

**INSTALLATION AND OPERATION MANUAL
FOR SEA TEL MODEL
DAC-2202 ANTENNA CONTROL UNIT**



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Sea Tel is an ISO 9001:2000 registered company. Certificate Number 19.2867 was issued August 12, 2005. Sea Tel was originally registered on November 09, 1998.

R&TTE CE

The Sea Tel DAC-2202, or DAC-2302, Antenna Control Unit used with the Sea Tel Antenna complies with the requirements for Radio and Telecommunication Terminal Equipment. A copy of the R&TTE Declaration of Conformity for this equipment is contained in the Antenna Manual for your system.



The Sea Tel DAC-2202, or DAC-2302, Antenna Control Unit contains FCC compliant supervisory software to continuously monitor the pedestal pointing accuracy and use it to control the "Transmit Mute" function of the satellite modem to satisfy the provisions of FCC 47 C.F.R. § 25.222(a)(l)(iii). A copy of the FCC Declaration of Conformity for this equipment is contained in the Antenna Manual for your system.

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1. Introduction

This manual describes the Sea Tel Model DAC-2202 Series of shipboard Tracking Antenna Control Units (ACU). System information, installation, setup, operating instructions, functional testing and maintenance for the ACU are also contained herein.

This ACU allows you to control the antenna that it is connected to. It also allows you to connect your Gyro Compass to provide heading input to the system for accurate targeting of satellites.

1.1. General Description of System

The Antenna Control Unit (ACU) has been designed and manufactured so as to be inherently reliable, easy to maintain, and simple to operate. Except for start-ups, or when changing to operate with different transponders or satellites, the equipment essentially permits unattended operation.

This ACU is housed in a standard 1 Unit high, 19-inch rack mount enclosure. The front panel contains function keys used to select the desired information to be displayed, and/or changed. Data is displayed on a 2 line 20 character display. All external connections are interfaced through connectors mounted on the rear panel.

The shipboard gyrocompass input is used as the long-term azimuth reference. The ACU accepts gyro compass input from Step-By-Step OR 1:1, 36:1, 90:1 or 360:1 Synchro OR NMEA 0183 serial interface. A GPS antenna is provided on your antenna pedestal to provide Latitude and Longitude location for the system.

The ACU automatically calculates the Elevation, Azimuth and Polarization pointing angles based on the ships Latitude, Longitude and the desired Satellite Longitude position. A programmable pattern search will automatically scan the area for a desired satellite if no signal is found. These two features make locating a new satellite very easy.

The internal Satellite ID Tracking Receiver (DVB Receiver) uses received satellite signal input to keep the antenna peaked on satellite. This internal digital receiver allows you to tune it to any frequency in the 950 to 2150 MHz range for tracking a wide bandwidth satellite signal.

It is normally connected to an Antenna and other equipment to form a system. The system consists of two major groups of equipment; an above-decks group and a below-decks group. Each group is comprised of, but 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 operation, this system requires only an unobstructed line-of-sight view to the satellite, GPS Latitude & Longitude input (provided with antenna pedestal), Ship's Gyro Compass input and AC electrical power.

The following text provides a basic functional overview of the system components and component interconnection as referred to in the System Block Diagram(s) for your model antenna.

Television Receive Only (TVRO) Systems are comprised of two major sections: The Above-Decks Equipment (ADE) is comprised of the Sea Tel antenna & radome assembly which is mounted outside, on an upper deck location chosen for best satellite reception. The Below-Decks Equipment (BDE) includes the Antenna Control Unit and will have satellite receiver(s), TV set(s) and all other ancillary equipment that is mounted in various locations throughout the interior of the ship. Refer to your antenna manual for more specific configuration information.

Transmit/Receive (TXRX) Systems are also comprised of two major sections: The Above-Decks Equipment (ADE) is comprised of the Sea Tel antenna & radome assembly which is mounted outside, on an upper deck location chosen for best satellite reception. The Antenna inside the radome has Transmit & Receive RF equipment mounted on it. The Below-Decks Equipment (BDE) includes the Antenna Control Unit and will have satellite modem, multiplexer and all other ancillary communications equipment that is mounted in various locations throughout the interior of the ship. Refer to your antenna manual for more specific configuration information.

1.2. General Scope of This Manual

This manual describes operation and installation of this Antenna Control Unit.

1.3. Quick Overview of Contents

The information in this manual is organized into chapters; Operation, Installation, Setup, Functional Testing, Maintenance & Troubleshooting, Technical Specifications and Drawings.

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2. Operation

When power is turned ON, the ACU Display will initially show “SEA TEL INC - MASTER” and the ACU software version (ie DAC-2202 VER 6.xx). 10 seconds later, the display will switch to “SEA TEL INC - REMOTE” and “INITIALIZING” for approximately two minutes while the Pedestal Control Unit (PCU) completes initialization of the antenna pedestal and then reports its Model & Software version.

2.1. Quick Start Operation

If your system has been set up correctly and the ship has not moved since the system was used last. Operation of the system from a cold start involves the following steps.

1. Turn on the AC power switches for the Antenna Control Unit (ACU) and other Below Decks Equipment..
2. Press **NEXT** until the **Ship** menu is displayed to check the Latitude, Longitude and Heading values. Latitude and Longitude should still be correct, but may be updated if necessary. Heading, in some cases, will be 000.0 and you will have to enter the *initial* value of the ships *current* heading. Entry of ships heading is not required when your system is connected to a 1:1 Synchro or NMEA 0183 Heading Gyro Compass output. To correct the Heading value, press **ENTER 3 times** to select ship's heading (HDG) entry mode. Use the **LEFT** arrow to bring the cursor up under the ones digit, then if desired, increment/decrement it using the **UP/DOWN** arrow keys. Use the **LEFT/RIGHT** arrow keys to select other digits to modify and the **UP/DOWN** arrow key to modify them as needed to enter the current ships gyro heading. Press **ENTER** to save the value. Press **NEXT** to return to the Ship display menu.
3. If System Type parameter includes value 1, the ACU should automatically target the last satellite that was used. If it does not, press **NEXT** to the **Satellite** display menu so you can manually target the satellite. If you are targeting the SAME satellite longitude as was used last; Press **ENTER**, then the **LEFT** (or **RIGHT**) arrow and then **ENTER** to target the same satellite. If you are targeting a different satellite you will need to change the tracking parameters and then target the desired satellite, refer to the operation section for the Satellite menu below.

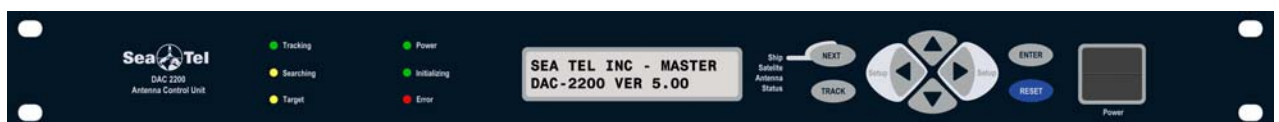
A. If no signal is found: The Tracking LED will flash for a short period of time (per the SEARCH DELAY parameter) followed by the Search LED coming **ON**. The ACU will automatically move the antenna in a spiral SEARCH pattern until the ACU receives a signal (AGC) value that is greater than the threshold value. 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.

B. If satellite signal is found AND network lock is achieved: The received signal level (AGC) will be higher than the threshold value. Tracking will take over (Tracking LED **ON**) and automatically peak the antenna position for highest receive signal level from the satellite and the satellite modem will get modem lock/receive sync. When the ACU has signal above threshold AND modem has network lock the antenna will continue to track the satellite.

B. If satellite signal is found but network lock is NOT achieved: If you're system has been setup to use the network lock/satellite ID output from the satellite modem; When signal above threshold is found but the modem does NOT get network lock (receive sync), the ACU will **re-target** in an attempt to find the satellite which has signal AND network lock. This could be due to the antenna targeting the wrong satellite, polarization failure, modem failure (not getting receive sync) or network failure (not allowing the modem to get receive sync). The ACU will continue to re-target.







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 level.

2.2. Front Panel Layout



2.3. Basic Function of Front Panel Keys

Keyboard operation is very simple and straightforward. Basic function of each key is:

	<p>Press NEXT to cycle through the four main menus; Ship, Satellite, Antenna and Status (refer to the Operation Flowcharts).</p>
	<p>Press TRACK key to toggle the state of Tracking, ON/OFF. If SEARCH is ON, pressing the TRACK key will turn search OFF.</p>
	<p>When the Antenna main menu is displayed, pressing the LEFT arrow moves the antenna left (CCW or down in azimuth). Pressing the RIGHT arrow to move the antenna right (CW or up in azimuth).</p> <p>In any sub-menu, pressing the LEFT or RIGHT arrow enters editing mode and brings up a cursor in the display. When the cursor is under a character, it is selected and can be changed (see UP/DOWN arrow below).</p> <p>(Setup) - Press and release BOTH the LEFT and RIGHT arrow keys to access the save parameters window. Press & Hold for six seconds to access the setup parameters (refer to the Setup section of this manual).</p>
	<p>When the Antenna main menu is displayed, press UP arrow to move the antenna up in elevation or the DOWN arrow to move the antenna down in elevation.</p> <p>Press the UP/DOWN arrow cycle Up and Down through the sub-menus.</p> <p>When a sub-menu item is being edited, use the UP/DOWN to increment/decrement the selected character. This steps the selected entry one increment per sequential key-press or rapidly increments the selected entry when pressed & held.</p>
	<p>At any main menu level, press ENTER to access the sub-menu items.</p> <p>When viewing one of the sub-menus, pressing the ENTER key will step down through the sub-menu items, like the DOWN arrow does.</p> <p>When editing, the cursor is visible under a character in a sub-menu (whether it has been changed or not), press ENTER to execute the present value, and return to display mode of that sub-menu. This does NOT save the new value to NVRAM.</p>
	<p>Press RESET to reset all the processors in the Antenna Control Unit. It does NOT reset the antenna.</p>

2.4. Basic Description of Front Panel Status LEDs

The basic description of the front panel LED states are:

Tracking - (Green LED)

- ON** indicates that the ACU has identified and is actively tracking the desired satellite to optimize the signal level (AGC).
- Blinking** indicates that the ACU is in search delay or is analyzing a satellite signal.
- OFF** indicates that Tracking is OFF.

Searching - (Yellow LED)

- ON** indicates that the ACU is actively searching for your satellite signal.
- OFF** indicates that SEARCH is OFF.

Target - (Yellow LED)

- ON** indicates that the antenna is TARGETING (driving) to the specified Azimuth and/or Elevation position(s).
- ON also indicates UNWRAP** in limited azimuth antennas.

Power - (Green LED)

- ON** indicates that the Antenna Control Unit is energized.

Initializing - (Green LED)

ON indicates that the Antenna is initializing. Initialization of the antenna will take approximately two minutes.

Error - (Red LED)

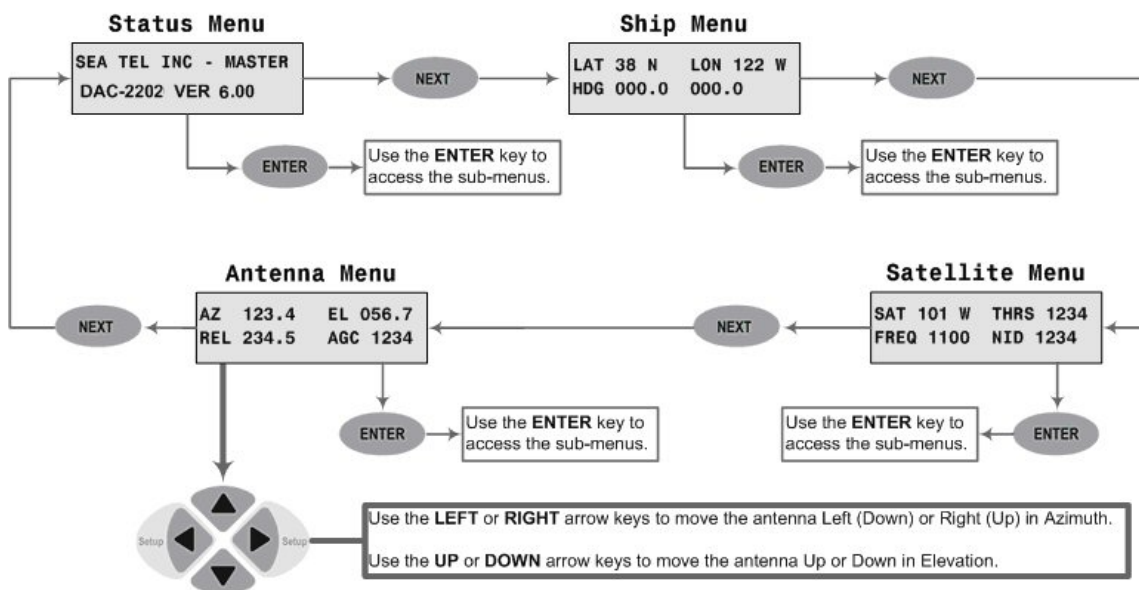
ON indicates that one, *or more*, discrete system errors have occurred. Refer to Status – Error Code information menu to determine which error(s) have occurred.

OFF indicates that no errors have occurred.

2.5. Display & Entry Operation Menus

The operation menus are arranged in four groups. Use the NEXT key to cycle through the groups, use the ENTER key to access the sub-menu of a selected group and then use the UP/DOWN arrow keys to move up and down the sub-menu items.

DAC-2202 Operation Menus

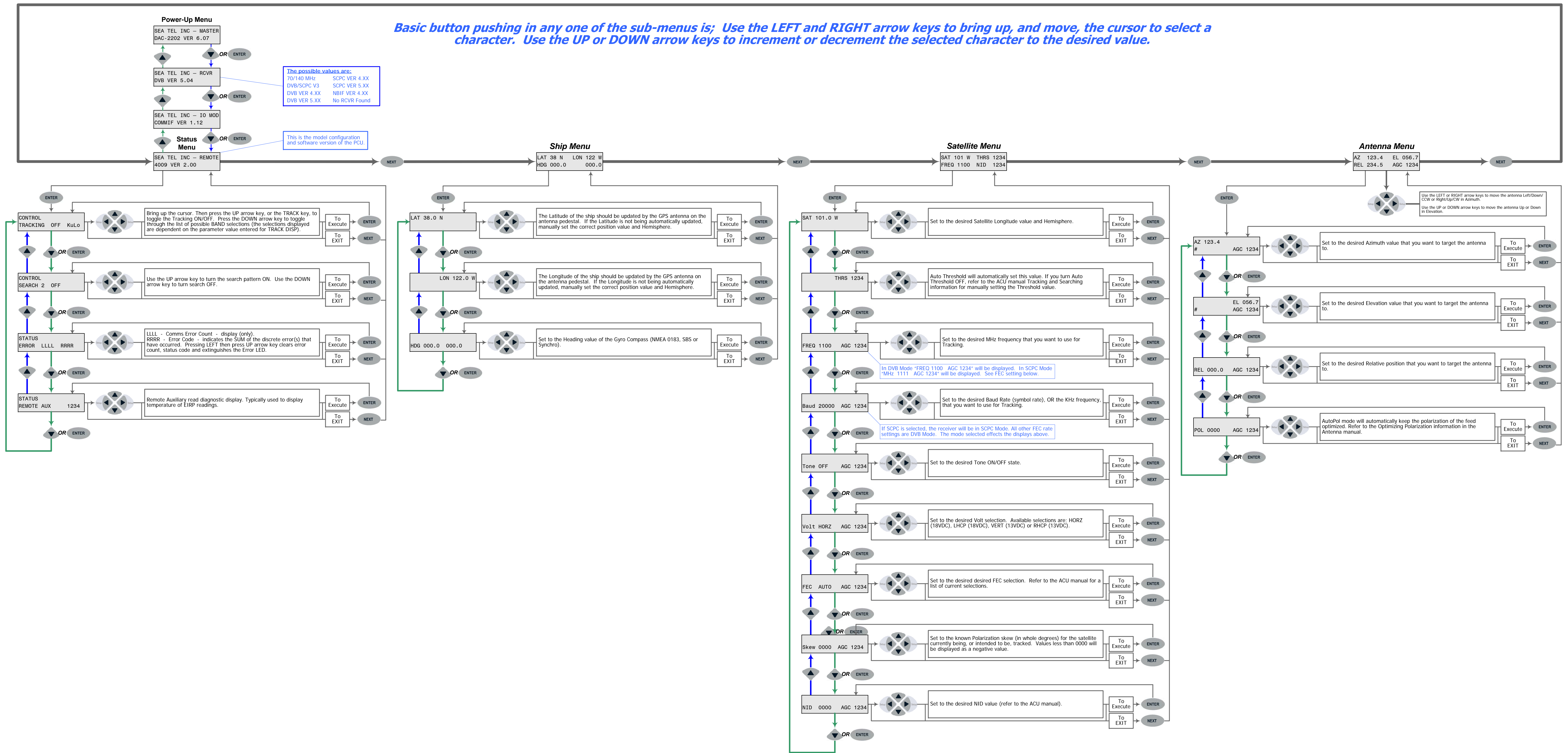


2.6. Overview - Operation Flowchart

On the next page you will find a flowchart of the Operation of the ACU.

DAC-2202 Operation Flowchart – Version 6.07

Basic button pushing in any one of the sub-menus is; Use the LEFT and RIGHT arrow keys to bring up, and move, the cursor to select a character. Use the UP or DOWN arrow keys to increment or decrement the selected character to the desired value.



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2.6.1. **Ship Information Menus.**

Display	Meaning
LAT 38 N LON 122 W HDG 000.0 000.0	Press the NEXT key until the Ship menu is displayed. This is the display of the current Ship information.
LAT 3 <u>8</u> .0 N	Press ENTER to access the Latitude sub-menu. Latitude is used to calculate Azimuth, Elevation and Polarization for the desired satellite position. Latitude is updated automatically by the GPS mounted on the pedestal. To manually update Latitude, press the LEFT/RIGHT arrow to enter edit mode. This will display a cursor under character to be modified. Press the UP/DOWN arrow to increment/decrement this character. Press the LEFT or RIGHT arrow again to select another digit, or the North/South character, to edit. Press ENTER when you are finished editing the Latitude position.
LON 12 <u>2</u> .0 W	Press DOWN or ENTER to access the Longitude entry mode . Longitude is used to calculate Azimuth, Elevation and Polarization for the desired satellite position. Longitude is updated automatically by the GPS mounted on the pedestal. To manually update Longitude, press the LEFT/RIGHT arrow to enter edit mode. This will display a cursor under character to be modified. Press the UP/DOWN arrow to increment/decrement this character. Press the LEFT or RIGHT arrow again to select another digit, or the East/West character, to edit. Press ENTER when you are finished editing the Longitude position.
HDG 00 <u>0</u> .0 000.0	The displayed heading is comprised of two values. The left is the integrated response from the antenna pedestal and right is the local input from the gyrocompass. Press DOWN or ENTER to access the Heading entry mode . Heading is used to provide "True" Azimuth antenna position. This must be True north input, NOT Magnetic north. If the heading input source is NMEA0183 data, or 1:1 Synchro, no initial heading entry is required. For all other acceptable Gyro Compass input types the HDG MUST be initially set whenever the ACU power is turned ON. To manually update, press the LEFT or RIGHT arrow key to bring the cursor up under the character to the left, or right, of the decimal point respectively. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character. Press ENTER to set the new heading value and return to heading display <i>OR</i> Press NEXT to abort and return to the main Ship display During subsequent normal operation, the HDG value should automatically follow the Ships Gyro Compass correctly (HDG value should agree exactly with the value observed on the Gyro Compass).

