CAUTION: Fiberglass paste or RTV silicone sealant will not wick into and seal the fiberglass strands as well as fiberglass resin, ONLY use fiberglass resin (such as TAP PLASTICS MARINE VINYL ESTER, or equivalent) for sealing the cut edges.

Follow the manufacturer's instructions to mix a small amount of fiberglass resin and catalyst, then working quickly, use a disposable brush to apply mixed fiberglass resin to the hole edges, both inside and out.

Allow the fiberglass resin to set per resin manufacturer's instructions.

Note: Like all chemical reactions, set time will be temperature/humidity dependent.

5.5 Refer to strain relief assembly drawing 124903 (attached)

Being careful not to damage either the radome or the strain relief threads, use adjustable pliers to install strain reliefs into the base pan with the locking nuts & sealing rings.

5.6 Installing Cables

Pass the end of the cable through the strain relief cap, washer, rubber stopper and then trough the body of the strain relief into the radome interior.

Pull sufficient excess cable into the radome to route the cable to its intended termination point. Once cables have been installed, slide the strain relief cap, washer and rubber stopper up into the body of the strain relief.

Tighten the cap until the rubber compresses sufficiently to prevent the cable from sliding in the body of the strain relief.

6.0 Records. N/A.

7.0 Training. N/A

8.0 References.

Strain relief assembly drawing (P/N: 124903)

SINGLE LEVEL MFG BILL OF MATERIAL

FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	109258-8	G2	STRAIN RELIEF	
2	1 EA	124904	A	LOCKNUT	
3	1 EA	124905	A	SEALING RING	
4	1 EA	124354-1	A1	RUBBER STOPPER	
5	1 EA	114580-033		WASHER, FLAT, 1/2, S.S.	

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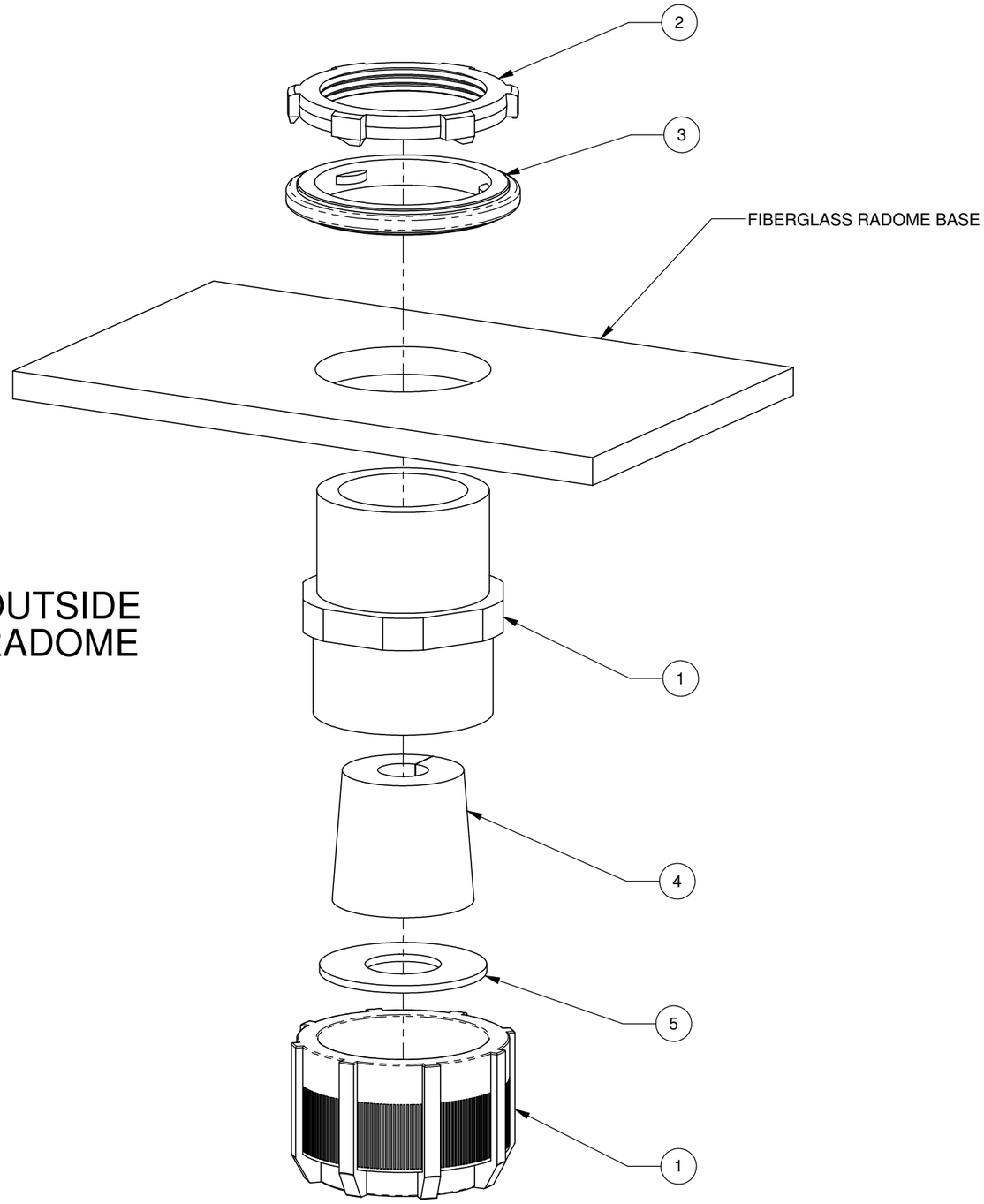
COBHAM