2.6.2. **Satellite Information Menus.**

Display	Meaning
SAT 101 W THRS 1234 FREQ 1100 NID 1234	<p>Press the NEXT key until the main Satellite menu is displayed. This is the display of the current Satellite tracking information.</p> <p>NID value displayed is the Network ID which is currently being received from the satellite that the antenna is pointed to. If your ACU has an L-Band SCPC receiver in it, "ABCD" will be displayed here. If your ACU has an L-Band NBIF receiver in it, "1234" will be displayed here. If your ACU has a 70, or 140, MHz SCPC narrow band receiver in it, 0000 will always be shown.</p>
SAT 101.0 <u>W</u>	<p>Press ENTER to access the Satellite Longitude sub-menu. Satellite longitude is used to calculate antenna Elevation, Azimuth and Polarity pointing angles from the ships current location and heading.</p> <p>To manually update, press the LEFT or RIGHT arrow key to bring the cursor up under the tenths digit to the left, or the E/W character to the right respectively. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>Range of acceptable latitude values is 000.0 East to 180.0 East/West to 000.0 West, however longitude may be entered as 000.0-359.9 East if you prefer (181.0 East is the same as 179.0 West). Tenths may be entered (and will be used internally) but the display will round off to nearest whole degree.</p> <p>When the hemisphere character is selected press the UP or the DOWN key to toggle East/West hemisphere.</p> <p>Press ENTER to target the displayed satellite position <i>OR</i> Press NEXT to abort and return to the main Satellite menu.</p>
THRS 123 <u>4</u>	<p>Press DOWN or ENTER to access the Threshold sub-menu. Threshold is a minimum AGC value for the ACU to determine if satellite signal has been located or has been lost.</p> <p>Default setup is <i>Automatic Threshold</i>, which sets the Threshold value to nnnn counts of AGC above the average off satellite AGC value whenever the ACU Searches, Targets or Unwraps (refer to your antenna manual for the default setting for AUTO THRES parameter).</p> <p>To manually set threshold; Note the Peak "on satellite" AGC value, move AZ or EL and note the "off satellite" (Noise Floor) AGC value. Calculate the difference between Peak AGC and Noise Floor AGC. Threshold should be set to 1/3 (to 1/2) of the Difference above Noise Floor.</p>

<p>In DVB Mode</p>	<p>Press DOWN or ENTER to access the Sat ID Receiver Frequency entry mode. The individual settings of the Satellite Identification tracking receiver and the current signal level (AGC) will be displayed in each of the sub-menus below. To enable SCPC mode you must first set the FEC parameter to "SCPC".</p>
<p>FREQ 1100 AGC 1234</p>	
<p>In SCPC Mode</p>	<p>In DVB Mode: FREQ ##### AGC 1234</p>
<p>MHz 1111 AGC 1234</p>	<p>In SCPC Mode: MHz ##### AGC 1234</p>
	<p>To manually set, press the LEFT or RIGHT arrow key to bring the cursor up under the character to the left, or right, of the decimal point respectively. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>If your ACU has an L-Band DVB receiver you will tune FREQ to 950-2150MHz. If your ACU has an L-Band SCPC or NBIF receiver you will tune the MHZ to 950-2150MHz (and then tune the KHZ value in the next step). If your ACU has a 70MHz SCPC receiver you will tune the MHZ to 52-88MHz (and then tune the KHZ value in the next step). If your ACU has a 140MHz SCPC receiver you will tune the MHZ to 104-176MHz (and then tune the KHZ value in the next step). Contact your dealer and/or Service Provider for the correct tracking parameters.</p> <p>If your system is configured to use an external AGC input, you must set Frequency to 0000. This will cause the ACU to read the input from the "AGC" & "GND" terminal connections on the Terminal Mounting Strip Assembly.</p> <p>Press ENTER to tune the receiver to this frequency and return to the frequency display <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>
<p>In DVB Mode</p>	<p>Press DOWN or ENTER to access the Sat ID Receiver Baud entry mode. This is used to input the numeric value of Baud Rate (symbol rate) <i>OR</i> of the KHz value of the desired the Intermediate Frequency (950-2150) you want to use for Tracking.</p>
<p>Baud 20000 AGC 1234</p>	<p>This setting of the Satellite Identification tracking receiver and the current signal level (AGC) will be displayed.</p>
<p>In SCPC/NBIF Mode</p>	<p>In DVB Mode: BAUD 20000 AGC 1234</p>
<p>KHz 0999 AGC 1234</p>	<p>In SCPC Mode: KHz ##### AGC 1234</p>
	<p>To manually update, press the LEFT or RIGHT arrow key to bring the cursor up under the character to the left, or right, of the decimal point respectively. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>DVB: Current receivers can be set to any desired Baud Rate between 3000 and 30000. It should be set to the symbol/ baud rate of the digital carrier you chose to use for tracking. This setting also changes the bandwidth of the receiver. Baud setting of equal to or less than 5000 sets the receiver to 7.5 MHz bandwidth. A Baud Rate of 5001 and greater sets the receiver bandwidth to 20MHz.</p> <p>SCPC: Key in the desired KHz frequency value you wish to use for tracking.</p> <p>Press ENTER to set the desired Baud/KHz and return to the Baud/KHz display <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>
<p>Tone OFF AGC 1234</p>	<p>Press DOWN or ENTER to access the Tone sub-menu. This setting is used to turn ON or OFF a continuous 22 KHz Tone output from the tracking receiver.</p>
	<p>Press the LEFT or RIGHT arrow key to display a cursor underneath the current state. Use the UP or DOWN arrow key to change states.</p> <p>ON is used to select High Band frequencies and OFF is used to select Low Band frequencies from the matrix switch.</p> <p>Press ENTER to set the desired tone setting <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>

<p>Vo1t HORZ AGC 1234</p>	<p>Press DOWN or ENTER to access the Volt sub-menu. This setting is used to select the Voltage output from the tracking receiver, based on the desired received transponder polarity. Available selections are; HORZ (18VDC), LHCP (18VDC), VERT (13VDC) or RHCP (13VDC).</p> <p>To change selection, press the LEFT or RIGHT arrow key to display a cursor underneath the current selection. Use the UP or DOWN arrow key to scroll through the selections.</p> <p>Press ENTER to set the desired Voltage setting <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>
<p>FEC AUTO AGC 1234</p>	<p>Press DOWN or ENTER to access the FEC sub-menu. Select the Forward Error Correction rate of the desired tracking signal. 1/2, 2/3, 3/4, 5/6, 6/7, 7/8 , AUTO or SCPC. AUTO automatically scans through all the standard DVB & DSS FEC rates.</p> <p><i>NOTE:</i> When SCPC is selected, the FREQ parameter changes to read MHz and the BAUD parameter changes to read KHz.</p> <p>Continue pressing the UP/DOWN arrow key to toggle through the available forced * (star'ed) FEC rates. If the satellite does not generate an NID but does have a unique combination of FREQ, BAUD and FEC lock, select the appropriate FEC* choice from this list. The ACU will then generate its own unique forced NID (FFFF for DSS signals or FFFD for DVB signals) to represent the desired satellite. You will need to enter this pseudo NID in the NID setting below.</p> <p>FEC <i>MUST</i> be set to SCPC if you have any one of the SCPC narrow band receivers installed in your ACU (L-Band SCPC, 70MHz SCPC or 140MHz SCPC).</p> <p>To manually update, press the LEFT or RIGHT arrow key to bring the cursor up under the current setting. Use the UP or DOWN arrow keys to scroll through the available FEC selections.</p> <p>Press ENTER to set the desired selection <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>
<p>SKEW 000 AGC 1234</p>	<p>Press DOWN or ENTER to access the SAT SKEW sub-menu. This setting is used to add or subtract Polarization skew for the satellite currently being or intended to be tracked.</p> <p>Each increment equals one degree of polarization rotation. Increment to "+02" for a satellite with a total positive 2 degree polarization skew (The intentional satellite skew +/- required skew for X-Pol isolation). Likewise decrement down to "-02" for a satellite with a total negative 2 degree polarization skew. Use of this parameter requires mechanical feed calibration for proper operation. Refer to Polang Adjustment procedure in the maintenance section of your antenna manual for detailed instructions on how to perform this calibration procedure (POL OFFSET).</p> <p>Adjustments of this parameter is required while running Cross-Pol isolation tests during the commissioning of a VSAT system (apparent skew) or is entered as an absolute satellite skew angle value (intentional) when switching between satellites.</p> <p>Press the LEFT or RIGHT arrow key to display a cursor underneath the current value. Use the UP or DOWN arrow key to increment or decrement value.</p> <p>Press ENTER to set the desired SKEW setting <i>OR</i> Press NEXT to abort and return to the main Satellite display.</p>

NID 0000 AGC 1234	<p>Press DOWN or ENTER to access the NID sub-menu. This setting, a four digit HEX value with a valid range of 0000-FFFF, is based on the desired received transponders' Network ID (NID). If this parameter is provided in decimal format, it will have to be converted to hexadecimal for entry.</p> <p>Set the NID value to 0000 if;</p> <ul style="list-style-type: none"> • The signal you intend to track does not contain a valid NID. • You do not want to use satellite identification function. • <i>You are using the external AGC input source from the satellite modem (most commonly used in the 09 Series antennas) which has been provided to you in your system configuration.</i> • You are experiencing a hardware/software issue which is preventing the ACU from decoding the NID and you want to temporarily disable this function. <p>To manually update, press the LEFT or RIGHT arrow key to bring the cursor up under a character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>Press ENTER to set the desired NID OR Press NEXT to abort and return to the main Satellite display.</p>
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2.6.3. Antenna Information Menus.

Display	Meaning
AZ 123.4 EL 056.7 REL 234.5 AGC 1234	<p>Press the NEXT key until the Antenna main menu is displayed. This is the display of the current <i>Antenna</i> information.</p> <p>While in the antenna main menu pressing the UP, DOWN, LEFT or RIGHT arrows moves the antenna in those respective directions. Quick pres & release the desired arrow key will <i>step</i> the antenna in small individual increments. Press & Hold the desired arrow key to <i>slew</i> the antenna in rapid steps.</p>
AZ 12 <u>3</u> .4 # AGC 1234	<p>Press ENTER to access the Azimuth sub-menu. This allows you to target the antenna to desired Azimuth position. The current IF signal level (AGC) is displayed to assist you in manually peaking AZ for best signal level. Range of input is 000.0-359.9.</p> <p>To target a new azimuth position, press the LEFT or RIGHT arrow key to bring the cursor up under the character to the left, or right, of the decimal point respectively. Continue to move the cursor until the desired character is selected. Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>Press ENTER to <i>target</i> the antenna to the new Azimuth position OR Press NEXT to abort and return to the main Antenna display.</p> <p>The number (2, 4, 6 or 8) you see periodically flashing in the lower left of the display are normal DishScan tracking signals.</p>

<p># EL 05<u>6</u>.7 AGC 1234</p>	<p>Press DOWN or ENTER to access the Elevation sub-menu. This allows you to target the antenna to a desired Elevation position. Range of input is 00.0-90.0.</p> <p>To target a new elevation position, press the LEFT or RIGHT arrow key to bring the cursor up under the character to the left, or right, of the decimal point respectively. Continue to move the cursor until the desired character is selected. Use the UP or DOWN arrow keys to increment or decrement the selected character.</p> <p>Press ENTER to <i>target</i> the antenna to the new elevation position OR Press NEXT to abort and return to the main Antenna display.</p> <p>The number (2, 4, 6 or 8) you see periodically flashing in the lower left of the display are normal DishScan tracking signals.</p>
<p>REL 234.5 AGC 1234</p>	<p>Press DOWN or ENTER to access the Relative Azimuth sub-menu. This sub-menu displays the current Relative azimuth position of the antenna.</p> <p>If this ACU is connected to a LIMITED azimuth antenna (has cable "UNWRAP"), the value displayed here is the antenna position relative to the bow of the ship, ranging from 020.0-700.0, with 360.0 indicating when antenna is pointed in-line with the bow. UNWRAP should occur at REL 023.0 & 697.0.</p> <p>If this ACU is connected to a UNLIMITED azimuth antenna (no mechanical stops in azimuth rotation), the value displayed here is the antenna position relative to the bow of the ship, ranging from 000.0-359.9, with 000.0 indicating when antenna is pointed in-line with the bow.</p> <p>The REL position of the antenna is also used to set Radiation Hazard & Blockage Mapping points (refer to Setup chapter of your antenna manual).</p>
<p>POL 000<u>0</u> AGC 1234</p>	<p>Press DOWN or ENTER to access the Polarization sub-menu. Auto-Polarization is the DEFAULT method of polarization adjustment. To optimize, or manually adjust, polarization refer to the Setup and Maintenance sections of this manual</p>

2.6.4. Status information menus.

Display	Meaning
<p>SEA TEL, INC - MASTER DAC-2202 VER 6.05t</p>	<p>Press the NEXT key until the Status menu is displayed. This is the power-up display of the Master (ACU) and Remote (PCU) Model & Software Version(s) information.</p>

<p>CONTROL TRACKING OFF C</p>	<p>Press the ENTER key once to display the Status – Control Tracking sub-menu. This is the display of the current <i>Tracking and Band Selection</i> information.</p> <p>To turn the Tracking status On or Off, press the Track key, or press the RIGHT arrow to bring up a cursor under the current tracking condition and then Press the UP arrow to toggle status ON/OFF. Press Enter to exit the selection mode.</p> <p>To toggle the Tracking band selection, Press the RIGHT or LEFT arrow and then press the DOWN arrow to toggle through the list of possible BAND selections (i.e. KuLo, KuHi, DLA or DSS). The actual band selections available are dependent on the parameter value entered for TRACK DISP. Press ENTER to submit and exit the selection entry mode.</p> <p>Band selection controls the <i>local</i> logic output state of SW1 output terminal on the 25 pin Terminal Mounting Strip PCB and if configured, <i>remote</i> C/Ku relays on the antenna pedestal. When KuHi/DSS band is selected the SW1 output will be shorted to ground (current sink of 0.5 amps max or when KuLo/DLA band is selected the SW1 output is open (floating.) to control (but not limited to):</p> <ul style="list-style-type: none"> • Band selection tone generators • Coax switches. <p>If AZ Limits have been set to define a known blockage zone “BLOCKED” will appear in place of ON/OFF tracking status when the antenna is in the described blockage zone(s). This Tracking condition controls the <i>local</i> logic output state of SW2 output terminal on the 25 pin Terminal Mounting Strip PCB.</p> <p>If the Antenna Pedestal, during normal operation fails to meet FCC stabilization compliance “MUTE” will be appear in the place of the ON/OFF tracking status Whenever in the “BLOCKED” or “MUTE” tracking condition, the SW2 output will be shorted (or open, if SYSTEM TYPE is set to reverse this logic state) to ground, providing a current sink of 0.5 amps max, to control (but not limited to):</p> <ul style="list-style-type: none"> • Below decks dual antenna coax switches • TX inhibit control to a satellite modem for radiation hazard control • TX mute for FCC compliance. <p>To test the blockage output, press the RIGHT arrow key 5 times (to bring up and move the cursor to the far right). Press the UP arrow to simulate BLOCKED condition and short (or open, if SYSTEM TYPE is set to reverse this logic state) on SW2. Press the LEFT arrow key twice and then press the UP arrow key to turn the BLOCKED condition OFF and open (or short, if SYSTEM TYPE is set to reverse this logic state) on SW2.</p>
<p>CONTROL SEARCH 2 OFF</p>	<p>Press DOWN arrow or ENTER to access the Control Status – Search sub menu. This is a display of the current Search condition.</p> <p>To initiate an automated SEARCH, press the RIGHT arrow to bring up a cursor under the current Search status, and then press the UP arrow.</p> <p>To terminate a SEARCH in process, press the RIGHT arrow to bring up a cursor under the current Search status, and then press the DOWN arrow or press the TRACK key</p> <p>Press Enter to exit the Search Control mode.</p>

STATUS ERROR LLLL _RRRR	<p>Press DOWN or ENTER to access the Status – Error menu. This is a display of errors that have been detected by the system</p> <p>LLLL - Comms Error Count - The first four numeric digits indicates the number of times that a Pedestal M&C communication message (between the ACU and PCU) was not received correctly. Occasional counts are acceptable but more than 10 per minute indicates a problem that needs attention (refer to Troubleshooting section).</p> <p>RRRR - Error Code - The second set of four numeric digits indicates the SUM of the discrete error(s) that have occurred. It does not indicate <i>how many</i> of a particular error have occurred.</p> <table border="0"> <tr> <td style="padding-right: 20px;">128</td> <td>Satellite Out Of Range</td> </tr> <tr> <td>16</td> <td>DishScan Pulse Error</td> </tr> <tr> <td>8</td> <td>Pedestal Error (NOTE: An error code 8 requires an additional PCU Query to determine fault type, refer to the maintenance section of this manual for further information)</td> </tr> <tr> <td>4</td> <td>ACU-PCU Communication Failure</td> </tr> <tr> <td>2</td> <td>Wrong Synchro Converter Type</td> </tr> <tr> <td>1</td> <td>Gyro Read Error</td> </tr> </table> <p>Refer to the Maintenance section of this manual for troubleshooting frequent or constant errors.</p> <p>Pressing UP arrow key and then the ENTER key clears error count, status code and extinguishes the Error LED. Refer to troubleshooting section of manual if error does not clear.</p>	128	Satellite Out Of Range	16	DishScan Pulse Error	8	Pedestal Error (NOTE: An error code 8 requires an additional PCU Query to determine fault type, refer to the maintenance section of this manual for further information)	4	ACU-PCU Communication Failure	2	Wrong Synchro Converter Type	1	Gyro Read Error
128	Satellite Out Of Range												
16	DishScan Pulse Error												
8	Pedestal Error (NOTE: An error code 8 requires an additional PCU Query to determine fault type, refer to the maintenance section of this manual for further information)												
4	ACU-PCU Communication Failure												
2	Wrong Synchro Converter Type												
1	Gyro Read Error												
STATUS REMOTE AUX 000 <u>0</u>	<p>Press DOWN or ENTER to access the Status – Remote Aux menu. Diagnostic <i>display</i> of Remote auxiliary read. Typically, this display is to indicate Temperature or EIRP readings from the antenna, if properly configured to do so; otherwise, there are no operational or diagnostic uses of this sub-menu.</p>												

2.6.5. SETUP Parameter display and entry menus.

Access to system setup parameters is only required during installation or repair of your antenna system. These parameters should only be changed by an authorized service technician.

CAUTION: *Improper setting(s) of these parameters can and will cause your system not to perform properly.*

Refer to the SETUP information in the Installation section of this manual.

2.7. Tracking Operation

Tracking, which is controlled by the ACU, is fine pointing angle adjustments to the antenna pedestal to maximize the level of the satellite signal being received. You can, as described in the Status Information Menu’s section of this manual, toggle Tracking ON or OFF by pressing the **Track** key regardless of what current menu or sub-menu is being displayed.

2.7.1. DishScan Operation

To control tracking this system uses a variation of Conical scanning, called DishScan, which continuously drives the antenna in a **very** small diameter circle (defined by DishScan Amplitude) at 60 RPM. This circle is defined in 4 “quadrants”, UP, DOWN, LEFT, and RIGHT (by the DishScan Phase). The received signal is evaluated throughout each full circle rotation of the antenna, by referencing timing pulses issued by the PCU in each of the 4 quadrants (defined by DishScan Phase), to determine where the strongest signal level is and will issue the appropriate Azimuth and/or Elevation steps to the antenna, as needed, 60 times per minute towards that quadrant. Both DishScan Phase timing mark and Amplitude drive are adjustable by the N7xxxx Remote Command parameter. For more information on this parameters refer to Sea Tel document 123400.

While viewing the AZIMUTH or ELEVATION sub-menu, the DishScan drive commands issued (2, 4, 6 or 8) will be visible in the lower left corner of the display. Each 2 you see flash is a command sent to step Elevation down, each 4 is a command sent to step down in Azimuth (CCW), each 6 is a command sent to step up in Azimuth (CW), each 8 is a command sent to step Elevation up.

When Tracking is turned **OFF** these commands indicate drive that is required, but will not be sent to the antenna to be carried out.

If the antenna is already perfectly pointed, the signal received (AGC) throughout each of the 4 quadrants will be equal and no tracking decision is made. If the dish is slightly mispointed, a portion of the circle movement will have higher signal level than the rest of the circle. DishScan will then issue a step in Azimuth, and/or Elevation, to move the antenna in the direction of the stronger signal. **[EXAMPLE:** If the dish is mispointed slightly to the LEFT of the satellite peak; as DishScan drives the antenna through one circle rotation it will evaluate that the signal is slightly higher to the RIGHT, therefore, a Azimuth UP (RIGHT) step will be issued to the antenna].

For proper Tracking performance, the **EL STEP SIZE, AZ STEP SIZE, STEP INTEGRAL** parameters **must** all be set to **Factory Default value of 0** and **DishScan** must be turned on. You must also correctly set the internal tracking receiver settings. Refer to the "Satellite" menu operation in the above section for adjustment instructions.

2.1. Searching Operation

The ACU 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 ACU will wait after AGC has fallen below the threshold value before it starts a search.

Search can be initiated manually by pressing the **MODE** button twice to access the SEARCH sub-menu and then press the **UP** arrow key (starts a search from the current antenna position). While in the SEARCH sub-menu, pressing the **DOWN** arrow key will stop the current search.

Search is terminated automatically when the AGC level exceeds the threshold value and Tracking begins.

The ACU can be configured to use one of three search patterns. Each of the search patterns are described below. Each description includes information about the settings involved in configuring the ACU to select that particular pattern and the values that those settings would be set to, to optimize the pattern for your antenna model and the frequency band being used.

The dimensions and timing of the search pattern are determined by the SETUP parameters **SEARCH INC, SEARCH LIMIT, SEARCH DELAY** and **SWEEP INC**. Search is also affected by the *Threshold* and the *internal receiver* settings under the Satellite menu. To change any one of these parameters, refer to "Changing the Search Parameters" procedures below.

All three search patterns are conducted in a two-axis pattern consisting of alternate movements in azimuth and elevation or along the polarization angle. The size and direction of the movements are increased and reversed every other time resulting in an increasing spiral pattern as shown.

2.1.1. Default Standard (Box) Search Pattern

The factory default search pattern in the ACU is a standard "box" pattern. You configure the ACU to use this pattern by using the following settings:

SEARCH INC - set to the default value for the frequency band that your antenna model is currently being used for (typically 15 counts for Ku-Band antennas and 30 for C-Band antennas).

SEARCH LIMIT – initially set to the default value (typically 100 counts for Ku-Band antennas and 200 for C-Band antennas). After targeting has been optimized, the search limit can be adjusted if desired.

SEARCH DELAY – default, or any number of seconds from 1-255 that you would prefer that the ACU wait before starting an automatic search.

SWEEP INC – default value (this parameter is not used in this search pattern).

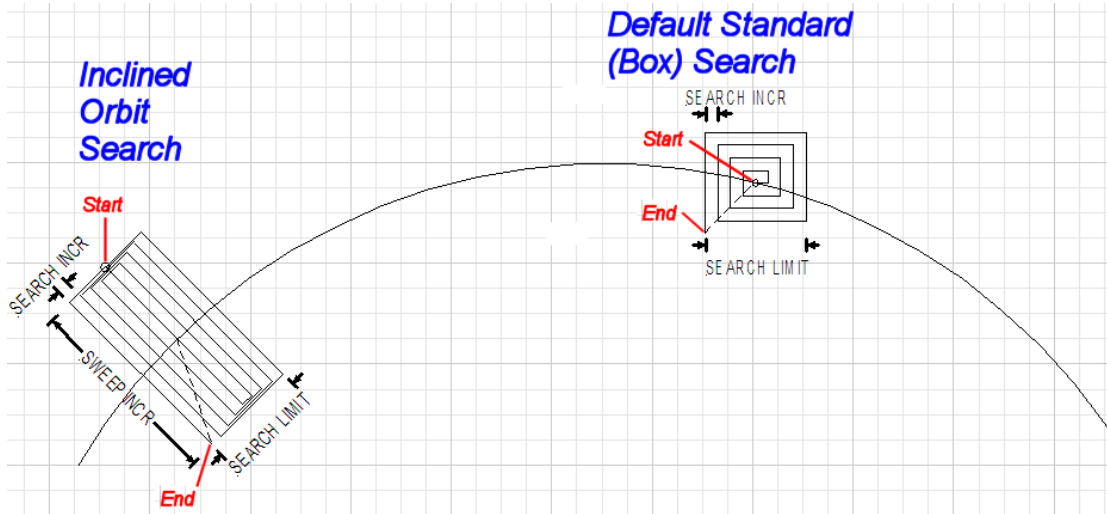
GYRO TYPE – must NOT be set to zero.

SAT REF mode – It is normally **OFF** as long as you have good gyro compass input. It **MUST** be **OFF** when the elevation angle is greater than 75 degrees. It **Must** be **ON** if you are experiencing frequent, or constant, gyro read errors (error code 0001).

Target any satellite longitude value which includes even tenths digit values (ie SAT 101.0 W or SAT 101.2 W). If the desired satellite longitude includes an odd tenths digit, you must round it up, or down, one tenth to make the tenths digit EVEN. The Antenna Control Unit calculates the Azimuth, Elevation and Polarization values it will target the antenna. Initially the antenna will go to a position that is 8 degrees above the calculated elevation, until Azimuth and Polarization have had time to complete adjustment. Then the antenna will drive down to the calculated elevation, which is the "Start" of the search pattern in the graphic below.

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 ACU will retarget the antenna 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 ACU will terminate search and go into Tracking mode. If the desired signal is not found the ACU 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.



2.1.2. 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.

You can configure the ACU to do a special search pattern for a satellite that is in an inclined orbit by using the following settings:

SEARCH INC - set to the default value for the frequency band that your antenna model is currently being used for (typically 15 counts for Ku-Band antennas and 30 for C-Band antennas).

SEARCH LIMIT – leave this set to the default value for your antenna model (typically 100 counts for Ku-Band antennas and 200 for C-Band antennas).

SEARCH DELAY – default, or any number of seconds from 1-255 that you would prefer that the ACU wait before starting an automatic search.

SWEEP INC – set to **192** if your antenna is a Series 04 or Series 06 or Series 09. Set to **193** if your antenna is a Series 97, Series 00 or Series 07. This parameter sets the sweep increment (shown in the graphic above) to be +/- 8.0 degrees above/below the satellite arc.

GYRO TYPE – must NOT be set to zero.

SAT REF mode – It is normally **OFF** as long as you have good gyro compass input. It **MUST** be **OFF** when the elevation angle is greater than 75 degrees. It **Must** be **ON** if you are experiencing frequent, or constant, gyro read errors (error code 0001).

Target the desired satellite longitude value but include an odd tenths digit (ie if you desire to target inclined satellite 186.0 W you would key in SAT 186.1 W for the ACU to do an inclined search). The Antenna Control Unit calculates the Azimuth, Elevation and Polarization values it will target the antenna to.

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 ACU 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 ACU will terminate search and go into Tracking mode. If the desired signal is not found the ACU 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.

2.1.3. No Gyro Search Pattern

If the ship does not have a gyro compass to use as a heading input to the Antenna Control Unit, 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 ACU to do a “No Gyro Search Pattern”.

You configure the ACU to use this pattern by using the following settings:

SEARCH INC - set to the default value for the frequency band that your antenna model is currently being used for (typically 15 counts for Ku-Band antennas and 30 for C-Band antennas).

SEARCH LIMIT – leave this set to the default value (typically 100 counts for Ku-Band antennas and 200 for C-Band antennas).

SEARCH DELAY – default, or any number of seconds from 1-255 that you would prefer that the ACU wait before starting an automatic search.

SWEEP INC – Larger antennas should have slower speeds and smaller antennas should have faster speeds:

Larger antennas should have slower speeds set to **0047** (= 5 degrees/second) for **2.4M to 3.6M antenna systems**).

Mid size antennas can be driven a little faster, set to **0063** (= 8 degrees/second) for **2M antenna models**).

Smaller antennas should have faster speeds, set to **0079** (= 18 degrees/second) for **all 0.8M to 1.5M antenna models**).

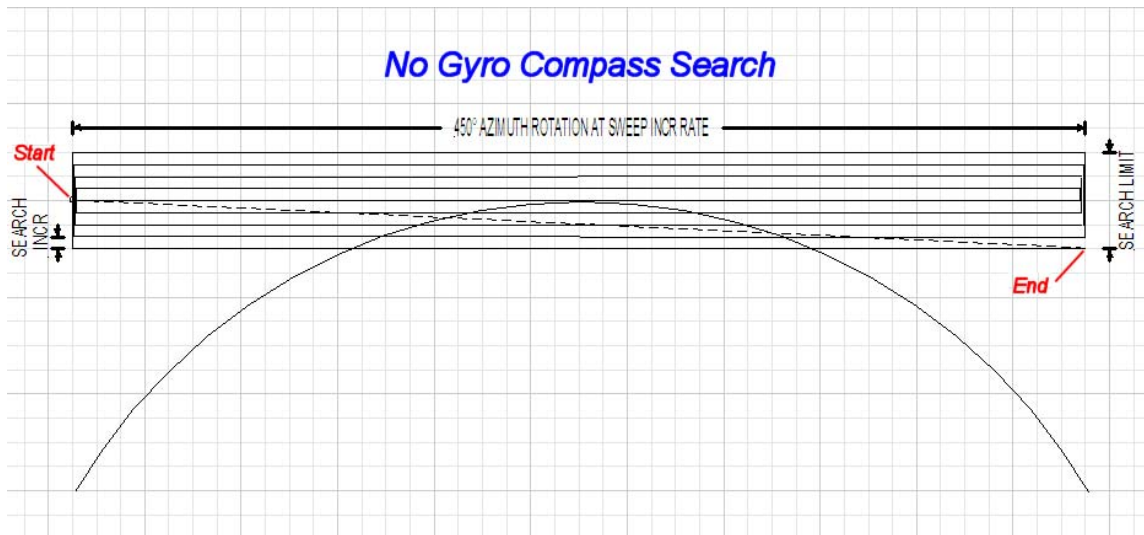
GYRO TYPE – **MUST** be set to **zero** for this search pattern.

SAT REF mode – **MUST** be **ON** for this search pattern.

Target any satellite longitude value which includes even tenths digit values (ie SAT 101.0 W or SAT 101.2 W). If the desired satellite longitude includes an odd tenths digit, you must round it up, or down, one tenth to make the tenths digit EVEN. The Antenna Control Unit calculates the Azimuth, Elevation and Polarization values it will use to target the antenna. However, without heading input, the ACU cannot target a “true azimuth” position (relative to true North). It will target the antenna to the calculated elevation and a repeatable “Start” relative azimuth position. In Series 04 antennas this relative position will be 90 degrees away from the nearest mechanical stop. In all other antennas it will be 000 degrees relative.

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 ACU 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 ACU will terminate search and go into Tracking mode. If the desired signal is not found the ACU 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.



2.2. Auto-Polarization Operation

Another feature of the ACU is auto-polarization. The ACU automatically calculates the required polarization angle for the feed every 2 seconds based on ship's Latitude, Longitude and the Satellite Longitude. If the polarization of the feed is not properly peaked, the ACU will send a command to the PCU to drive the 24V DC motor drive on the feed to peak the polarization.

There is no other operation required when the system is in auto-polarization mode (Polang Type 72).

2.3. Radome Assembly Operation

When operating the system it is necessary that the radome access hatch, or door, be closed and secured in place at all times. This prevents rain, salt water and wind from entering the radome (water and excessive condensation promote rust & corrosion of the antenna pedestal and wind gusts will disturb the antenna pointing).

3. Basic Configuration Information

This section provides you with some additional information about the satellites you will be using, some basics of your satellite antenna system and other equipment within your system configuration. For more information about you specific antenna, refer to its manual.

3.1. Open Antenna-Modem Interface Protocol (OpenAMIP™) Specification:

3.1.1. Overview:

OpenAMIP, an ASCII message based protocol invented and Trademarked by iDirect is a specification for the interchange of information between an antenna controller and a satellite modem. This protocol allows the satellite modem to command the ACU (via TCP port 2002) to seek a particular satellite as well as allowing exchange of information necessary to permit the modem to initiate and maintain communication via the antenna and the satellite. In general, OpenAMIP is not intended for any purpose except to permit a modem and the ACU to perform synchronized automatic beam switching. It is **NOT** a status logging system or a diagnostic system. In addition, OpenAMIP is intend for a typical installation whereby a specific satellite modem and Antenna system are properly configured to work together. The protocol does not make specific provisions for auto-discovery or parameter negotiation. It is still the responsibility of the installer to assure the parameters of both the satellite modem (proper option files) and the ACU/PCU (setup parameters) are actually compatible for the intended satellite(s).

3.1.2. Interface requirements:

3.1.2.1. Hardware

Sea Tel Antenna Control Units Model DAC2202 or DAC2302.

Any Satellite modem manufacturer that is compatible with OpenAMIP

CAT5 Patch cable

3.1.2.2. Software

Sea Tel model DAC2202:

ACU software version 6.06 or greater

CommIF module software version 1.10f or greater

Sea Tel model DAC2302:

ACU software version 7.06 or greater

CommIF module software version 1.10f or greater

3.1.3. Utilized OpenAMIP Commands:

3.1.3.1. Antenna Commands:

Command	Description	Example
S f1 f2 f3	Satellite Longitude, 3 parameters: Degrees E/W (-value equals West), Latitude Variance (Inclined Orbit), Sat Skew Offset	"S -20.1 1.0 3.5"
P c1 c2	Polarization, 2 parameters: H,V,L, or R	"P L R"
H f1 f2	Tracking Frequency: 2 Parameters: Center Frequency and Bandwidth in MHz	"H 14123.321 0.256"
B f1 f2	Down Conversion Offset: 2 parameters: LNB (Receive) Local Oscillator and BUC (TX) L.O.	"B 10750"
F	Find, Target satellite using existing S, P,R, and H Parameters	

A i	Set keep alive in seconds (0 = off)	"A 5"
L b1 b2	Modem Lock and free to transmit. 2 parameters: b1 indicates Rx lock and b2 (not utilized) enables/disables Tx Mute to BUC	"L 1 1"
W i	GPS Update: Sets GPS Update period in seconds (0 = Off)	"W 300"
I s1 s2	Set modem vendor (s1) and device (s2) 2 parameters:	"I iDirect 5100"

3.1.3.2. Modem Commands:

Command	Description	Example
a i	Set keep alive in seconds (0 = off)	"a 5"
i s1 s2	Set Antenna Vendor (s1) and device (s2) 2 parameters:	"i Sea Tel DAC-2202"
s b1 b2	Antenna Status: 2 parameters: b1 is functional status and b2 is Tx allowed	"s 1 1"
w b1 f1 f2 t1	Set GPS Position: 4 parameters: b1 is validity flag, f1 is latitude, f2 is longitude, and t1 is timestamp	"w 1 38.222 122.123 0"

3.2. Components of the System Configuration

The following text provides a basic functional overview of the system components and component interconnection as referred to in the System Block Diagram for your model antenna.

Television Receive Only (TVRO) Systems are comprised of two major sections: The Above-Decks Equipment (ADE) is comprised of the Sea Tel antenna & radome assembly which is mounted outside, on an upper deck location chosen for best satellite reception. The Below-Decks Equipment (BDE) comprises of an Antenna Control Unit and will have satellite receiver(s), TV set(s) and all other ancillary equipment that is mounted in various locations throughout the interior of the ship.

Transmit/Receive (TXRX) Systems are also comprised of two major sections: The Above-Decks Equipment (ADE) is comprised of the Sea Tel antenna & radome assembly which is mounted outside, on an upper deck location chosen for best satellite reception. Transmit & Receive RF equipment will be mounted on the Antenna pedestal inside the radome. The Below-Decks Equipment (BDE) comprises of an Antenna Control Unit, a satellite modem, Multiplexer and all other ancillary communications equipment mounted in various locations throughout the interior of the ship.

3.2.1. Positive Satellite ID

The ACU has the means of positively identifying a satellite either internally (DVB compliant transponders) or Externally (Modem lock indication via Ethernet, OpenAMIP, or via an analog DC input into the TMS.

For internal satellite ID, all of the DVB receiver parameter settings must be set to match that of the inbound transponder.

For external satellite ID, the NID value must be set to 0000 and the system type parameter must include the 2 value at minimum.

- For OpenAMIP compatible satellite modems, an Ethernet cable connection to the ACU's Ethernet port is required. NOTE: The modems option file must be built to enable the appropriate Rx lock indication.
- For non-OpenAMIP compatible satellite modems, 2 wires coming from the Satellite modems must be connected to the AGC and Ground input pins of the TMS.

3.2.2. Below Decks AC Power Supply

AC Voltage - An appropriate source of AC Voltage (110 VAC 60 Hz OR 220 VAC 50 Hz) will also be required for all of the below decks equipment. The AC voltage source should be well regulated and surge protected. Uninterrupted Power Supplies are frequently installed to provide power for the below decks equipment, and in some cases it supplies the above decks equipment too. Refer to the Specifications section of this manual for the power consumption of the ACU. Refer to the manuals for your other below decks equipments for voltage and power consumption of each of these devices. Total power consumption will depend on the number of components connected to this power source.

4. Installation

Below are basic steps to guide you in installing this equipment, but you may choose to complete installation steps in a different order. Read this complete section before starting.

The following instructions describe the installation procedures for installing the Antenna Control Unit.

The installation procedures for the Antenna Pedestal (ADE) is outlined in the Pedestal Installation and Operation manual

4.1. 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 Terminal Mounting Strip.



CAUTION - Allow only an authorized dealer to install or service the your Sea Tel System components. Unauthorized installation or service can be dangerous and may invalidate the warranty.

4.2. Site Survey

Find the best location for the ACU and other Below Decks Equipment. Assure that each piece of equipment is properly mounted. They should have sufficient cable to pull the equipment out of its mounting location and disconnect the cables attached to it. There should be plenty of air space between units to allow heat to vent off of the equipment. If the mounting location is a closed space, assure that the equipment will not be damaged by trapped heat, install vents and/or fans to evacuate the heat. Refer to the Specifications of the equipment installed for acceptable operating temperature.

4.3. Preparing For The Installation

Always prepare for the installation before you actually start.

4.3.1. Unpack Shipping Crates and Inspect / Inventory

Unpack the crates. Inspect everything to assure that all materials have been received and are in good condition.

4.3.2. Preparing BDE Location

Prepare the Rack (or other location) for the ACU, Terminal Mounting Strip and base multiplexer panel. Prepare the mounting locations for the other Below Decks Equipment throughout ship.

4.3.3. Read the Installation Information

Read the Installation section of the ACU and Antenna Pedestal manuals to be familiar with the installation before attempting.

4.3.4. Plan The Install

Plan your installation. You may wish to follow a different order of installation steps than is outlined in this manual.

4.3.5. The Installing Cables

Installing appropriate cables from location to location. Refer to the System Block Diagram in your Antenna manual.

4.4. Install the ACU

Install the ACU in the front of the standard 19" equipment rack or other suitable location.

4.5. **Install the Terminal Mounting Strip (TMS)**

Install the TMS in the rear of the standard 19" equipment rack or other suitable location.

Connect the TMS to the ACU.

1. Connect the 25 pin ribbon cable from the Terminal Mounting Strip to J1 "Ships Gyro" DB25 on the rear panel of the ACU.
2. Connect the 9 pin ribbon cable (or NMEA serial cable) from the Terminal Mounting Strip to J2 "NMEA" DB9 on the rear panel of the ACU.



Figure 4-1 Rear Panel DAC-2202 ACU

4.6. **Install the Base Multiplexer Panel**

If your antenna system includes a base multiplexer panel, install the panel in the rear of the standard 19" equipment rack or other suitable location.

4.7. **Terminal Mounting Strip Connections and Jumper Settings**

4.7.1. **Terminal Mounting Strip (TMS) Connections**

Connect the Ships Gyro Compass input to the appropriate screw terminals on this strip. The satellite modem must also be connected to provide compliance with FCC Order 04-286 and WRC-03 Resolution 902.

There are several functional connections that may be made on the TMS connectors. Although you may not need to make all of these connections, they are listed here for clarification during the installation process. Connect the 9 pin ribbon cable from this PCB to J2 "NMEA" DB9 on the rear panel of the ACU. Connect the 25 pin ribbon cable from this PCB to J1 "Ship Gyro" DB25 on the rear panel of the ACU.



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. DO NOT HOTPLUG THIS CONNECTION

4.7.1.1. **Jumper Selection**

JP1 – JP4 are to couple in pull-up resistors for the below listed functions. JP5 selects the DC voltage output on TS4.

JP1 SW1 – This output would be used for below decks band select - to control a band selection switch or tone generator. Default is OPEN.

JP2 SW2 (blockage & RF radiation hazard output) - Used to control dual antenna arbitrator, in dual antenna configurations, and provide TX Mute control to the Satellite Modem. Default is SHORTED when blocked.

JP3 SW3 (reserved) - Reserved for future use.

JP4 AGC (external AGC input) - Pull-up for external AGC input from Satellite Modem which is used to a positive satellite Network ID when the modem is on the correct network (therefore the antenna is on the correct satellite). Default is SHORTED. **NOTE: This jumper MUST be removed when using iDirect 3000 & 5000 Series modems.**

JP5 Voltage Output Select - Select 12VDC or 24VDC. Default is 12VDC.

4.7.1.2. **J1 "Modem Console Port" connector**

FCC compliance connection to an iDirect Satellite Modem can be made very easily by connecting a Straight Serial RJ-45 cable from the J1 "Modem Console Port" connector on the Terminal Mounting Strip to the Console port on the iDirect Modem. Your modem must be set

If your modem is Open AMIP compatible and you wish to use it in an Open AMIP configuration you will use an Ethernet patch or cross-over cable as is appropriate to connect to your LAN.

Refer to the Setup – Modem Connections, Setup and Test chapter for more information.

4.7.1.3. TS1 Control Interface Connections.

AGC & GND - External AGC, or Modem Lock, input.

- External AGC input to the DAC-2202 must be 0 to 15 Volts DC analog signal, positive going voltage proportional to satellite signal input level and must be real-time in its response to antenna pointing.
- External Modem Lock from a satellite modem is used as a positive ID that the antenna is on the desired satellite. **This input is NOT used for Tracking purposes**, it is only used for satellite identification to acquire the correct satellite during search. To enable the external modem input you must include a 2 in the SYSTEM TYPE parameter (If your system type is presently 76 or 77, then change it to 78 or 79) and **NID MUST be set to 0000**.
- **Connections** - The modem lock signal connects to EXT AGC and a ground reference from the modem. The expected signal from the modem allows 0VDC to +15VDC. Low voltage indicates modem lock, high voltage indicates modem unlock.
- **Testing** - The input connections from the modem can be tested by selecting the external AGC input and monitoring the displayed value. To select external AGC, set the tuning frequency to 0000. Normally, AGC readings below 2048 are considered a low condition and indicate modem lock and AGC readings above 2048 are considered a high condition and indicate modem unlock.

[If you find the AGC reading for locked and unlocked conditions need to be reversed you must add 128 to your current SYSTEM TYPE parameter].

Turn tracking OFF when checking the external AGC inputs. Be sure to properly retune the receiver frequency when you are finished testing the external input.

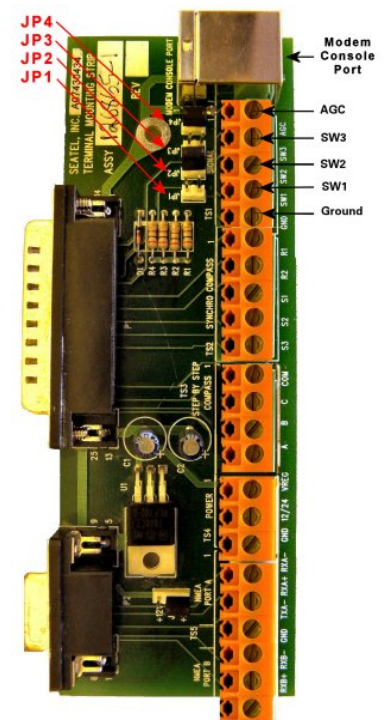
- **Operation** - In *NORMAL* operation, AGC must be above Threshold AND external MODEM Lock input must be locked to Track the satellite. If you are tracking a satellite signal and the AGC is above threshold (Tracking light on solid) but the external AGC signal rises above 2.5 volts for more than 20 seconds (external MODEM input **UNLOCKED**) the ACU will automatically retarget the selected satellite.

SW1 - Band Selection control output. This output is used to control below decks tone generator(s), or coax switch(s), for band selection functions. The band selection control output is driven by the band selected in the MODE – TRACKING display.

SW2 - The Blockage/TX Mute Control output is driven by Blockage and RF Radiation Hazard functions. This output will short to ground whenever the antenna is within the programmed AZ LIMIT zone(s) or is Searching, Targeting or is mispointed 0.5 degrees from satellite peak. This output is commonly used to drive:

If your modem cannot use the Modem Console Port connection you will have to provide a transmit inhibit output from the ACU by connecting a SW2 wire connection to the modem to comply with FCC Order 04-286 and WRC-03 Resolution 902.

- Dual or Quad Antenna Arbitrator coax switches in dual antenna configurations. The coax switches select which antenna is feeding signal to the below decks equipment.
- Mute the Transmit output of the Satellite Modem used in TX/RX antenna configurations when the antenna is positioned where people may be harmed by the transmit power emanating from the antenna (RF Radiation Hazard).
- Mute the Transmit output of the Satellite Modem used in TX/RX antenna configurations when the antenna is mispointed by 0.5 degrees, or more, and keep it muted until the antenna has been



within 0.2 degrees of peak pointing to the satellite for a minimum of 5 seconds (FCC part 25.221 & 25.222 TX Mute requirement).

4.7.1.4. TS2 Synchro Gyro Compass Input.

Use the R1, R2, S1,S2 and S3 screw terminals to connect the Synchro Gyro Compass to the ACU.