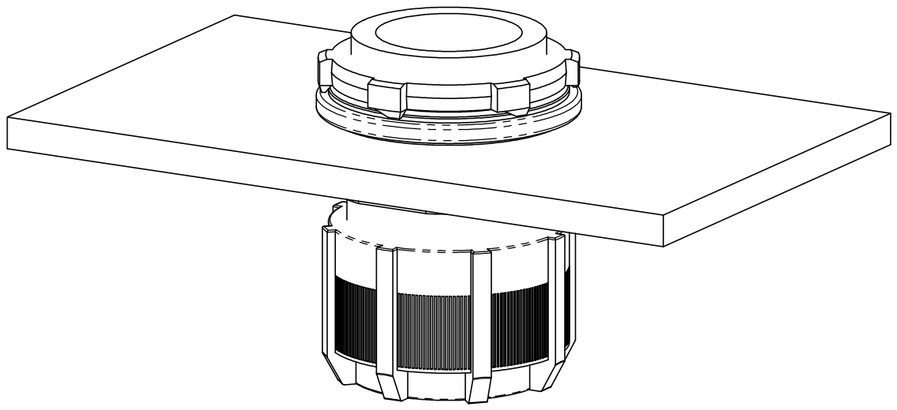
STRAIN RELIEF ASS'Y

PROD FAMILY	EFF. DATE	SHT	DRAWING NUMBER	REV
COMMON	1/24/2012	1 OF 1	**124903-1**	**B2**

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	N/A	1-9-06	RELEASED TO PRODUCTION, WAS REV X3.	MSF
B	5266	8-7-06	ADD NOTE 3.	SL
B1	5872	10-11-07	DELETED ADHESIVE APPLICATION NOTE, NOTE 2 RE-WRITTEN.	LAE
B2	N/A	5-7-10	CORRECTED MODEL, UPDATED TITLE BLOCK.	JZ