4.7.1.5. TS3 Step-By-Step (SBS) Gyrocompass Input.

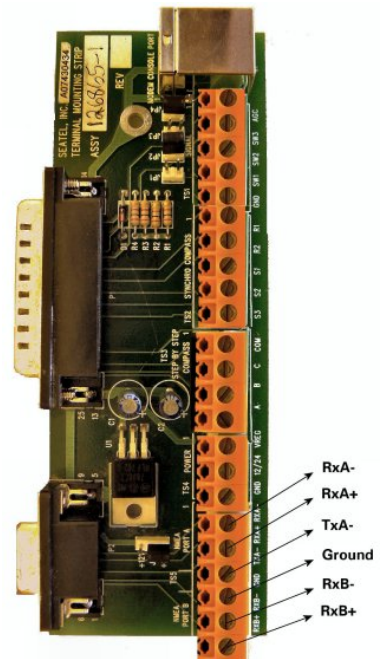
Use the COM, A, B and C screw terminals to connect the SBS Gyrocompass to the ACU. Some SBS Gyro distribution boxes have terminals which are labeled S1, S2 & S3 instead of A, B and C.

4.7.1.6. TS4 Power

- **VREG** Screw terminal is used to provide a regulated DC operating voltage to ancillary equipment. Voltage out is dependant upon which terminal mounting strip assembly is provided. 126865-1 supplies 8Vdc @ 1Amp, while the 126865-2 assembly supplies 5Vdc @ 2Amps.
- **GND** Screw terminal is the ground reference for the regulated and unregulated power terminals.
- **12/24** Screw terminal is commonly used to provide operating voltage to a external GPS, Dual Antenna Arbitrator or other below decks tone generators or switches. Voltage output is based on the T.M.S assemblies JP5 jumper settings.

4.7.1.7. TS5 NMEA A/B, GPS output.

- **RxA- and RxA+** screw terminals, which are defined as the NMEA A connection is used to connect to the ships Gyro Compass (Heading). The NMEA0183 compliant inputs are then connected via a 9 pin ribbon cable to the ACU's J2 NMEA communications port. A GPS (Latitude and Longitude) input may also be connected, but is not required because there is a GPS device already installed in your antenna.. **NOTE: If you connect a ships GPS to the terminal mounting strip, you MUST disconnect the GPS antenna on the antenna pedestal.**
- **RxB- and RxB+** screw terminals, which are defined as the NMEA B connection is used to connect to the ships Gyro Compass (Heading). The NMEA0183 compliant inputs are then connected via a 9 pin ribbon cable to the ACU's J2 NMEA communications port. A GPS (Latitude and Longitude) input may also be connected, but is not required because there is a GPS device already installed in your antenna.
- **TxA-** screw terminal is used to provide a Pseudo GPS (GGA and GLL formats) output to other system components such as a Satellite Modem.



4.8. AC Power To The ACU

Assure Power switch on the front panel of the ACU is turned OFF. Connect AC Power cord to the ACU and to the AC Power outlet. It is recommended that a UPS be installed.

4.9. AGC Tracking Connection

Connect the IF Coax from one of the available outlets on the FSK Modem, splitter or matrix switch to "RF IN" jack on the rear panel of the ACU.

For external AGC, connect a cable between the AGC or TM output of the master receiver or modem and the terminals labeled "EXT AGC" and "GND" TB2 of the Terminal Mounting Strip.

4.10. **Monitor And Control Connections**

- **J2 NMEA** - The NMEA Port allows 2 simultaneous NMEA-0183 input connections on the same DB9 connector, defined as NMEA A and NMEA B. Both ports have selectable baud rates independent of each other. In addition, NMEA A Tx- Line (J2- Pin 3) outputs a pseudo NMEA string (GGA format) which can be connected to an external device, such as a satellite modem, to provide Latitude and Longitude position.
 - **NOTE:** The factory default for NMEA heading input is xxHDT, if the gyro input into the ACU is providing heading information in any other format, you must use the internal webpage to configure the NMEA Heading ID parameter for proper operation. Example if you have a heading input providing xxHDG heading strings, you would set up the NMEA Heading ID parameter to **HDG**. Refer to the “**Communications Port Settings**” information in the Maintenance section of this manual.
- **J3 M&C** - The Monitor and Control port allows external control from a PC using a communications program such as Sea Tel ProgTerm or DacRemP via a straight 9 wire serial cable. This Port is used in conjunction with a diagnostic software connection to configure all communications settings, and/or for an **Authorized Sea Tel Dealer** to perform software uploads to the PCU, ACU Main PCB, and DVB Receiver.
- **Ethernet** - The Ethernet Port allows use of a LAN connection to login into the ACUs internal webpage’s to view or change system parameters using a web browser such as Internet Explorer or Mozilla Firefox and a standard CAT5 Ethernet patch cable. This 10BaseT Ethernet Port has a configurable static IP address with 2 TCP/IP connections for diagnostic software connections and a UPD Port for an **Authorized Sea Tel Dealer** to perform a software upload to the Comm IF Module. For operating a ABS VSAT system, this Ethernet port must be connected via a CAT5 patch cable to an available LAN port of an OpenAMIP™ compatible satellite modem (i.e. an iDirect 5000 Series satellite modem)

4.11. **Install Other BDE Equipment**

Install and connect the other below decks equipment as required.

4.12. **Final Checks**

4.12.1. **Visual/Electrical inspection**

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

4.13. **Power-Up**

Verify that all shipping straps and restrains have been removed prior to energizing the antenna.

When all equipment has been installed, turn ACU Power ON. If the ACU does not provide power to the antenna, turn antenna power ON. The ACU will initially display “SEA TEL – MASTER and DAC-2202 VER 6.xx”. If the Antenna is energized, approx. 10 seconds later the display will change to “SEA TEL – REMOTE and INITIALIZING”. After initialization, the bottom line of the remote display will display the antenna model number and the software version from the PCU.

Energize and check the other Below Decks Equipment to verify that all the equipment is operating. You will need to assure that the ACU is setup correctly and that the antenna acquires the correct satellite before you will be able to completely check all the below decks equipment for proper operation.

4.14. **Setup**

If your system includes the Touch Screen Controller, refer to the Setup chapter in the TSC-10 manual to setup the ACU. If not, refer to the Setup instructions in the next section of this manual to assure that the ACU settings and parameters are set correctly for your desired satellite.

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5. Setup

Below are basic steps to guide you in setting up the ACU. Assure that the Antenna Pedestal (ADE) has been properly installed. If your system includes the OPTIONAL Touch Screen Controller, refer to the Operation & Setup chapters in the TSC-10 manual to setup the ACU.

5.1. Operator Settings

Refer to the Operation chapter of this manual to set the Ship information. Latitude and Longitude should automatically update when the GPS engine mounted on the antenna pedestal triangulates an accurate location, but you may enter this information manually to begin. Except when integrating NMEA-0183 Gyro source, you will have to enter the initial Heading of the ship, subsequently the ACU will then increment/decrement as the Gyro Compass updates.

Next, set the Satellite information. Longitude of the desired satellite you wish to use and the receiver settings for it are especially important.

At this point you should be able to target the desired satellite. Continue with the setup steps below to optimize the parameters for your installation.

5.2. Default Setup Parameters For Your Antenna

Refer to the Setup section of your antenna manual for the Default Setup Parameters which were entered into your ACU at the Factory. When your system was installed, your dealer will have changed some of these parameters so that the ACU will read your Gyro compass input properly, optimize azimuth and elevation targeting, optimize polarization and to assure that Tracking is in DishScan mode. In normal operation you should **NOT** need to change these parameters.

CAUTION: Improper setting of these parameters will cause your system to not perform properly.

If you need to set, or change, a parameter refer to the Flow-Charts and individual parameter setting information below to optimize your settings.

5.3. SETUP Parameter display and entry menus.



Press and hold BOTH the LEFT and the RIGHT arrow keys **for 6 seconds** to access to the system setup parameters (at the **EL TRIM** selection). **Press** BOTH the LEFT and the RIGHT arrow keys **momentarily** to access to the **SAVE NEW PARAMETERS** parameter.

Access is only required after installation or repairs of your antenna system. These parameters should only be changed by an authorized service technician.

CAUTION: Improper setting of these parameters will cause your system to not perform properly. Also refer to the SETUP section of your Antenna manual.

5.4. Overview - Setup Flowchart

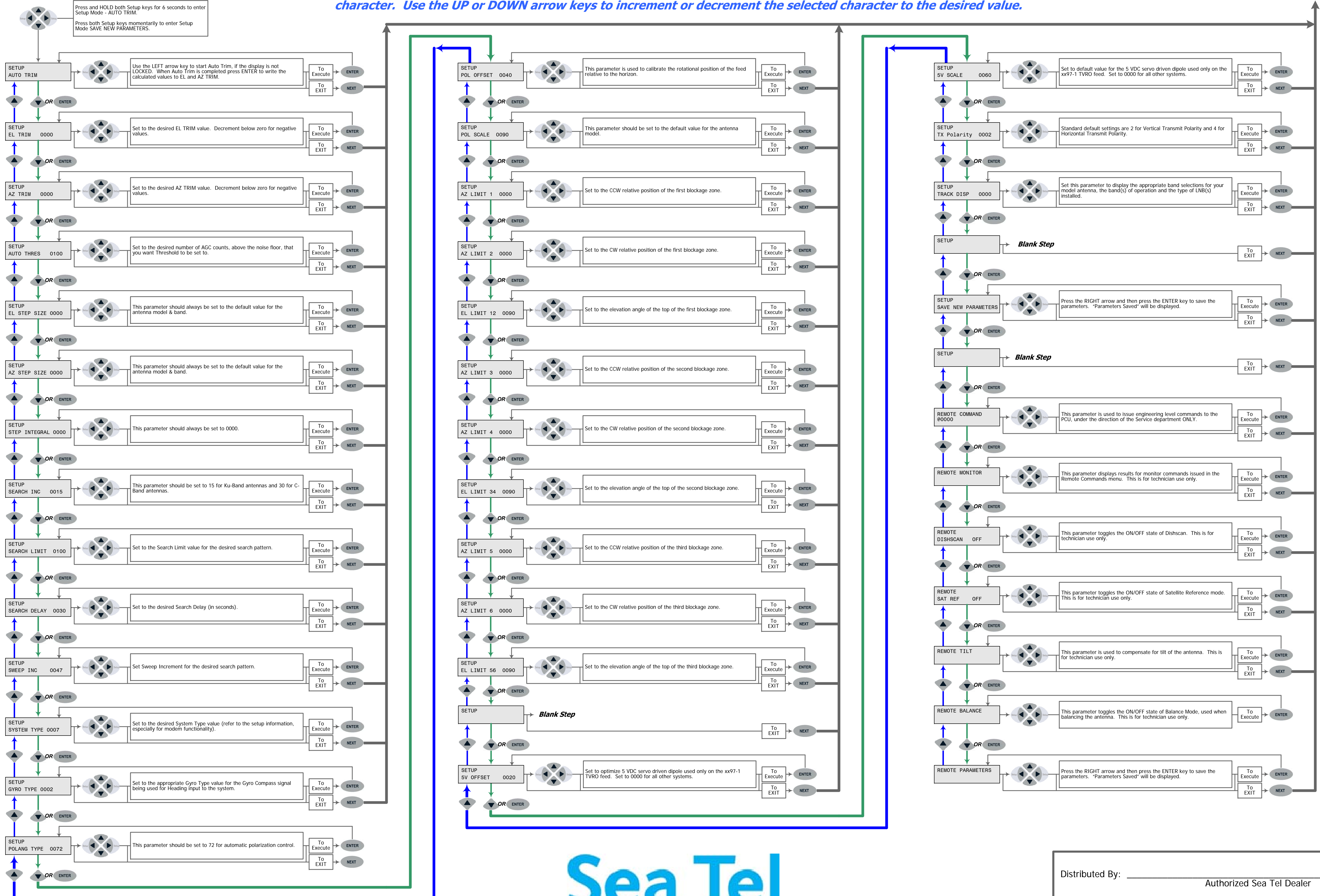
The following page is a flowchart of setting up the Parameters of the ACU.

DAC-2202 Setup Flowchart – Version 6.07

Setup (from any other menu)

Basic button pushing in any one of the sub-menus is: Use the LEFT and RIGHT arrow keys to bring up, and move, the cursor to select a character. Use the UP or DOWN arrow keys to increment or decrement the selected character to the desired value.

To Operation Flowchart Status menu



Distributed By: _____ Authorized Sea Tel Dealer
Phone: _____

5.5. 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.

Refer to “Optimizing Targeting” in the Setup section of this manual for further details on the parameters settings.

To enable this function, the Antenna **MUST** be actively tracking the satellite with positive SAT ID and elevation of the antenna must be less than 83 degrees and the ACU must **NOT** be set for Inclined Orbit Search. After locating the satellite, with Tracking ON, wait at least 30 seconds before performing the AUTO TRIM feature, this will allow sufficient time for the antenna to peak up on signal. It is equally important that you verify that the system is tracking the **CORRECT** satellite (verify video is produced on the Televisions in a TVRO system or verify a RX lock indication on the satellite modem in a VSAT system).

While in the AUTO TRIM sub-menu, press the **LEFT** arrow key to bring start the calibration procedure, the display should read AUTO TRIM SETUP, press the **ENTER** key to submit. AUTO TRIM SAVED will be displayed, indicating the proper AZ and EL trims were submitted to RAM. This does not save these parameters to NVRAM, in order to save to memory, continue down through the setup mode parameters until the SETUP **SAVE NEW PARAMETERS** sub menu is displayed. Press the **RIGHT** arrow and then press the **ENTER** key. The display should now report that the parameters were saved. From the AUTO TRIM SETUP screen, press the **NEXT** key (DAC2202) without hitting **ENTER** to escape this screen without submitting the new AZ and EL Trim values.

NOTE: AUTO TRIM LOCKED will be displayed on the front panel, indicating that the AUTO TRIM Feature is **NOT** allowed if all of these conditions are not met:

The ACU **must** be actively tracking a satellite (AGC above threshold) **and**

The ACU **must** have positive SAT ID (internal NID match or external RX lock received from the Satellite Modem) **and**

The elevation angle of the antenna **must** be LESS than 75 degrees **and**

The ACU **must** NOT be set for Inclined Orbit Search.

5.6. Manually Optimizing Targeting

First, assure that all of your Ship & Satellite settings in the ACU are correct.

1. Target the desired satellite, immediately turn Tracking OFF, and record the Azimuth and Elevation positions in the “**ANTENNA**” display of the ACU (these are the **Calculated** positions).
2. Turn Tracking ON, allow the antenna to “Search” for the targeted satellite and assure that it has acquired (and peaks up on) the satellite that you targeted.
3. Allow several minutes for the antenna to “peak” on the signal, and then record the Azimuth and Elevation positions while peaked on satellite (these are the Peak positions). Again, assure that it has acquired the satellite that you targeted!
4. Subtract the Peak Positions from the Calculated Positions to determine the amount of Trim which is required. Refer to the ACU Setup information to key in the required value of Elevation Trim.
5. Continue with Azimuth trim, then 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 ACU targets to an Elevation position of 30.0 degrees and an Azimuth position of 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 (displayed as -0015) and an AZ TRIM of +2.2 degrees (displayed as 0022). After these trims values had been set, your peak **on satellite** Azimuth and Elevation displays would be very near 180.2 and 30.0 respectively.

5.7. EL TRIM

Elevation trim offset parameter is entered in tenths of degrees. Adjusts display to correct for antenna alignment errors or imbalances in the antenna system. Increase number to increase display. Refer to “Optimizing Targeting” in the Setup section of your antenna manual.

To update: While in the EL TRIM sub-menu, press the LEFT arrow key to bring the cursor under the ones digit. Press the UP or DOWN arrow key to increment or decrement the selected digit. Minus values are entered by decrementing below zero. Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

Continue with Azimuth trim, then 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.

5.8. AZ TRIM

Azimuth trim offset parameter is entered in tenths of degrees. Offsets true azimuth angle display to compensate for installation alignment errors when used with Ships Gyro Compass input reference. **Azimuth Trim does not affect REL azimuth reading.** Increase number to increase displayed value. Refer to "Optimizing Targeting" in the Setup section of your antenna manual.

To update: While in the AZ TRIM sub-menu, press the LEFT arrow key to bring the cursor under the ones digit. Press the UP or DOWN arrow key to increment or decrement the selected digit. Minus values are entered by decrementing below zero. Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode. Then 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.

5.9. AUTO THRES

Sets offset of AGC tracking threshold above the average noise floor. Units are in A/D counts, approximately 20 counts/dB. A setting of 0 disables auto threshold, therefore, the operator would have to manually enter a threshold value.

When AUTO THRESHOLD is enabled, the ACU automatically re-sets the AGC tracking threshold whenever the antenna Targets (AZ, EL or SAT), Searches or Unwraps. The new AGC threshold is set to the average signal level input (approximate background noise level) **plus** the AUTO THRES offset value. EXAMPLE: If the Noise Floor off satellite is 1000 counts of AGC and Auto Threshold is set to 100, Threshold will be set to approximately 1100 after the antenna has finished targeting, Searching or Unwrapping. If you wish to change this parameter, refer to the Setup Flowchart to key in and save the desired value.

To change the Automatic Threshold value *OR* manually set threshold; Note the Peak "on satellite" AGC value, move EL and note the "off satellite" (Noise Floor) AGC value. Calculate the *Difference* between Peak AGC and Noise Floor AGC. AUTO THRES should be set to 1/3 (to 1/2) of the *Difference*. This will usually be around 100 counts (3 dB) for a typical antenna configuration. Changes to this parameter may be required based on carrier tracking frequency, possible adjacent satellite, or ambient interference with desired satellite.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.10. EL STEP SIZE

Sets elevation sensitivity for *DishScan Tracking Mode*. Units are in pedestal step resolution. For proper DishScan operation this parameter **must** be set to **factory default value of 0000**. If not already set to the correct value for your antenna, key in the value and press ENTER.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.11. AZ STEP SIZE

Sets azimuth sensitivity for *DishScan Tracking Mode*. Units are in pedestal step resolution. For proper DishScan operation this parameter **must** be set to **factory default value of 0000**. If not already set to the correct value for your antenna, key in the value and press ENTER.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.12. **STEP INTEGRAL**

Sets the integration time for *Tracking Mode*. Units are in processor timing cycles and should be left at your antennas' default value of 0000 for *DishScan Tracking Mode*. Refer to your antenna manual.

To manually update, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.13. **SEARCH INC**

Sets size of search pattern increment. Units are in pedestal step resolution. The suggested setting is equal to 1/2 the 3dB beamwidth of your antenna. Refer to your antenna manual.

To manually update, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.14. **SEARCH LIMIT**

Sets the overall peak to peak size of the search pattern. Units are in pedestal step resolution. After you have optimized your Targeting (TRIM settings above) and have verified that you are able to accurately Target you may wish to reduce the size of the Search pattern to avoid Tracking on an adjacent satellite (ie set to 50% of its default value to only search half as far from your targeted position). Refer to your antenna manual.

To manually update, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.15. **SWEEP INC**

This parameter should be set for the desired azimuth sweep speed of a No Gyro search or the Sweep Increment dimension of an Inclined Orbit search (refer to the search pattern information in paragraph 2.7).

When the GYRO TYPE parameter is 0000 the ACU is in "No Gyro" mode (no heading input is available for the ACU). A SWEEP INC setting of 0040 = 9 degrees/second, 0060 = 13 degrees/second or 0080 = 18 degrees/second. Larger antennas should have slower speeds and smaller antennas should have faster speeds. Refer to your antenna manual for factory default setting for your antenna. If Gyro Type is set to 0000, you must set SWEEP INC correctly and SATELLITE REFERENCE MODE **MUST** also be turned **ON**.

If you want the ACU to conduct an Inclined Orbit search pattern you must set SWEEP INC to 192 if your antenna is a Series 04, Series 06 or Series 09. Set to 193 if your antenna is a Series 97, Series 00 or Series 07. This parameter sets the sweep increment dimension of the search pattern.

To manually update, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.16. **SYSTEM TYPE parameter**

The System Type parameter is used to enable a variety of system functions. **With this parameter value set to 0, the DAC software functions will be as follows:**

- External AGC, or Modem Lock, function is used to bring an external modem lock signal from a satellite modem into the ACU as a positive ID that the antenna is on the desired satellite. This input is NOT used for Tracking purposes, it is only used during search to identify when the antenna has acquired the correct satellite. This external AGC function in the DAC software is **disabled**. Expected input is 0 VDC when the modem has RX sync/Network Lock and a positive voltage (+15 VDC **max**) when the does not have lock.

- LNB Voltage - This function enables the Tracking Receiver to output 13/18 VDC, and/or 22kHz Tone to power an LNB and/or control a Matrix Switch. This function is **disabled**.
- The blockage output (SW2) of the ACU is a **short** to ground circuit when the antenna *is* in a programmed blockage zone, is searching, or targeting and or is mis-pointed by 0.5 degrees or greater. Whenever one of these conditions exist a transistor on the main PCB in the ACU shorts to ground providing a current sink of 0.5 amps max to control below decks dual antenna coax switches or TX Mute control to a satellite modem (for radiation hazard control or TX mute requirements for FCC compliance).
- Relative Azimuth value is normally only visible in the **Antenna** main menu display. The Azimuth entry menu normally displays Azimuth position, DishScan tracking signal and AGC.
- When Search limit is reached the antenna will return back to the origin of the search pattern.
- When the ACU power is turned ON it does not automatically target the satellite that was used last.
- Pressing RESET on the front panel of the ACU normally only resets the processors inside but does not re-target the satellite.

The functions below can be enabled to change the normal behavior of the system if desired. Select system options according to the following table. Add together all the desired options and enter the sum into the SYSTEM TYPE parameter to enable the desired functions.