OUTSIDE
RADOME



NOTES: UNLESS OTHERWISE SPECIFIED

1. DISCARD RUBBER BUSHING AND PLASTIC RETAINING RING FROM STRAIN RELIEF AT ASSEMBLY.
2. WHEN PRE-ASSEMBLED, PLACE ALL COMPONENTS IN ZIPLOC BAG AND LABEL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. X.X = ±.050 X.XX = ±.020 X.XXX = ±.005 ANGLES: ±.5° INTERPRET TOLERANCING PER ASME Y14.5M - 1994	DRAWN BY: V.S. DRAWN DATE: 10-21-05 APPROVED BY: APPROVED DATE:	Sea Tel COBHAM Tel. 925-798-7979 Fax. 925-798-7986 TITLE: STRAIN RELIEF ASSEMBLY	
MATERIAL: N/A			
FINISH: N/A	SIZE: B SCALE: 1:4	DRAWING NUMBER: 124903	REV: B2
3rd ANGLE PROJECTION	FIRST USED:	SHEET NUMBER 1 OF 1	

SINGLE LEVEL MFG BILL OF MATERIAL

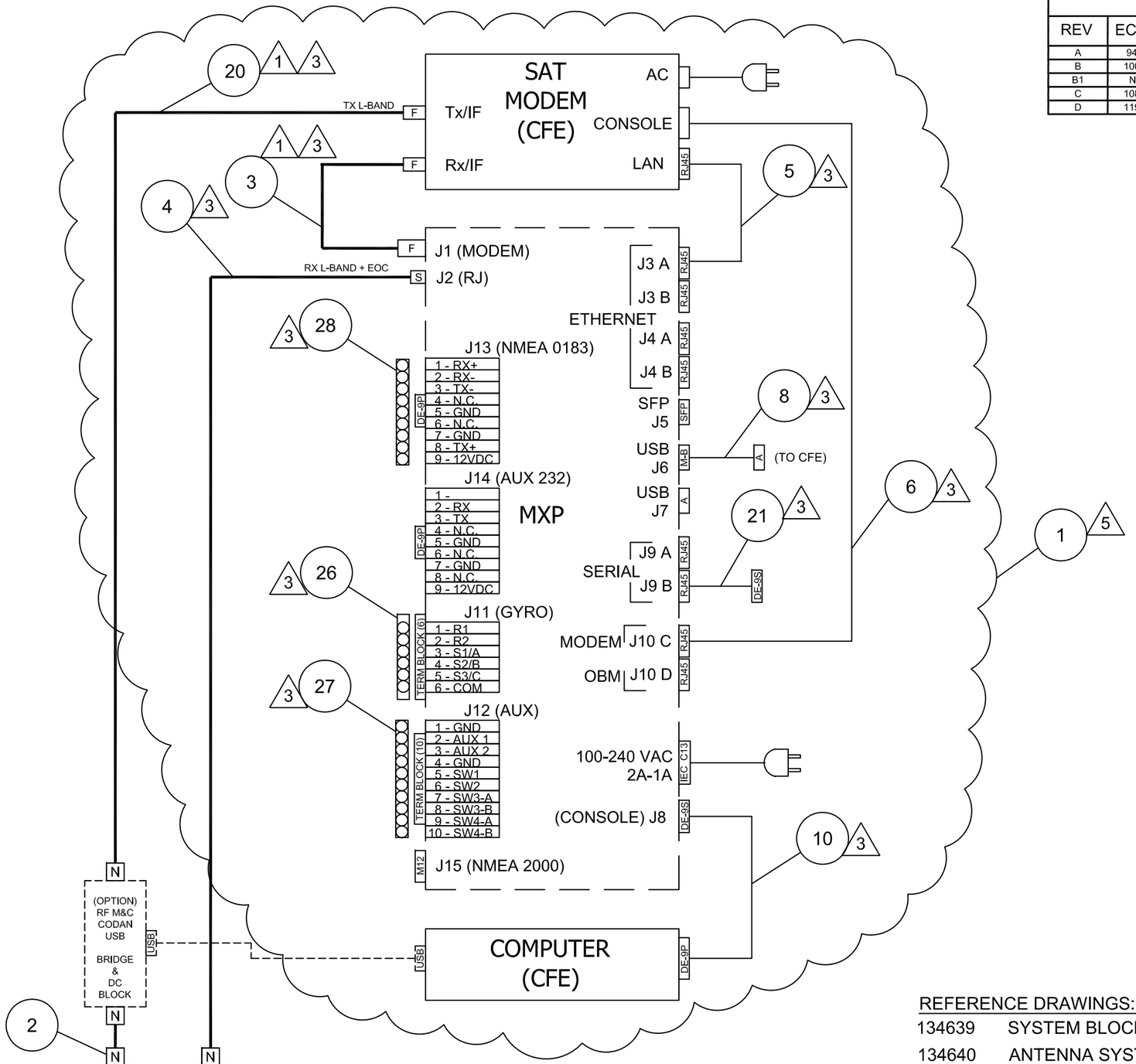
FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	138633-4	B1	BDE CABLE KIT, 4012GX (MXP)	
2	1 EA	136872	A1	BRACKET ASSY, CONNECTOR, RACK MOUNT	
3	1 EA	139410	B	BOX, ACCESSORY	

Sea Tel
COBHAM

BELOW DECK KIT, MXP

PROD FAMILY	EFF. DATE	SHT	DRAWING NUMBER	REV
COMMON	5/5/2014	1 OF 1	**134563-1**	**D**

REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
A	9465	03-30-12	RELEASE TO PRODUCTION; REV WAS X6	HT
B	10089	12-5-12	ADD ITEM 1; REMOVE ALL ITEMS BUT ITEM 21; UPDATE NOTES; ADD MISSED SHEET 2 BACK FR REV X6	SL
B1	N/A	2-26-13	NOTE 5 ADDED	MSF
C	10823	7-1613	DELETED LEADER AND CABLE FROM MXP ETHERNET PORT J3 B.	MSF
D	11983	10-17-13	ITEM 3 ACCESSORY BOX ADDED TO THE BOM.	MSF



SHEET	DESCRIPTION
1	iDirect 5000 Series
2	Comtech CDM-570L

NOTES UNLESS OTHERWISE SPECIFIED:

1. 75 OHM SATELLITE MODEM CONFIGURATION SHOWN. FOR 50 OHM MODEM CONFIGURATION, REPLACE ITEM 3 WITH ITEM 20 ON THE RX/IF PATH, AND ITEM 20 WITH ITEM 23 (REFER TO BOM) ON THE TX/IF PATH.
2. 50 OHM SATELLITE MODEM CONFIGURATION SHOWN. FOR 75 OHM MODEM CONFIGURATION, REPLACE ITEM 20 WITH ITEM 3 ON THE RX/IF PATH, AND ITEM 23 WITH ITEM 20 (REFER TO BOM) ON THE TX/IF PATH.
3. PART CI OF ABLE KIT; ITEM NUMBERS REFER TO THE CABLE KIT BOM
4. MFR PER SEA TEL SPEC 122298.
5. BUBBLE ID NO FROM 3-28 ARE ITEM 1. (P/N 138633-4). MXP AND CFE EQUIPMENT NOT INCLUDED.

REFERENCE DRAWINGS:

134639 SYSTEM BLOCK DIAGRAM,

134640 ANTENNA SYSTEM SCHEMATIC

DRAWN BY:	RML
DRAWN DATE:	6/7/2011
APPROVED BY:	
APPROVED DATE:	