128	Reverse External Modem Lock input polarity (logic hi = lock). If you know that the modem you will be using with the system provides requires a logic hi (+15 VDC max) when it has modem lock or you find the AGC reading for locked and unlocked conditions from your modem need to be reversed you must enable this function in your current SYSTEM TYPE parameter.
64	Enables LNB voltage output from the ACU. This is NOT recommended for Series 09 systems, because they ALL provide the LNB voltage at the pedestal.
32	Display Relative in the Azimuth entry display. Enabling this function causes REL position to take the place of the DishScan signaling in the Azimuth entry display. Relative position of the antenna is RARELY more desirable than the DishScan signaling.
16	Reverse blockage output logic (SW2 logic hi = blocked). If you know that the modem you will be using with the system requires a logic hi (open circuit) to mute or you find that the Modem is being muted when the antenna is ON satellite (and un-muted when the antenna is blocked, searching or targeting) you must enable this function in your current SYSTEM TYPE parameter.
8	-- Reserved --
4	Auto SAT load after SEARCH failure. Enabling this function will cause the ACU to re-target the calculated satellite position (rather than returning to origin).
2	Enable External Modem Lock Input (logic low = lock) This enables the ACU to use the external modem input. Expected input is logic low (0 VDC) when the modem has RX sync/Network Lock and a positive voltage (+15 VDC max) when the does not have lock. This function must be enabled to use the external input from ANY modem, regardless of its locked/unlocked logic. [If you find the AGC reading for locked and unlocked conditions need to be reversed you must add 128 to your current SYSTEM TYPE parameter].
1	Auto SAT load on "hot" RESET and ACU Power-Up. Enable this function if you want the ACU to automatically re-target the satellite whenever the system power is turned ON (after antenna initialization) or whenever the operator presses the RESET button on the from panel of the ACU.

To change the SYSTEM TYPE parameter, press the **LEFT** arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the **UP** or **DOWN** arrow keys to increment or decrement the selected character. Use the **LEFT** or **RIGHT** arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press **ENTER** to execute

the new value. Continue pressing **ENTER** until SAVE NEW PARAMETERS is displayed, and then press the **RIGHT** arrow, **UP** arrow then **ENTER** to save the change(s).

5.17. **GYRO TYPE**

Selects the type of gyro compass interface for ship turning compensation.

362	for 360:1 Synchro with S/D Converter
360	for 360:1 Synchro with SBS Converter
90	for 90:1 Synchro with S/D Converter
36	for 36:1 Synchro with S/D Converter
2	for Step-By-Step gyro or NMEA gyro
1	for 1:1 Synchro with S/D Converter
0	for No Gyro linear AZ Search Mode (No Heading input available)

If Gyro Type will be set to 0000, you must set SWEEP INC correctly and SATELLITE REFERENCE MODE **MUST** also be turned **ON**.

To manually update, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.18. **POLANG TYPE**

Default setting is 0072 for Auto-Polarization mode. This automatically adjusts the polarization of the feed by calculating the required polarization angle for the feed every 2 seconds based on ship's Latitude, Longitude and the Satellite Longitude. If the feed is not properly oriented, the ACU will send a command to the PCU to adjust the feed. The system will function with all 24V DC motor driven feeds assemblies.

- Set to 0000 when a circular feed is installed on your dish (polarization drive OFF)
- Set to 0009 (Manual Polarization) for troubleshooting or polarization alignment purposes OR if you desire to manually adjust the polarization of the feed as the ship travels. Refer to your antenna manual.
- **Set to 0072 for default Auto-Pol mode.**
- Set to 0073 for C-Band Circular systems which will be used at high elevation look angles (above 83 degrees).

To change this parameter value, press the LEFT arrow key to bring the cursor under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.19. **POL OFFSET**

The POL OFFSET parameter is utilized to mechanically calibrate the feed assembly installed onto your antenna (this technically calibrates the Polang pot position reference to its' center of range). Each increment equals one degree of polarization rotation. Refer to Optimizing Auto-Polarization in the setup section of your antenna manual for detailed instructions on how to perform this calibration procedure.

5.20. **POL SCALE**

90 degree 24V Polang pot motion scale factor. Leave at factory default (0090).

5.21. **Radiation Hazard and Blockage Mapping (AZ LIMIT parameters)**

The ACU 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 ACU software may allow you to set four zones or it will only three zones and include +5 volt polarization.

When the AZ LIMIT parameters are set to create these ZONES (up to four), several things happen when the antenna is within 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 (if 4 value is included in SYSTEM TYPE). Timeout and re-target will continue until the satellite is re-acquired and tracking can resume.

2. "BLOCKED" will be displayed in the TRACKING window wherever the antenna is inside one of the zones.
3. A contact closure to ground (or an open if the blockage logic is reversed – See SYSTEM TYPE 16 value) is provided on the SW2 terminal of the Terminal Mounting Strip. This Switch output provides a "Blocked", "RF Radiation Hazard" or "FCC TX Mute" logic output. When the antenna exits the zone it will be on satellite, tracking and the SW2 logic contact closure will open.

The lower and upper limits are user programmable and are stored in NVRAM within the ACU parameter list.

AZ LIMIT 1 is the Lower Relative AZ limit (this is the more counter-clockwise of the two points, even if it is numerically larger). AZ LIMIT 2 is the Upper Relative AZ limit (the more clockwise of the two points) for pattern mapping of ZONE 1. Enter the elevation value that represents the top of the blockage between the two azimuth limit points in the EL LIMIT 12 parameter.

AZ LIMIT 3 is the Lower Relative AZ limit (CCW point) and AZ LIMIT 4 is the Upper Relative AZ limit (CW point) for pattern mapping of ZONE 2. Enter the elevation value that represents the top of the blockage between the two azimuth limit points in the EL LIMIT 34 parameter.

AZ LIMIT 5 is the Lower Relative AZ limit (CCW point) and AZ LIMIT 6 is the Upper Relative AZ limit (CW point) for pattern mapping of ZONE 3. Enter the elevation value that represents the top of the blockage between the two azimuth limit points in the EL LIMIT 56 parameter.

AZ LIMIT 7 is the Lower Relative AZ limit (CCW point) and AZ LIMIT 8 is the Upper Relative AZ limit (CW point) for pattern mapping of ZONE 4. Enter the elevation value that represents the top of the blockage between the two azimuth limit points in the EL LIMIT 78 parameter. If your ACU software includes 5 volt polarization you will not see these AZ & EL LIMIT parameters.



CAUTION: The **Lower Relative AZ limit** is the more **counter-clockwise** of the two points (even if it is numerically larger) and the **Upper Relative AZ limit** is the more **clockwise** of the two points. If you enter the two relative points incorrectly, Tracking and Searching will be adversely affected.

The ACU provides a contact closure to ground on the SW2 terminal of the Terminal Mounting Strip when the antenna is pointed within any one of the blockage/hazard zones or the system is searching, targeting, unwrapping or is mis-pointed by 0.5 degrees or more (FCC TX Mute function for Transmit/Receive systems **only**). The contact closure is a transistor switch with a current sinking capability of 0.5 Amp. Refer to "Functional Testing" for instructions on how to **simulate** a manual BLOCKED condition to test SW2 logic output.

When used as simple "**BLOCKED**" logic output for a single Sea Tel antenna, this output could be used to light a remote LED and/or sound a buzzer to alert someone that the antenna is blocked, and therefore signal is lost.

In a "Dual Antenna" installation, this logic output is also used to control a Dual Antenna Arbitrator panel to switch the TXIF & RXIF signals from Antenna "A" to Antenna "B" when Antenna "A" is blocked, and vice versa.

When used as simple "**RF Radiation Hazard**" logic output for a single Sea Tel TXX antenna, this output could be used to suppress RF transmissions while the antenna is pointed where people would be harmed by the transmitted microwave RF power output. The SW2 output would be interfaced to the satellite modem to **disable** the TX output signal from the Satellite TXX Modem whenever the antenna is within the RF Radiation Hazard zone(s).

When used for "**FCC TX Mute**" logic output for a single Sea Tel TXX antenna, this output is used to suppress RF transmissions whenever the antenna is mis-pointed 0.5 degrees or more, is blocked, searching, targeting or unwrapping. The SW2 output would be interfaced to the satellite modem to **disable/mute** the TX output signal from the Satellite TXX Modem. When the mute condition is due to antenna mis-pointing, it will not **un-mute** until the pointing error of the antenna is within 0.2 degrees. The default output is contact closure to ground when the antenna is mis-pointed, therefore providing a **ground** to "Mute" the satellite modem from the SW2 terminal of the Terminal Mounting Strip. If your satellite modem requires an **open** to "Mute", refer to SYSTEM TYPE parameter 16 value to reverse the output logic from the ACU.

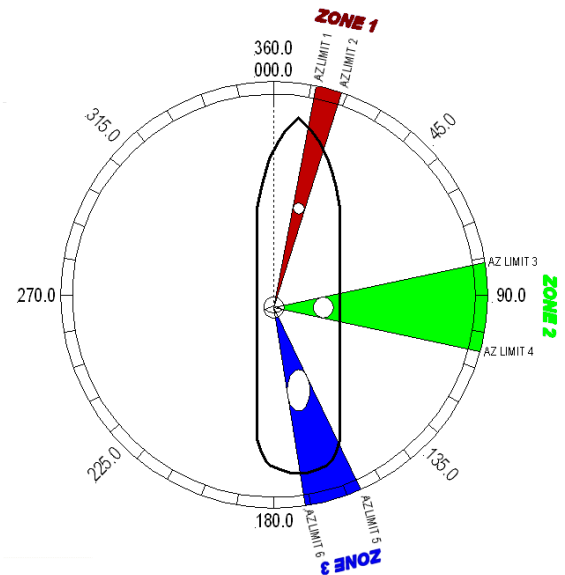
Programming instructions:

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 (in AZ LIMIT pairs).

In unlimited antenna systems the Relative position of the antenna must have been calibrated by properly setting the Home Flag Offset (HFO) value in the PCU. The HFO calibrates Relative to display 0000 when the antenna is pointed in-line with the bow of the boat/ship (parallel to the bow).

Convert the relative readings to AZ LIMIT/EL LIMIT values by multiplying by 10. Enter the beginning of the **first** blockage region as AZ LIMIT 1 and the end of the region (clockwise direction from AZ LIMIT 1) as AZ LIMIT 2 parameters in the ACU. If needed, repeat setting AZ LIMIT 3 & 4 for a **second** ZONE and then AZ LIMIT 5 & 6 if a **third** ZONE is needed. All **unneeded** zone AZ LIMIT pairs **must** be set to 0000. Set the upper elevation limit of each blockage zone (also entered in degrees multiplied by 10).

EXAMPLE 1 - Three blockage Zones: A ship has a Sea Tel antenna mounted on the port side and an Inmarsat antenna mounted on the starboard side. A mast forward, the Inmarsat antenna to starboard and an engine exhaust stack aft form the three zones where satellite signal is blocked (as shown in the graphic). In this example zone 1 is caused by the mast, zone 2 is from the Inmarsat antenna, zone 3 is from the stack and zone 4 is not needed:



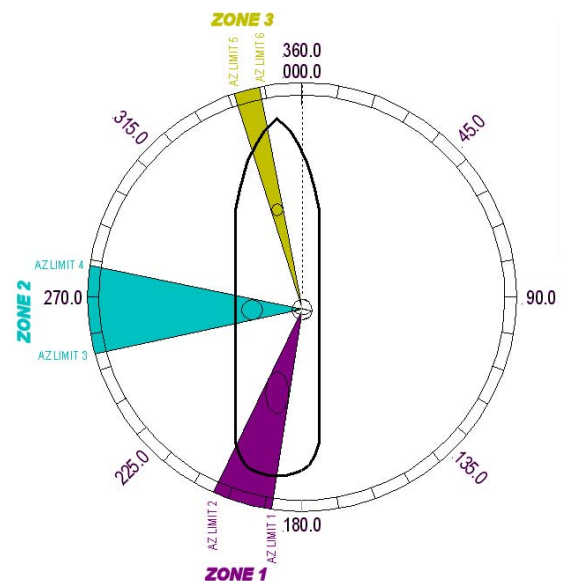
ZONE 1 begins (AZ LIMIT 1) at 12 degrees Relative and ends (AZ LIMIT 2) at 18 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 1 value of 0120 and AZ LIMIT 2 value of 0180. In this case the mast height only causes blockage up to an elevation of 50 degrees, so we set EL LIMIT 12 to 0500. If the antenna is between these two AZ Limit points but the elevation is greater than 50 degrees, the antenna will no longer be blocked.

ZONE 2 begins (AZ LIMIT 3) at 82 degrees Relative and ends (AZ LIMIT 4) at 106 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 3 value of 0820 and AZ LIMIT 4 value of 1060. In this case the Inmarsat antenna height only causes blockage up to an elevation of 12 degrees, so we set EL LIMIT 34 to 0120. If the antenna is between these two AZ Limit points but the elevation is greater than 12 degrees, the antenna will no longer be blocked.

ZONE 3 begins (AZ LIMIT 5) at 156 degrees Relative and ends (AZ LIMIT 6) at 172 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 5 value of 1560 and AZ LIMIT 6 value of 1720. In this case the stack antenna height only causes blockage up to an elevation of 36 degrees, so we set EL LIMIT 56 to 0360. If the antenna is between these two AZ Limit points but the elevation is greater than 36 degrees, the antenna will no longer be blocked.

ZONE 4 is not needed. Enter AZ LIMIT 7 value of 0000 and AZ LIMIT 8 value of 0000. Set EL LIMIT 78 to 0000. If your ACU software includes 5 volt polarization you will not see these AZ & EL LIMIT parameters.

EXAMPLE 2 - Three blockage Zones, Dual Antenna configuration: A ship has 2 Sea Tel antennas, “Antenna A” mounted on the port side and “Antenna B” mounted on the starboard side. Antenna A is designated as the **master** antenna and its zones would be set as in example 1 above. The mast forward, Antenna A to port and the engine exhaust stack aft form the three zones where satellite signal is blocked from Antenna B. The SW2 logic output from Antenna A (ACU A) and Antenna B (ACU B) are used to control a “Dual Antenna Arbitrator”, which will route satellite signal from the **un-blocked** antenna to the other below decks equipment. If both antennas are tracking the same satellite, they will not both be blocked at the same time. The logic output will switch to provide satellite signal to the below decks equipment from Antenna A when it is **not blocked** and will switch to provide satellite signal from Antenna B whenever Antenna A is **blocked**. The switches will not change state if **both** antennas are blocked, or if **both** are on satellite.



Antenna A is the same as the previous example and its ACU would be set to those AZ LIMIT values.

Antenna B ACU would be set to:

In this example Antenna B zone 1 is caused by the stack, zone 2 is from Antenna A, zone 3 is from the mast and zone 4 is not needed.

ZONE 1 begins (AZ LIMIT 1) at 188 degrees Relative and ends (AZ LIMIT 2) at 204 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 1 value of 1880 and AZ LIMIT 2 value of 2040. In this case the stack height only causes blockage up to an elevation of 42 degrees, so we set EL LIMIT 12 to 0420. If the antenna is between these two AZ Limit points but the elevation is greater than 42 degrees, the antenna will no longer be blocked.

ZONE 2 begins (AZ LIMIT 3) at 254 degrees Relative and ends (AZ LIMIT 4) at 278 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 3 value of 2540 and AZ LIMIT 4 value of 2780. In this case the Antenna B height only causes blockage up to an elevation of 12 degrees, so we set EL LIMIT 34 to 0120. If the antenna is between these two AZ Limit points but the elevation is greater than 12 degrees, the antenna will no longer be blocked.

ZONE 3 begins (AZ LIMIT 5) at 342 degrees Relative and ends (AZ LIMIT 6) at 348 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 5 value of 3420 and AZ LIMIT 6 value of 3480. In this case the mast height only causes blockage up to an elevation of 41 degrees, so we set EL LIMIT 56 to 0410. If the antenna is between these two AZ Limit points but the elevation is greater than 12 degrees, the antenna will no longer be blocked.

ZONE 4 is not needed. Enter AZ LIMIT 7 value of 0000 and AZ LIMIT 8 value of 0000. Set EL LIMIT 78 to 0000. If your ACU software includes 5 volt polarization you will not see these AZ & EL LIMIT parameters.

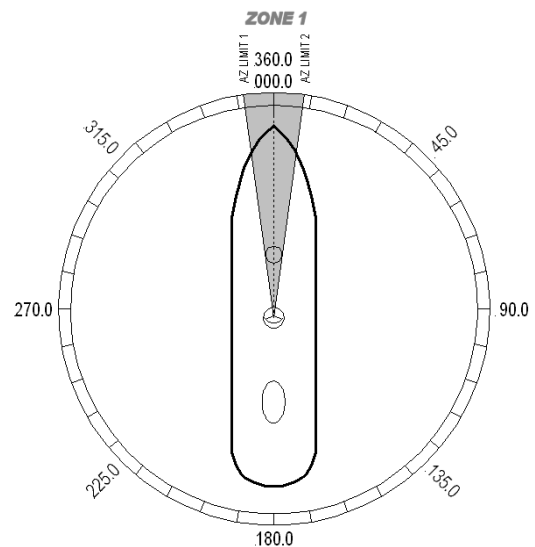
EXAMPLE 3 - One blockage Zone: A ship has a Sea Tel antenna mounted on the center line of the ship. A mast is forward and an engine exhaust stack is aft. In this example the Stack does **NOT** block the satellite, only the mast forward does. In this example zone 1 is caused by the mast, zone 2, 3 and 4 are not needed:

ZONE 1 begins (AZ LIMIT 1) at 352 degrees Relative and ends (AZ LIMIT 2) at 8 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 1 value of 3520 and AZ LIMIT 2 value of 0080. In this case the mast height only causes blockage up to an elevation of 52 degrees, so we set EL LIMIT 12 to 0520. If the antenna is between these two AZ Limit points but the elevation is greater than 52 degrees, the antenna will no longer be blocked.

ZONE 2 is not needed. Enter AZ LIMIT 3 value of 0000 and AZ LIMIT 4 value of 0000. Set EL LIMIT 34 to 0000.

ZONE 3 is not needed. Enter AZ LIMIT 5 value of 0000 and AZ LIMIT 6 value of 0000. Set EL LIMIT 56 to 0000.

ZONE 4 is not needed. Enter AZ LIMIT 7 value of 0000 and AZ LIMIT 8 value of 0000. Set EL LIMIT 78 to 0000. If your ACU software includes 5 volt polarization you will not see these AZ & EL LIMIT parameters.



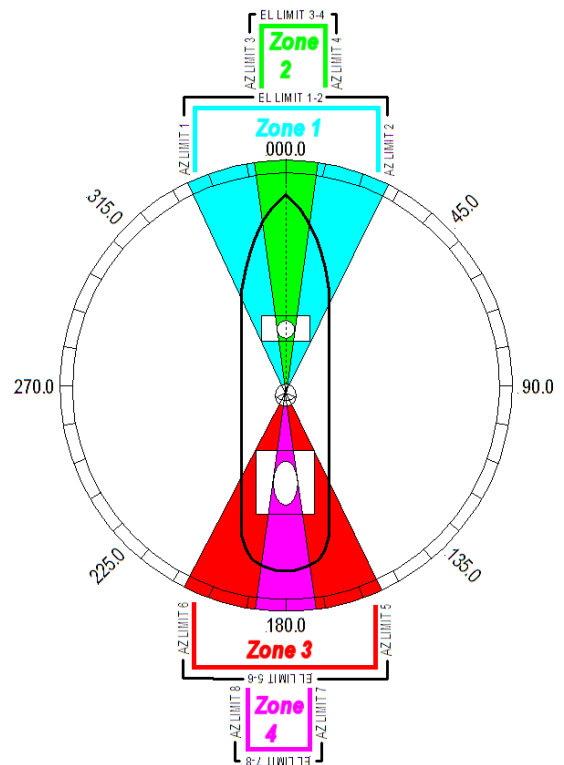
EXAMPLE 4 - Overlaid Blockage Zones: A ship has a Sea Tel antenna mounted on the center line of the ship. A mast mounted on top of a deckhouse (like the picture below) is forward and an engine exhaust stack, also on a deckhouse, is aft. These two blockage areas have wide azimuth blockage at lower elevations and then a narrower azimuth area of blockage extends up to a higher value of elevation.

ZONE 1 begins (AZ LIMIT 1) at 334 degrees Relative and ends (AZ LIMIT 2) at 026 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 1 value of 3340 and AZ LIMIT 2 value of 0260. In this case the mast height only causes blockage up to an elevation of 40 degrees, so we set EL LIMIT 12 to 0400. 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.

ZONE 2 begins (AZ LIMIT 3) at 352 degrees Relative and ends (AZ LIMIT 4) at 008 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 3 value of 3520 and AZ LIMIT 4 value of 0080. In this case the mast height only causes blockage up to an elevation of 70 degrees, so we set EL LIMIT 34 to 0700. 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 begins (AZ LIMIT 5) at 155 degrees Relative and ends (AZ LIMIT 6) at 205 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 5 value of 1550 and AZ LIMIT 6 value of 2050. In this case the mast height only causes blockage up to an elevation of 30 degrees, so we set EL LIMIT 56 to 0300. 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 begins (AZ LIMIT 7) at 173 degrees Relative and ends (AZ LIMIT 8) at 187 degrees Relative. Multiply these Relative positions by 10. Enter AZ LIMIT 7 value of 1730 and AZ LIMIT 8 value of 1870. In this case the mast height only causes blockage up to an elevation of 55 degrees, so we set EL LIMIT 78 to 0550. If the antenna is between these two AZ Limit points but the elevation is greater than 55 degrees, the antenna will no longer be blocked. If your ACU software includes 5 volt polarization you will not see these AZ & EL LIMIT parameters.



5.22. 5V OFFSET (May not be in your software)

CCW 5v Polang servo position reference. Refer to your antenna manual.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.23. 5V SCALE (May not be in your software)

90 degree 5V Polang servo motion scale factor. Refer to your antenna manual.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.24. TX Polarity

Selects TX polarity override to disable Polang selection and coordinate TX polarities, therefore it is NOT used in TVRO antennas).

Refer to your antenna manual for default setting of this parameter.

To manually update, press the LEFT arrow key to bring the cursor up under the least significant character. Continue to move the cursor until the desired character to be edited is underscored (selected). Use the UP or DOWN arrow keys to increment or decrement the selected character.

Use the LEFT or RIGHT arrow key to move the cursor left or right to select other characters to modify. When you are finished modifying press ENTER to execute the new value OR press NEXT to abort and exit setup mode.

5.25. TRACK DISP

This parameter sets the selections that the user will see in the Tracking - Band Selection menu. Band Selection must be set to the appropriate selection for Tracking to operate properly.

Band selection controls the local logic output state of SW1 output terminal on the Terminal Mounting Strip PCB and remote C/Ku relays (or other switches) on the antenna pedestal.

Refer to your antenna manual for the proper default value (and the associated displayed ACU selections, and the remote Tone/Band/Voltage controls, that will be set as the band selection is toggled by the operator.

When the SW1 output is shorted to ground a current sink of 0.5 amps max is provided to control below decks band selection tone generators or coax switches. When SW1 output is open it is a floating output.

5.26. SAVE NEW PARAMETERS

Press RIGHT arrow and then press ENTER to save any recent changes in NVRAM for permanent storage. A "Parameters Saved" message will be displayed. If changes are made and not stored, they will still be effective but will be lost when power is removed or when the RESET is pressed. Press LEFT and RIGHT arrows at the same time to access this sub-menu

5.27. REMOTE COMMAND

Use to enter diagnostic commands to the PCU. Allows sending specific commands to the PCU from the ACU. All the checksums and response strings are handled by the ACU.

The default displayed remote command in the ACU is @0000 which gets the Latitude & Longitude position of the GPS mounted on the pedestal.

To send a different remote command to the PCU;

1. Press the LEFT arrow key to bring up the cursor and move it to the left until the current symbol in front of the 0000 is underscored.
2. Increment or decrement the symbol using the UP & DOWN arrow keys until the desired character is displayed.
3. Press the RIGHT arrow to underscore a digit to change and use the UP & DOWN arrow keys until the digit is the desired value. Continue moving the cursor and incrementing/decrementing digits until the desired value has been entered.
4. Press the ENTER key to send the command to the PCU. A response may be displayed in the lower line of the Remote Command window, or in the Remote Monitor window, depending on the command sent.

Refer to the Maintenance & Troubleshooting section of your antenna manual for some of the common diagnostic commands.

5.28. **REMOTE MONITOR**

Use to monitor the results of a diagnostic command which was sent to the PCU. Refer to your antenna manual.

5.29. **To Disable/Enable DishScan**

To be able to use Step Track, or to revert to Conscan, as your active tracking mode you will have to disable DishScan. Select the DISHSCAN parameter window on the ACU:

1. Press the **RIGHT** arrow, then press the **UP** arrow and last press the **ENTER** key to turn DishScan mode ON.
2. Press the **RIGHT** arrow, then press the **DOWN** arrow and last press the **ENTER** key to turn DishScan Mode OFF.

If you change this remote parameter, you must save the change using **REMOTE PARAMETERS**.

If DishScan is OFF and the Step Integral parameter is set to 0000, you will get a constant ERROR 0016 (DishScan error) and you will see zeros flashing in the lower left of the Azimuth and Elevation ENTRY menu displays. This is a visual indication that DishScan is turned OFF.

5.30. **Satellite Reference Mode**

The ships gyro compass input to the ACU may be accurate and stable in static conditions and yet may NOT be accurate or stable enough in some underway dynamic conditions. If there is no gyro compass or if the input is corrupt, not stable or not consistently accurate the tracking errors will become large enough to cause the antenna to be mis-pointed off satellite.

Satellite Reference Mode will uncouple the gyro reference from the azimuth rate sensor control loop. When operating in Satellite Reference Mode changes in ships gyro reading will not directly affect the azimuth control loop. The Pedestal Control Unit will stabilize the antenna based entirely on the azimuth rate sensor loop and the tracking information from DishScan. This will keep the azimuth rate sensor position from eventually drifting away at a rate faster than the tracking loop can correct by using the tracking errors to regulate the rate sensor bias.

Satellite Reference Mode can be used as a diagnostic mode to determine if tracking errors are caused by faulty gyro inputs.

It should normally be **OFF** as long as you have an accurate, reliable, gyro compass input available.

It **MUST** be **OFF** when the elevation angle is greater than 75 degrees. Above 75 degrees Elevation, the ability of Sat Reference tracking to correct the Az Rate sensor bias begins to degrade, especially on a circular C system.

Satellite Reference Mode **MUST be ON when:**

- No Gyro Compass is available.
- The Gyro Compass input is noisy, occasionally inaccurate or occasionally unavailable.
- Frequent or constant ACU Error Code 0001 (Gyro Compass has failed).
- Using an **uncompensated** Flux Gate Compass.

To view, or change, the Satellite Reference Mode status, select the SAT REF remote parameter:

1. Press the **RIGHT** arrow, then press the **UP** arrow and last press the **ENTER** key to turn Satellite Reference Mode ON.
2. Press the **RIGHT** arrow, then press the **DOWN** arrow and last press the **ENTER** key to turn Satellite Reference Mode OFF.

If you change this remote parameter, you must save the change using **REMOTE PARAMETERS**.

5.31. **REMOTE TILT**

Allows easy access to the tilt adjustment commands. Refer to your antenna manual. Press **LEFT** or **RIGHT** arrow bring up the cursor and begin adjustment. Press **UP/DOWN** arrow to adjust tilt forward and back. Press **LEFT/RIGHT** to adjust the tilt left and right. Press **ENTER** to restore normal system operation. (You must save the new tilt settings using the **REMOTE PARAMETERS** function below.

5.32. Remote Balance:

The Remote Balance function, when enabled, will turn off the operational motor gain of the 3 BLDC motors. If enabled, this function will also temporarily turn off DISHSCAN drive. This function is required when trying to perform an antenna balance procedure with antenna systems that have a built-in braking mechanism in the elevation and cross-level axis.

To enable balance mode:

1. Enter into the setup mode parameter settings
2. Access the "REMOTE BALANCE" sub-menu (located at the end of the Remote Parameters and hit the RIGHT arrow to initiate. The screen should now display "REMOTE BALANCE ON".
3. Perform the physical antenna balancing procedure as required.
4. Once the antenna balance is finished, press the ENTER key (or any other main menu key) to exit remote tilt mode and re-enable antenna motor gain.

5.33. REMOTE PARAMETERS

Allows any remote parameters that have been changed (via Remote Command or Remote Tilt) to be saved. Any REMOTE changes must be saved to NVRAM in the PCU, or they will be lost when power to the antenna is cycled or remote reset command is issued. Press RIGHT arrow and then press ENTER to save the parameters in the remote PCU's NVRAM. A "Parameters Saved" message will be displayed.

6. Functional Testing

If not already ON, Turn ON the Power switch on the front panel of the ACU.

6.1. ACU / Antenna System Check

1. Press RESET on the ACU front panel to initialize the system. Verify the display shows "SEA TEL INC - MASTER" and the ACU software version number. Wait 10 seconds for the display to change to "SEA TEL INC - REMOTE" and the PCU software version number.
2. If the display shows "REMOTE INITIALIZING" wait for approximately 2 minutes for the antenna to complete initialization and report the Antenna Model and PCU software version. If "REMOTE NOT RESPONDING" is displayed, refer to the Troubleshooting Section of this manual.
3. Press the **NEXT** key repeatedly to display the *Ship, Satellite, Antenna* and *Status* menu displays. This verifies that the displays change in the correct response to the keys.

6.2. Latitude/Longitude Auto-Update check

This verifies that the GPS position information is automatically updating..

1. Press the **NEXT** key repeatedly to display the *Ship* menu. Press **ENTER** to access edit mode and view the current Latitude value.
2. Press the **LEFT** arrow key to bring the cursor up under the ones digit, press **UP** and then hit **ENTER**. The display should immediately show a latitude value one degree higher, but then will be overwritten within several seconds (back to the previous value) by the GPS engine.

This test does not need to be repeated in the Longitude menu.

6.3. Ship Heading – Gyro Compass Following Check

This verifies that the Heading display is actually following the Ships Gyro Compass.

1. Press the **NEXT** key repeatedly to display the *Ship* menu. If the boat is underway, monitor the Heading value to verify that the display changes in the correct response to the Gyro Compass input (Heading value should always be exactly the same as the Gyro Compass repeater value).
2. If the ship is NOT underway, most ships will turn +/- 1-2 degrees at the pier, monitor the Heading value to verify that the display changes in the correct response to the Gyro Compass input (Heading value should always be exactly the same as the Gyro Compass repeater value).

6.4. Azimuth & Elevation Drive

This verifies that the antenna moves in the correct response to the keys.

1. Press the **NEXT** key several times to display the Antenna menu.
2. Press the **TRACK** key to toggle Tracking OFF. Press the **UP** arrow key repeatedly and verify that the antenna moves up in elevation.
3. Press the **DOWN** arrow key repeatedly and verify that the antenna moves down in elevation.
4. Press the **RIGHT** arrow key repeatedly and verify that the antenna moves up (CW) in azimuth.
5. Press the **LEFT** arrow key repeatedly and verify that the antenna moves down (CCW) in azimuth.

6.5. Four Quadrant Tracking Test

This verifies that the antenna moves in the correct response to the keys, that Tracking is signaling correctly and that the Tracking commands are being carried out (antenna drives to peak).

1. Verify antenna is locked onto and tracking a satellite
2. Press the **NEXT** key several times to display the *Antenna* menu.
3. Note the current peak AGC value. Press the **Tracking** key to toggle Tracking OFF, press the **UP** arrow key repeatedly to move the antenna up in elevation until AGC falls about 100 counts. Turn Tracking ON and verify that the antenna moves back down in elevation and that the AGC rises to its' previous high value.

4. Note the current peak AGC value. Press the **Tracking** key to toggle Tracking OFF, press the **DOWN** arrow key repeatedly to move the antenna down in elevation until AGC falls about 100 counts. Turn Tracking ON and verify that the antenna moves back up in elevation and that the AGC rises to its' previous high value.
5. Note the current peak AGC value. Press the **Tracking** key to toggle Tracking OFF, press the **RIGHT** arrow key repeatedly to move the antenna up in azimuth until AGC falls about 100 counts. Turn Tracking ON and verify that the antenna moves back down in azimuth and that the AGC rises to its' previous high value.
6. Note the current peak AGC value. Press the **Tracking** key to toggle Tracking OFF, press the **LEFT** arrow key repeatedly to move the antenna down in azimuth until AGC falls about 100 counts. Turn Tracking ON and verify that the antenna moves back up in azimuth and that the AGC rises to its' previous high value.

6.6. Blockage Simulation Test

Blockage output function is used to modify the behavior of Tracking and Searching when there is a known blockage zone. The ACU provides a contact closure to ground on the SW2 terminal of the Terminal Mounting Strip when the antenna is pointed within any one of the blockage/hazard zones or the system is searching, targeting, unwrapping or is mis-pointed by 0.5 degrees or more (FCC TX Mute function for Transmit/Receive systems **only**). The contact closure is a transistor switch with a current sinking capability of 0.5 Amp. This logic output control signal is used for:

- When used as simple "BLOCKED" logic output for a single Sea Tel antenna, this output could be used to light a remote LED and/or sound a buzzer to alert someone that the antenna is blocked, and signal is lost.
- In a "Dual Antenna" installation, this logic output(s) is used to control Dual Antenna Arbitrator panel of coax switches to switch the source inputs to the matrix switch from Antenna "A" to Antenna "B", and vice versa.
- When used as simple "**RF Radiation Hazard**" logic output for a single Sea Tel TX/RX antenna, this output could be used to suppress RF transmissions while the antenna is pointed where people would be harmed by the transmitted microwave RF power output. The SW2 output would be interfaced to the satellite modem to **disable** the TX output signal from the Satellite TXRX Modem whenever the antenna is within the RF Radiation Hazard zone(s).
- When used for "**FCC TX Mute**" logic output for a single Sea Tel TX/RX antenna, this output could be used to suppress RF transmissions whenever the antenna is mis-pointed 0.5 degrees or more, is blocked, searching, targeting or unwrapping. The SW2 output would be interfaced to the satellite modem to **disable/mute** the TX output signal from the Satellite TX/RX Modem. When the mute condition is due to antenna mis-pointing, it will not **un-mute** until the pointing error of the antenna is within 0.2 degrees. The default output is contact closure to ground when the antenna is mis-pointed, therefore provides a **ground** to "Mute" the satellite modem on the SW2 terminal of the Terminal Mounting Strip. If your satellite modem requires an **open** to "Mute", refer to SYSTEM TYPE parameter 16 value to reverse the output logic from the ACU.

To Test the blockage function:

1. Press the NEXT key until you are at the Status menu. Press ENTER to access the Tracking menu.
2. Press the RIGHT arrow key to bring up and move the cursor to the far right. Press the UP arrow to simulate a manual BLOCKED condition. BLOCKED will appear in the Tracking display.
3. Verify that SW2 terminal shorts to ground (or open circuit if you have SYSTEM TYPE configured to reverse the output logic) and that the external alarms actuate OR the Dual Antenna Arbitrator coax switches toggle (if antenna B is not blocked) OR the Satellite Modem TX is disabled/muted.
4. Press the LEFT arrow key and then press the UP arrow key to turn the simulated blocked condition OFF. BLOCKED will disappear from the Tracking display.
5. Verify that SW2 terminal is open circuit (or ground if you have logic reversed) and that the external alarms deactivate OR the Satellite Modem TX is un-muted. The Dual Antenna Arbitrator coax switches should not toggle until you manually block Antenna B ACU.

6.7. Check ACU Parameters

Assure that the parameters are set correctly (you may wish to record them). Refer to the Antenna manual for factory default parameters.

PARAMETER	My Parameters
EL TRIM	
AZ TRIM	
AUTO THRES	
EL STEP SIZE	
AZ STEP SIZE	
STEP INTEGRAL	
SEARCH INC	
SEARCH LIMIT	
SEARCH DELAY	
SWEEP INC	
SYSTEM TYPE	
GYRO TYPE	
POL TYPE	
POL OFFSET	
POL SCALE	
AZ LIMIT 1	
AZ LIMIT 2	
EL LIMIT 12	
AZ LIMIT 3	
AZ LIMIT 4	
EL LIMIT 34	
AZ LIMIT 5	
AZ LIMIT 6	
EL LIMIT 56	
AZ LIMIT 7 / 5V OFFSET	
AZ LIMIT 8 / 5V SCALE	
EL LIMIT 78 / (Blank)	
TX POLARITY	
TRACK DISP	

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7. Diagnostic M&C Software Installation & Use

In an ongoing effort to aid our Dealer Technicians in troubleshooting and ease of Software Uploading, Sea Tel makes available two proprietary M&C diagnostic software's (ProgTerm and DacRemP) as well as one 3rd party software known as SHD Network Utility. All three of these programs may be found on the diagnostic support disk provided with every antenna system or it is also located on the dealer support site. The following chapter has been written to describe the software installation, the electrical hookup, and functional usage process'.

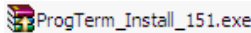
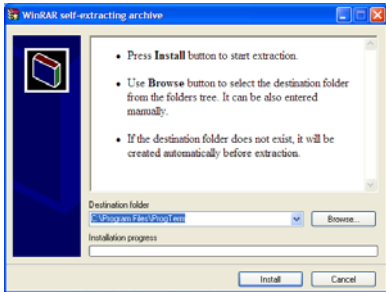
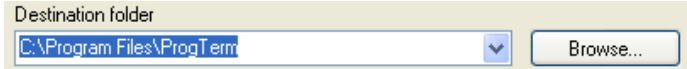
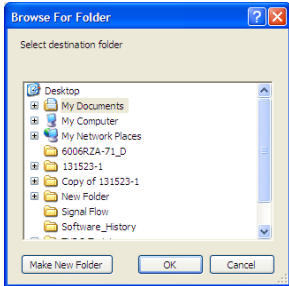
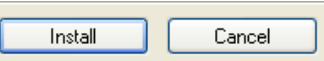
7.1. ProgTerm Diagnostic M&C Software

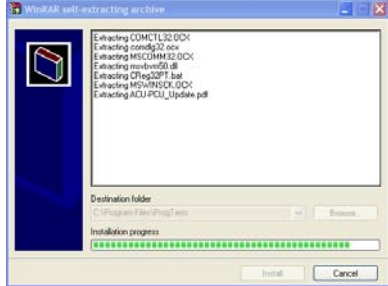
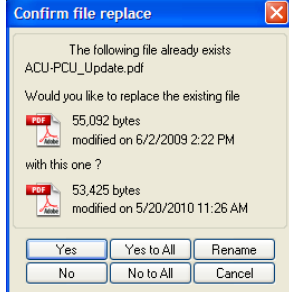
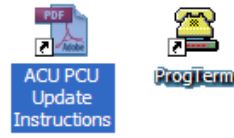
ProgTerm (Sea Tel Program Terminal) is a terminal program that may be used to:

- Configure all above decks or below software parameter(s), including by not limited to enabling port security.
- Download and/or Upload Software parameter dump log files.
- Perform software updates to above decks or below decks equipment.
- Aid in communication fault diagnostics.
- Auto-Discover all local and remote systems that are on the same network as client computer.

The following text describes the installation and use of this program. NOTE: It is highly recommended that only a qualified technician perform any of the below procedures as an incorrectly set value may render your system inoperable. Any failures caused by an incorrect parameter setting will NOT be covered as part of the limited warranty policy.

7.2. ProgTerm Software Installation.

A copy of the ProgTerm Installation program may be found on the Diagnostic Support disk provided with the Antenna.	
Double Click on the ProgTerm_Install_1.xx.exe filename. Where xx represents the current software revision.	
This will bring up the WinRAR self-extracting archive dialog box.	
Although not recommended, click on the "Browse" button to bring up a dialog box to browse through you computer and select a different Destination folder in which you wish to have the program installed.	 
Once the desired Destination folder has been selected click on Install to begin the installation process.	

<p>The WinRaR dialog box will display the installation progress.</p>	
<p>If you have a previous version of ProgTerm installed, you may be prompted to “Confirm File Replacement”. Click on Yes to All to continue.</p>	
<p>When the installation process has completed, the WinRaR Dialog box will disappear. You will find one shortcut to open ProgTerm and the other to open the ACU_PCU Software update instructions both on your Desktop as well as in the All Programs>SeaTel folder in your windows Start Menu.</p>	

7.3. ProgTerm Electrical Hookup: TCP/IP Based

ProgTerm Diagnostic Software may be run in one of two modes, Serial based or TCP/IP Based. TCP/IP electrical hookup is as follows:

7.3.1. PC/Laptop Direct to ACU

Connect a Cross-Over CAT5 cable from your computers Ethernet port to the Ethernet port of the ACU.




Figure 2 DAC-2202 ACU

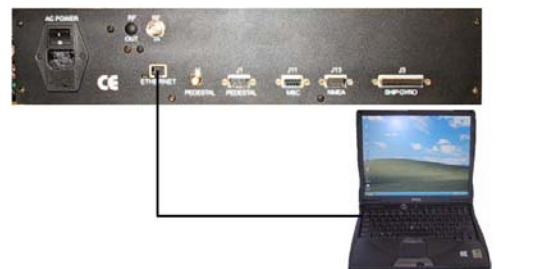
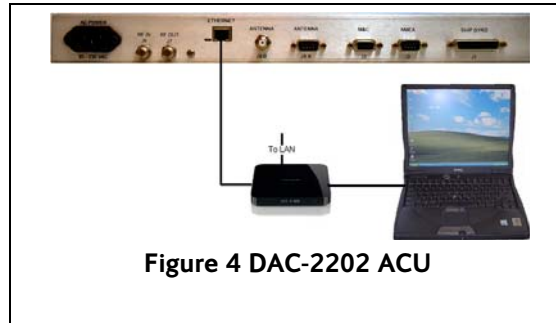


Figure 3 DAC 2302 ACU

7.3.2. PC/Laptop LAN to ACU

Connect a CAT5 patch cable from your computers Ethernet port to an available LAN port of a Switch/Hub. Connect a CAT5 patch cable from the Ethernet port of the ACU to an available LAN port of a Switch/Hub.

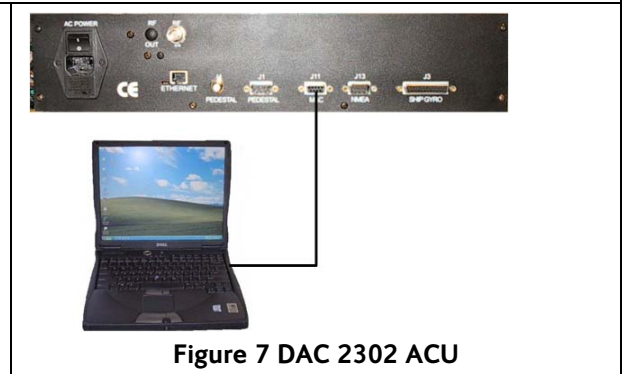


7.4. ProgTerm Electrical Hookup: Serial Based

ProgTerm Diagnostic Software may be run in one of two modes, Serial based or TCP/IP Based. Serial electrical hookup is as follows:

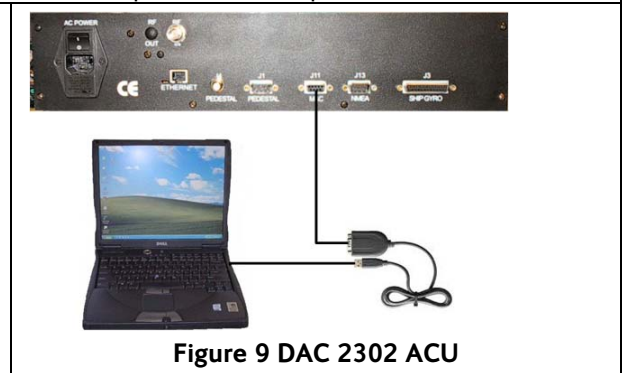
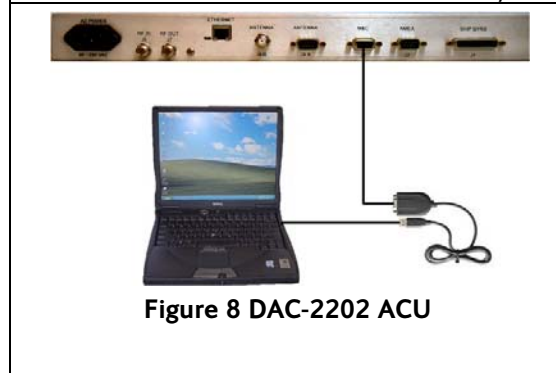
7.4.1. PC/Laptop Native 9 Pin Serial Port to ACU

Connect a Straight 9 Pin Serial cable from your computers Native 9 Pin Serial Port to the M&C port of the ACU.