Sea Tel COBHAM
Tel. 925-798-7979 Fax. 925-798-7986

TITLE: BELOW DECK KIT

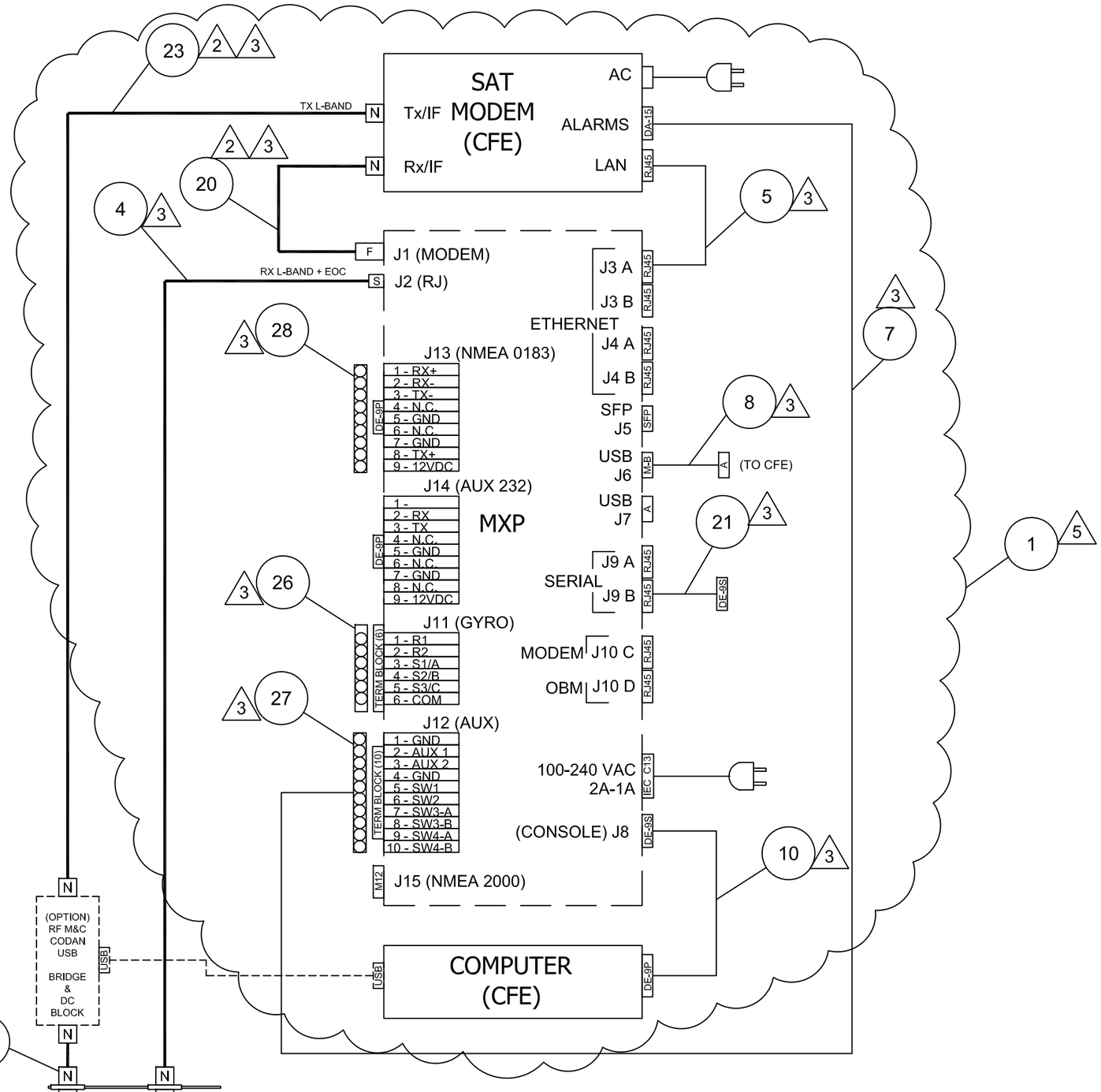
4012 GX (MXP)

SIZE	SCALE:	DRAWING NUMBER	REV
B	NONE	134563	D

FIRST USED: 4012

SHEET NUMBER 1 OF 2

DOCUMENT NO. 124225-4_A



SIZE	SCALE:	DRAWING NUMBER:	REV:
B	NONE	134563	D
		SHEET NUMBER:	2 OF 2

DOCUMENT NO. 124225-4_A