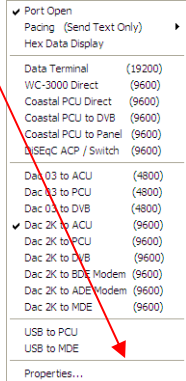
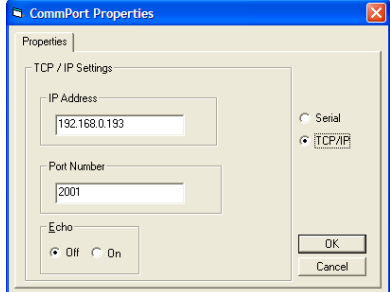

7.4.2. PC/Laptop USB Port to ACU

Connect the USB connector of your CFE USB adapter to an available USB Port of your computer.. Connect the 9 Pin Serial D-Sub connector of your CFE USB Adapter to the M&C port of the ACU.




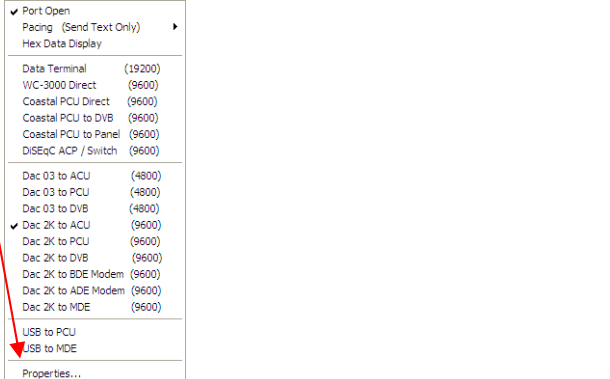
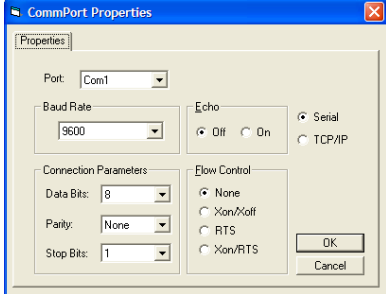
7.5. PC (ProgTerm) to ACU Communication Configuration

7.5.1. TCP/IP Based

<p>1. If not already, apply power to the ACU</p>	
<p>2. Click on the “ProgTerm” icon to open the ProgTerm program.</p>	
<p>Under the Comm Port Menu, select Properties.</p>	
<p>In the CommPort Properties Dialog box, select the TCP/IP radio button. Enter in the ACU’s IP address information Enter in the ACU’s Port Number If desired, turn Echo On. (Not required) Click On “OK” to submit and save these communication settings.</p>	
<p>If prompted, enter in username and password information. If this system has not been changed from Factory Default: Username: seatel Password: 1234.</p>	<pre>>Comm IF Ver 1.12 Port TCP:1 Username: seatel Password: 1234 > </pre>
<p>Verify a Green Communications LED in the upper right hand corner of the ProgTerm program.</p>	
<p>Note: If you experience a communications fault, as evidenced by a RED communications LED, ensure your computers network settings are of the network subnet as that of your ACU.</p>	

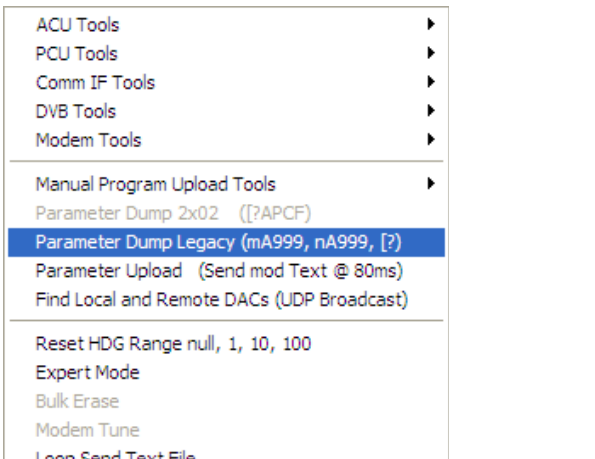
7.5.2. Serial Based

<p>1. If not already, apply power to the ACU</p>	
<p>2. Click on the “ProgTerm” icon to open the ProgTerm program.</p>	

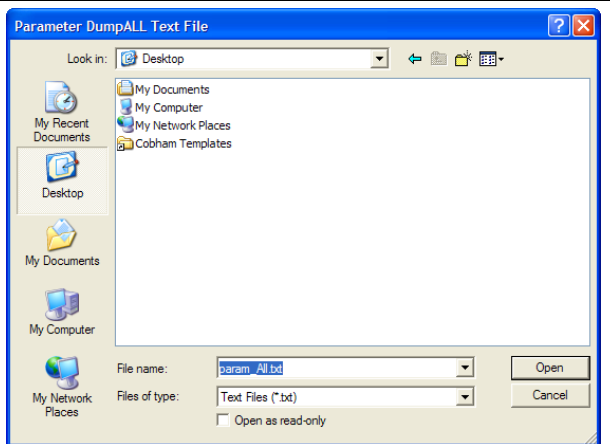
<p>Under the Comm Port Menu, select Properties.</p>	
<p>In the CommPort Properties Dialog box, select the Serial radio button.</p> <p>Using the drop down menu, select the Com port number. Using the drop down menu, select the Baud rate of the ACU you are connected to. (All DAC2x02 ACU's are shipped out at 9600)</p> <p>Leave Connection Parameters to 8, None, 1, and None for Flow Control.</p> <p>If desired, turn Echo On. (Not required)</p> <p>Click On "OK" to submit and save these communication settings.</p>	
<p>Note: If you experience a communications fault, as evidenced by a RED communications LED, ensure your communication settings are correct. If you are using a USB to Serial Adapter, verify the Com Port number assigned to it is set correctly, ProgTerm restricts com port selections to up to COM20, if your adapter has assigned a higher value you are required to reconfigure your port. Refer to your computer and/or USB to Serial Adapter manufacturers manual for detailed information on how to do this.</p>	

7.6. Parameter Dump Using ProgTerm

ProgTerm versions 1.50 or later provides a means to save all ACU, COMMIF, and PCU parameter settings into a text file. This text file may be used to restore the parameter settings in the system to a known configuration. It is important to verify all settings are correct and your system is operational prior to saving a parameter dump file. Use the procedure(s) below to dump all of the parameter settings or a single module dump (i.e. you may dump only the ACU parameter settings or just the PCU parameter settings.)

<p>Click on the Parameter Legacy button.</p>	
--	--

Browse to a location, of your choice, on the PC or memory stick, type in the desired filename and click Open.



ProgTerm will log all of the ACU, COMM IF, and PCU parameters to a text file while simultaneously displaying on Screen.

```

ml 000 '
ml 000 'AZ Limit8 = 0000
ml 180 'EL Limit12 = 0900
ml 180 'EL Limit34 = 0900
ml 180 'EL Limit56 = 0900
ml 180 'EL Limit78 = 0900
ml 000 'SatSkew = 0000

'PCU parameter dump...
'CMD Value Description
n0 000 'Pedestal Type
n1 000 'CL Loop Gain
n2 000 'LV Loop Gain
n3 000 'AZ Loop Gain
n4 000 'CL Tilt Trim
n5 000 'LV Tilt Trim
n6 000 'Home Flag Trim
n7 000 'DishScan Setup
n8 000 'Scan Rate
n9 000 'Error Flags
nA 000 'System ID

'CommIF parameter dump...
'CMD Value Description
I 192.168.30.195 'IP Address
N 255.255.255.0 'Netmask
G 192.168.30.1 'Gateway
O 2000 'TCP-0
I 2001 'TCP-1
2 2002 'TCP-2 (OpenAMIP)
U 3000 'UDP Port
C 9600 'M&C Baud Rate
A 4800 'NMEA A Baud Rate
B 4800 'NMEA B Baud Rate
D1 9750 'LO Band 1
D2 10600 'LO Band 2
D3 10750 'LO Band 3
D4 11250 'LO Band 4
H HDG 'NMEA Heading ID

'Favorites coming soon.
    
```

The displayed text presents the individual parameter command and value in the two left columns followed by the decoded parameter description and value in the two right columns. For purposes of reading the file, all text following the ' character is commented out, and as such is ignored by the system during a parameter upload. This allows an operator to decipher the set parameter description and values without the need of any reference documents (i.e. ACU/PCU command set)

```

'ACU parameter dump...
'CMD Value Description Result
mA 000 '
mB 000 'EI Trim = 0000
    
```

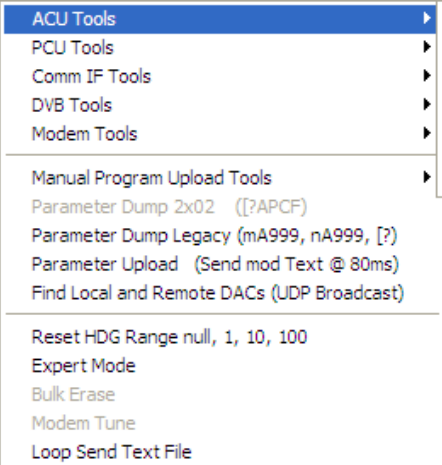
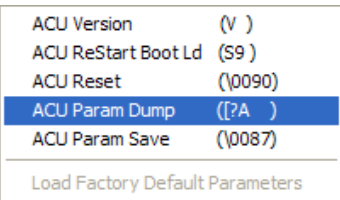
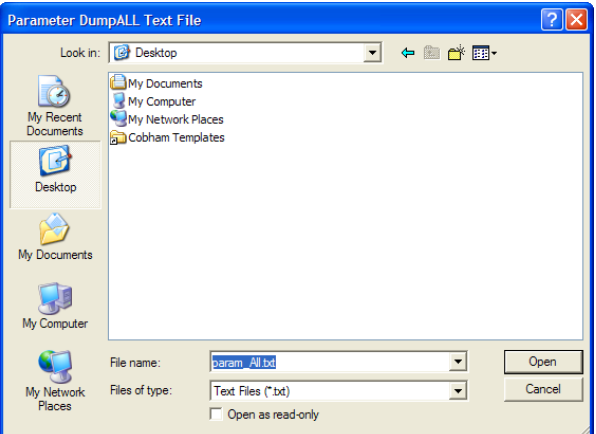
Parameter description and value

ACU Command and value

PARAMETER DUMP: ACU Module Only
 Applicable to: DAC2x02 Antenna Control Units

```

SS@@@T@L0379
>VDAC-2200 VER 511
>S@@@T@L0379
>DAC-2200 VER 511
>
0000
V02
.....
.....
.....
.....
    
```


<p>Under the Tools Menu, select “ACU TOOLS”</p>	 <p>A screenshot of a software menu. The 'ACU Tools' option is highlighted in blue. Other options include PCU Tools, Comm IF Tools, DVB Tools, Modem Tools, Manual Program Upload Tools, Parameter Dump 2x02 (?APCF), Parameter Dump Legacy (mA999, nA999, [?]), Parameter Upload (Send mod Text @ 80ms), Find Local and Remote DACs (UDP Broadcast), Reset HDG Range null, 1, 10, 100, Expert Mode, Bulk Erase, Modem Tune, and Loop Send Text File.</p>
<p>Under the ACU TOOLS Menu, Select “ACU Param Dump”</p>	 <p>A screenshot of the 'ACU TOOLS' menu. The 'ACU Param Dump (?A)' option is highlighted in blue. Other options include ACU Version (V), ACU ReStart Boot Ld (S9), ACU Reset (\0090), ACU Param Save (\0087), and Load Factory Default Parameters.</p>
<p>Browse to a location, of your choice, on the PC or memory stick, type in the desired filename and click Open.</p>	 <p>A screenshot of a Windows file explorer window titled 'Parameter DumpALL Text File'. The 'Look in:' dropdown is set to 'Desktop'. The file list shows 'My Documents', 'My Computer', 'My Network Places', and 'Cobham Templates'. The 'File name:' field contains 'param All.txt' and the 'Files of type:' dropdown is set to 'Text Files (*.txt)'. The 'Open' button is visible.</p>

ProgTerm will log all of the ACU parameters to a text file while simultaneously displaying on Screen.

CMD	Value	Description	Result
mA	000	'	
mB	000	'El Trim	= 0000
mC	000	'	
mD	000	'Az Trim	= 0000
mF	100	'Auto Threshold	= 100
mG	000	'El Step Size	= 000
mH	000	'Az Step Size	= 000
mI	000	'Step Integral	= 000
mJ	010	'Search Inc	= 010
mK	100	'Search Limit	= 100
mL	030	'Search Delay	= 030
mM	040	'Sweep Increment	= 040
mN	000	'System Type	= 000
mO	002	'Gyro Type	= 002
mP	072	'Polang Type	= 072
mQ	030	'24v Polang Offset	= 030
mR	090	'24v Polang Scale	= 090
mS	000	'	
mT	000	'AZ Limit 1	= 0000
mU	000	'	
mV	000	'AZ Limit 2	= 0000
mW	002	'Polang Tx Type	= 002
mX	000	'	
mZ	000	'AZ Limit3	= 0000
m[000	'	
m\	000	'AZ Limit4	= 0000
m]	000	'	
m^	000	'AZ Limit5	= 0000
m_	000	'	
m`	000	'AZ Limit6	= 0000
mb	001	'	
mc	124	'Lat	= 038.0
md	078	'Lat ns	= N
me	004	'	
mf	196	'Lon	= 122.0
mg	087	'Lon ew	= W
mh	002	'	
mi	118	'SAT	= 063.0
mj	087	'Sat ew	= W
mk	004	'	
ml	056	'Hdg	= 180.0
mm	007	'	

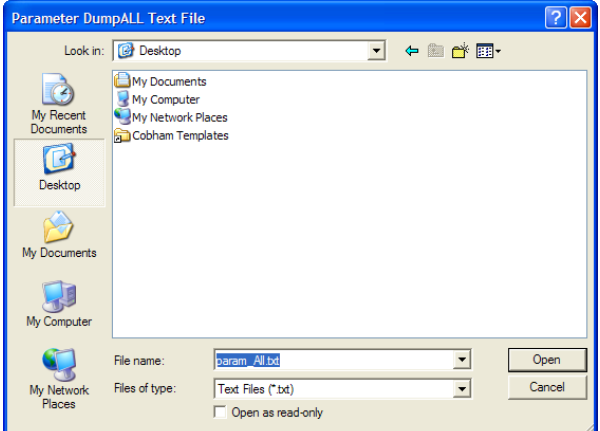
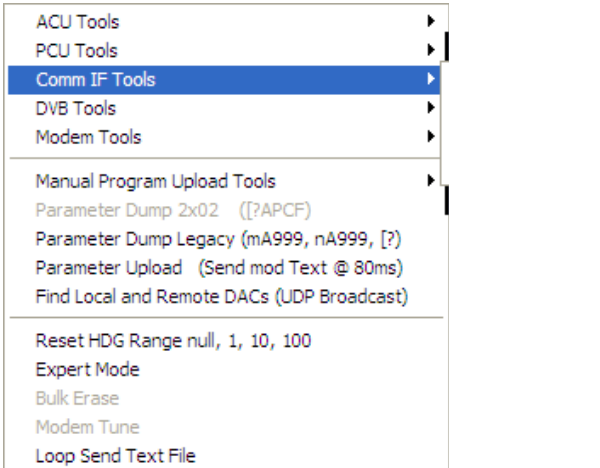
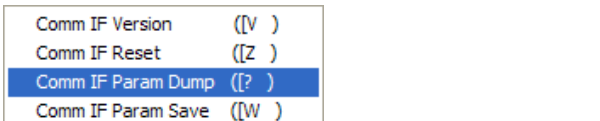
PARAMETER DUMP: PCU Module Only
 Applicable to: All Model PCU's connected via a DAC2x02 Antenna Control Units.

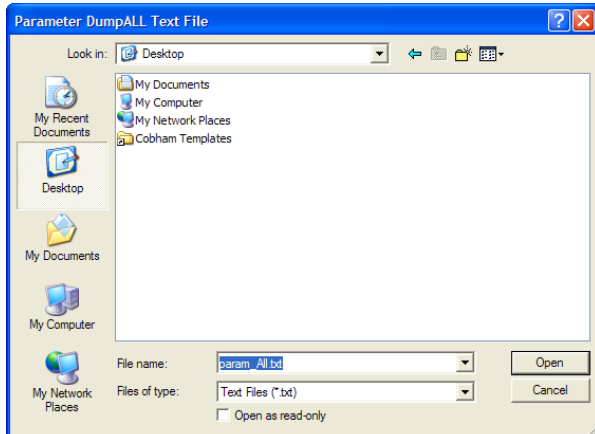
Under the Tools Menu, select "PCU TOOLS"

- ACU Tools
- PCU Tools**
- Comm IF Tools
- DVB Tools
- Modem Tools
- Manual Program Upload Tools
 - Parameter Dump 2x02 ([?APCF)
 - Parameter Dump Legacy (mA999, nA999, [?)
 - Parameter Upload (Send mod Text @ 80ms)
 - Find Local and Remote DACs (UDP Broadcast)
- Reset HDG Range null, 1, 10, 100
- Expert Mode
- Bulk Erase
- Modem Tune
- Loop Send Text File

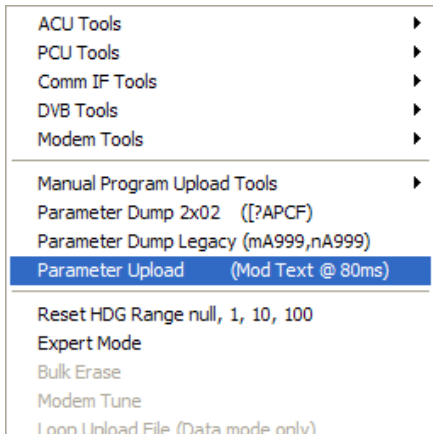
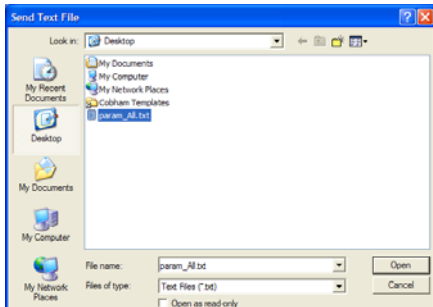
Under the ACU TOOLS Menu, Select "PCU Param Dump"

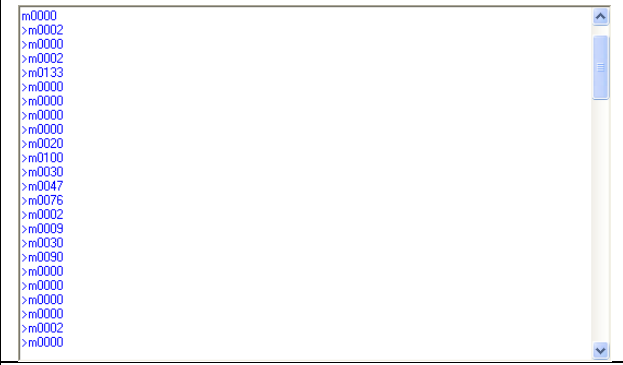
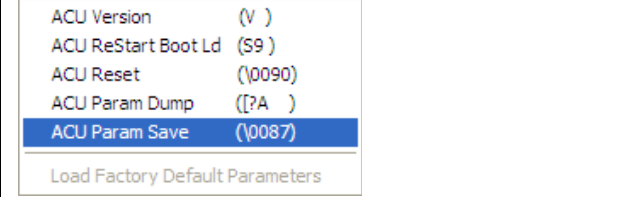
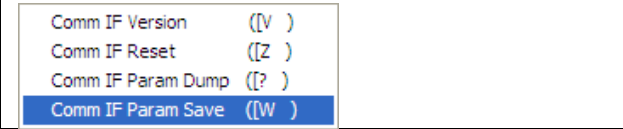
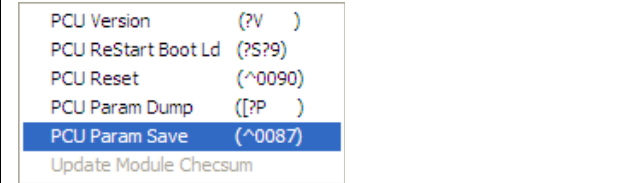
- PCU Version (?V)
- PCU ReStart Boot Ld (?S?9)
- PCU Reset (^0090)
- PCU Param Dump ([?P)**
- PCU Param Save (^0087)
- Update Module Checsum

<p>Browse to a location, of your choice, on the PC or memory stick, type in the desired filename and click Open.</p>	
<p>ProgTerm will log all of the PCU parameters to a text file while simultaneously displaying on Screen.</p>	<pre>'PCU parameter dump... 'CMD Value Description n0 000 'Pedestal Type n1 000 'CL Loop Gain n2 000 'LV Loop Gain n3 000 'AZ Loop Gain n4 000 'CL Tilt Trim n5 000 'LV Tilt Trim n6 000 'Home Flag Trim n7 000 'DishScan Setup n8 000 'Scan Rate n9 000 'Error Flags nA 000 'System ID</pre>
<p>PARAMETER DUMP: COMM IF Module Only Applicable to: DAC22/2302 Antenna Control Units</p>	
<p>Under the Tools Menu, select “Comm IF Tools”</p>	
<p>Under the ACU TOOLS Menu, Select “Comm IF Param Dump”</p>	

<p>Browse to a location, of your choice, on the PC or memory stick, type in the desired filename and click Open.</p>																																																																																																
<p>ProgTerm will log all of the PCU parameters to a text file while simultaneously displaying on Screen.</p>	<table border="1"> <thead> <tr> <th>'CMD</th> <th>Value</th> <th>Description</th> <th>Enabled</th> <th>Secured</th> </tr> </thead> <tbody> <tr> <td>[I</td> <td>192.168.20.194</td> <td>'IP Address</td> <td></td> <td></td> </tr> <tr> <td>[N</td> <td>255.255.255.0</td> <td>'Netmask</td> <td></td> <td></td> </tr> <tr> <td>[G</td> <td>192.168.20.251</td> <td>'Gateway</td> <td></td> <td></td> </tr> <tr> <td>[0</td> <td>2000</td> <td>'TCP-0 Port</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[1</td> <td>2001</td> <td>'TCP-1 Port</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[2</td> <td>2002</td> <td>'TCP-2 Port (OpenAMIP)</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[U</td> <td>3000</td> <td>'UDP Port</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[C</td> <td>9600</td> <td>'M&C Baud Rate</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[A</td> <td>4800</td> <td>'NMEA A Baud Rate</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[B</td> <td>4800</td> <td>'NMEA B Baud Rate</td> <td>On</td> <td>Off</td> </tr> <tr> <td>[D1</td> <td>10000</td> <td>'LO Band 1</td> <td></td> <td></td> </tr> <tr> <td>[D2</td> <td>10750</td> <td>'LO Band 2</td> <td></td> <td></td> </tr> <tr> <td>[D3</td> <td>11300</td> <td>'LO Band 3</td> <td></td> <td></td> </tr> <tr> <td>[D4</td> <td>9750</td> <td>'LO Band 4</td> <td></td> <td></td> </tr> <tr> <td>[H</td> <td>HDT</td> <td>'NMEA Heading ID</td> <td></td> <td></td> </tr> <tr> <td>[T</td> <td>80</td> <td>'Web (HTTP)</td> <td>On</td> <td>On</td> </tr> <tr> <td>[O</td> <td>255</td> <td>'Enabled Mask</td> <td></td> <td></td> </tr> <tr> <td>[Q</td> <td>16</td> <td>'Secured Mask</td> <td></td> <td></td> </tr> </tbody> </table>	'CMD	Value	Description	Enabled	Secured	[I	192.168.20.194	'IP Address			[N	255.255.255.0	'Netmask			[G	192.168.20.251	'Gateway			[0	2000	'TCP-0 Port	On	Off	[1	2001	'TCP-1 Port	On	Off	[2	2002	'TCP-2 Port (OpenAMIP)	On	Off	[U	3000	'UDP Port	On	Off	[C	9600	'M&C Baud Rate	On	Off	[A	4800	'NMEA A Baud Rate	On	Off	[B	4800	'NMEA B Baud Rate	On	Off	[D1	10000	'LO Band 1			[D2	10750	'LO Band 2			[D3	11300	'LO Band 3			[D4	9750	'LO Band 4			[H	HDT	'NMEA Heading ID			[T	80	'Web (HTTP)	On	On	[O	255	'Enabled Mask			[Q	16	'Secured Mask		
'CMD	Value	Description	Enabled	Secured																																																																																												
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[G	192.168.20.251	'Gateway																																																																																														
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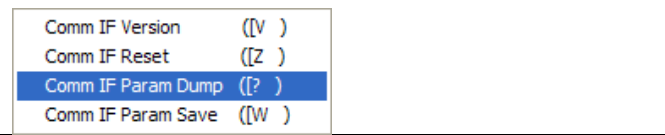
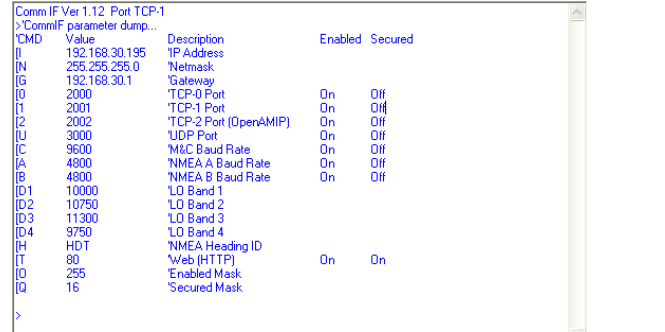
7.7. Parameter Upload Using ProgTerm

<p>Under the Tools Menu, select "Parameter Upload"</p>	
<p>In the Send Text File dialog box, browse to the location where the previously uploaded text file is stored, and then double click on the file or single click on the filename and hit open.</p>	

<p>ProgTerm will then upload the file to the ACU, PCU, and CommIF module.</p>	
<p>Under the Tools Menu Select “ACU Tools>ACU Param Save” to commit ACU Setup and ACU Tracking Parameters to NVRAM.</p>	
<p>Under the Tools Menu Select “COMM IF Tools>COMM IF Param Save” to commit the COMM IF Parameters to NVRAM.</p>	
<p>Under the Tools Menu Select “PCU Tools>PCU Param Save” to commit PCU Setup Parameters to NVRAM.</p>	

7.8. TCP/IP Port Security

DAC2202/2302 Antenna Control Units installed with COMMIF Ver 1.12 or later software versions installed give the user the ability to require authentication for the TCP 0 and/or, TCP 1 port(s) to allow remote access to the system. It also gives you the ability to change the factory default username and password required for login access on the internal HTML Page. The following procedure may only be done via the M&C port (Serial Based Instance of ProgTerm).

<p>Under the COMMIF Tools Menu, select the COMM IF Param Dump Option or type [?].</p>	
<p>This will display all of the communication port settings. Verify that the port in which you wish to enable authentication on is “Enabled”. If not, first follow the “Enabling/Disabling M&C Ports” procedure.</p>	

Type in "[Q" and press ENTER.
You will then be presented with a list of the ports and the current state of security (On or Off).

```

[A] 4800 *NMEA A Baud Rate On Off
[B] 4800 *NMEA B Baud Rate On Off
[D1] 10000 *LO Band 1
[D2] 10750 *LO Band 2
[D3] 11300 *LO Band 3
[D4] 9750 *LO Band 4
[H] HDT *NMEA Heading ID
[T] 80 *Web (HTTP) On On
[O] 255 *Enabled Mask
[Q] 16 *Secured Mask

>[Q

Secured Mask: 16
(1) TCP-0 Off
(2) TCP-1 Off
(3) TCP-2 (OpenAMIP) Always Off
(4) UDP Always Off
(5) Web (HTTP) Always On
(6) M&C Always Off
(7) NMEA A Always Off
(8) NMEA B Always Off
Use digits to toggle On/Off, Enter to accept and Q or ESC to quit.
>|
    
```

Type a "1" to enable security on the TCP0 port
Type a "2" to enable security on the TCP1 port
Then,
Press ENTER to submit changes or
Press ESC or type a Q to exit entry mode if you do not wish to make any changes.

NOTE: Always on and/or Always Off is an indication on the ability to turn on or turn off authentication. (i.e. you may NOT enable authentication on the M&C or NMEA Ports).

WARNING: By Enabling Port Security on TCP 0/1 you will be NOT be able to run DacRemP in TCP/IP based mode of operation.

```

>[Q

Secured Mask: 16
(1) TCP-0 Off
(2) TCP-1 Off
(3) TCP-2 (OpenAMIP) Always Off
(4) UDP Always Off
(5) Web (HTTP) Always On
(6) M&C Always Off
(7) NMEA A Always Off
(8) NMEA B Always Off
Use digits to toggle On/Off, Enter to accept and Q or ESC to quit.
>1

Secured Mask: 17
(1) TCP-0 On
(2) TCP-1 Off
(3) TCP-2 (OpenAMIP) Always Off
(4) UDP Always Off
(5) Web (HTTP) Always On
(6) M&C Always Off
(7) NMEA A Always Off
(8) NMEA B Always Off
Use digits to toggle On/Off, Enter to accept and Q or ESC to quit.
>|
    
```

Reselect the COMMIF Param Dump tool and verify the port you want to require authentication now reads "ON" in the Secured column as shown in the example to the right.

```

CommIF parameter dump...
CMD Value Description Enabled Secured
[L] 192.168.30.195 IP Address
[N] 255.255.255.0 Netmask
[G] 192.168.30.1 Gateway
[O] 2000 *TCP-0 Port On On
[T] 2001 *TCP-1 Port On Off
[Z] 2002 *TCP-2 Port (OpenAMIP) On Off
[U] 3000 *UDP Port On Off
[C] 9600 *M&C Baud Rate On Off
[A] 4800 *NMEA A Baud Rate On Off
[B] 4800 *NMEA B Baud Rate On Off
[D1] 10000 *LO Band 1
[D2] 10750 *LO Band 2
[D3] 11300 *LO Band 3
[D4] 9750 *LO Band 4
[H] HDT *NMEA Heading ID
[T] 80 *Web (HTTP) On On
[O] 255 *Enabled Mask
[Q] 17 *Secured Mask

>
    
```

Changing the Username and Password

The factory default username for remote access is "seatel", If you wish to change this type in "[Xsssssss" (where sssssss is any alphanumeric string 4-8 characters long) then hit ENTER. ProgTerm will display "Username changed" as an indication that the command was accepted.

Type in "[W" to submit changes to memory
Type in "[Z" to reset the CommIF module and to take effect

Once this command has been entered and saved all remote access requiring authentication (TCP0/1 if enabled and the Web page access, will use this new username.

```

>[Xusername
Please retype new username: username
Username changed
    
```

The factory default password for remote access is "1234". If you wish to change this type in "[Ysssssss" (where sssssss is any alphanumeric string 4-8 characters long) then hit ENTER. ProgTerm will prompt you to "Retype the new password". Do so and

```

>[Ypassword
Please retype new password: password
Password changed.
>|
    
```

<p>then press ENTER, this will then display “Password changed.’ as an indication that the command was accepted.</p> <p>Type in “[W]” to submit changes to memory</p> <p>Type in “[Z]” to reset the CommIF module and take effect.</p> <p>Once this command has been entered and saved all remote access requiring authentication (TCP0/1 if enabled and the Web page access, will use this new password.</p>	
--	--

7.9. Updating Your System Software:

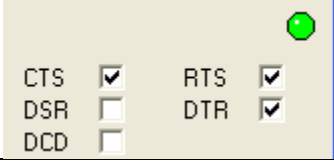



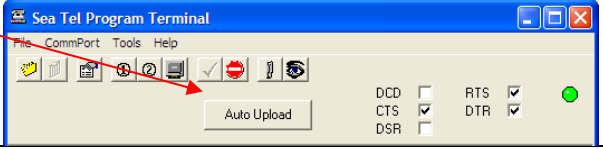
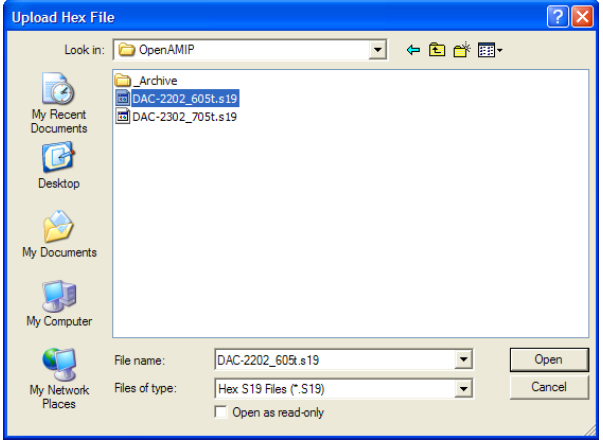
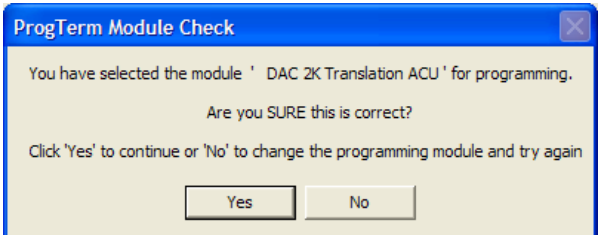
There are four processors each (referred to as the “Target Module” below) in the DAC2202 / DAC2302 Antenna Control Units that *may* require software updates. There is one processor in the Pedestal Control Units, with the exception of the Series 09 systems which have two processors (one for the PCU Main PCB and one for the 400MHz Modem PCB), that *may* require software updates. The following table is intended to be used as a quick reference to determine the appropriate software program/files to use during the process of uploading software to your Below Decks and Above Decks Equipment. **NOTE:** Choosing the incorrect Translation Mode or Software Filename may render your system inoperable, contact the Sea Tel Service Department if your intended Target Module is not listed below or if you need additional assistance.

ACU Model	Target Module	Software Program / Translation Mode or (Ram Loader)	Typical Software Module Filename Format		
			(where xx is the latest version number)		
DAC2202	ACU Main PCB	ProgTerm / DAC2K to ACU	DAC-2202_6.xx.S19		
	Tracking Receiver PCB	ProgTerm / DAC2K to DVB	DVB Receiver	DVB5.xx.S19	
			L-Band SCPC Receiver	SCPC5.xx.S19	
	COMMIF PCB	SHDownload / C:\...\SHDownload\PDL-Generic.bin	COMMIF_1.xx.bin		
	Pedestal Control Unit PCB	ProgTerm / DAC2K to PCU	xx03/xx06	X03-2.xx.S19	
			xx04	X04-2xxK.s19	
			xx09	X09-PCU-1.xx.S19	
			xx97(A/B)/00/07(D)	Model Specific	
	Synchro Converter	**Not Flash Programmable** Sea Tel Programmer required	SDC-1.xx.S19		
	BDE 400 MHz Modem	ProgTerm / DAC2K to BDE Modem	Modem_1.xx.S19		
ADE 400 MHz Modem	ProgTerm / DAC2K to ADE Modem	Modem_1.xx.S19			

DAC2302	ACU Main PCB	ProgTerm / DAC2K to ACU	DAC-2302_7.xx.S19		
	Tracking Receiver PCB	ProgTerm / DAC2K to DVB	DVB Receiver	DVB5.xx.S19	
			L-Band SCPC Receiver	SCPC5.xx.S19	
	COMMIF PCB	SHDownload / C:\...\SHDownload\PDL-Generic.bin	COMMIF_1.xx.bin		
	Pedestal Control Unit PCB	ProgTerm / DAC2K to PCU	xx03/xx06	X03-2.xx.S19	
			xx04	X04-2xxK.s19	
			xx09	X09-PCU-1.xx.S19	
			xx97(A/B)/00/07(D)	Model Specific	
	Synchro Converter	**Not Flash Programmable**, Sea Tel Programmer required	SDC-1.xx.S19		
	BDE 400 MHz Modem	ProgTerm / DAC2K to BDE Modem	Modem_1.xx.S19		
ADE 400 MHz Modem	ProgTerm / DAC2K to ADE Modem	Modem_1.xx.S19			

ACU Main PCB Software Update Instructions

<p>Obtain a Copy of the ACU .s19 file and save in a copy in the same directory as the ProgTerm files.</p>	
<p>Programming Operation: ACU Software Upload Power on ACU From the CommPort menu, Select the correct programming mode. (I.e. for a DAC2200/2202/2302, Click the 'Dac 2k to ACU') to set the ProgTerm program parameters for updating the below decks Antenna Control Unit (ACU). It is very important to be sure that you have selected the correct destination for the desired program update (ACU or PCU) and that you have selected the correct style of DAC interface to the PCU (03, 2200 or direct connection). If you select the incorrect destination and override the warnings, you will most certainly render your system inoperable.</p>	
<p>To make it easy to check the ProgTerm setup, the selected serial interface (port and baud rate) and the operating mode (ACU style and program destination) are always shown in the status bar at the bottom of the program window.</p>	

<p>Verify the LED on the right side of the program is GREEN indicating the port is open and functional. Click on the LED or select Port Open from the Comm Port menu to change the active state of the port and the LED.</p>	
<p>Click on the Paper Clip  button and then click on the EyeBall  button in the tool bar. This queries the Module Status and Module Version. The responses will be the Status and Version of the ACU (such as "DAC 2202 VER x.xx"). Both of these data requests must function properly before you can continue.</p>	
<p>If the ACU does not respond to a status request (Paper Clip button) the module may have been erased by a previous action. It can still be programmed but you need to contact the Sea Tel service department for instructions.</p>	
<p>Click on the "AUTO UPLOAD" button.</p>	
<p>Browse to the appropriate file location and either double click on the desired file or single click the desired file and click Open.</p>	
<p>Confirm that ProgTerm is in the correct translation mode (DAC 2K Translation ACU) and then click on Yes to continue.</p>	

ProgTerm will go through the process of verifying communications with the ACU, Starting the Upload process, erasing the module, then finally uploading the .s19 file itself.

```

PT: Module = DAC 2K Translation ACU
PT: File = M:\SoftwareBeta\OpenAMIP\DAC-2202_605t.s19
PT: File verification complete!
PT: Locking external port access
Ports Locked by M&C [C]!

>
PT: Checking communication with ACU, send 'S'
S@@T@L1068 @G
>PT: Normal ACU response, starting ACU bootloader
PT: Send '\0080' Start ACU Bootloader command

0050
V31
PT: Bootloader mode is active
PT: Module Erase Try 1
TWI Tol
PT: Module Erase Try 2
PT: Module Erase Try 3
+
PT: Successful Erase
PT: Begin Module Upload
            
```

For each line of hex data that is programmed during the ACU software upload procedure ProgTerm will display one of the following characters:

- “*” (successful programming),
- “_” (failed programming),
- “!” (protected memory access).

Although ProgTerm actively monitors the upload process for any errors, If you see any “_” characters while programming it means that the ports did not get locked properly and you must stop the upload (by pressing Cancel to abort) immediately and restart the upload sequence.

This completes the upload process, it is recommended that you verify all parameters to ensure that they are properly set to values that is compatible with your antenna and antenna control unit.

7.10. ACU DVB PCB Software Update Instructions

Obtain a Copy of the ACU .s19 file and save in a copy in the same directory as the ProgTerm files.

x04_249P.s19	22 KB	S19 File	11/21/2009 11:16 PM
x09-PCU_151b.s19	26 KB	S19 File	4/13/2010 4:49 PM
dwb402a.s19	26 KB	S19 File	9/5/2007 2:35 PM

Programming Operation: ACU Software Upload

Power on ACU

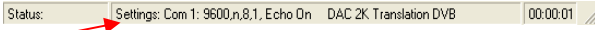
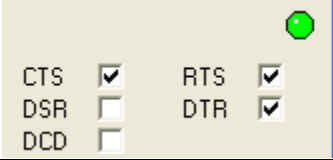



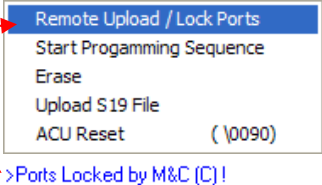
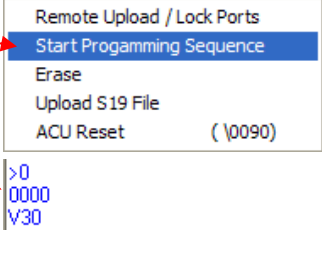
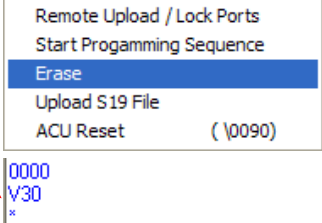
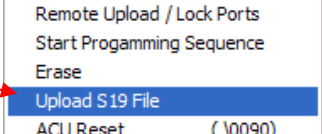
From the CommPort menu, Select the correct programming mode. (I.e. for a DAC2200/2202/2302, Click the 'Dac 2k to DVB') to set the ProgTerm program parameters for updating the below decks Antenna Control Unit (ACU) DVB Receiver. It is very important to be sure that you have selected the correct destination for the desired program update (ACU or PCU) and that you have selected the correct style of DAC interface to the PCU (03, 2200 or direct connection). If you select the incorrect destination and override the warnings, you will most certainly render your system inoperable.

Port Open

Pacing (Send Text Only) ▶

Hex Data Display

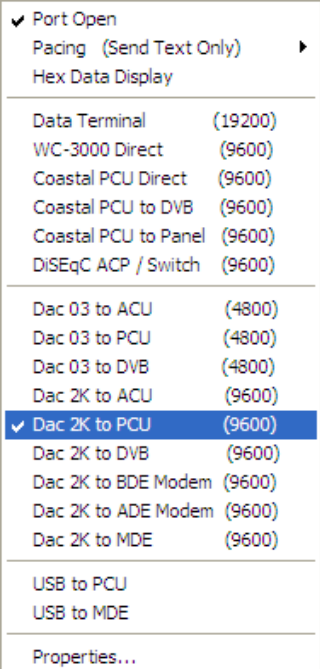
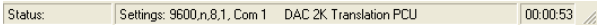
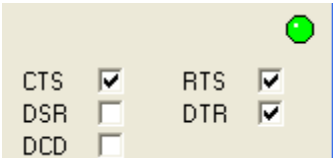




Data Terminal	(19200)
WC-3000 Direct	(9600)
Coastal PCU Direct	(9600)
Coastal PCU to DVB	(9600)
Coastal PCU to Panel	(9600)
DiSEqC ACP / Switch	(9600)
Dac 03 to ACU	(4800)
Dac 03 to PCU	(4800)
Dac 03 to DVB	(4800)
Dac 2K to ACU	(9600)
Dac 2K to PCU	(9600)
<input checked="" type="checkbox"/> Dac 2K to DVB	(9600)
Dac 2K to BDE Modem	(9600)
Dac 2K to ADE Modem	(9600)
Dac 2K to MDE	(9600)
USB to PCU	
USB to MDE	
Properties...	

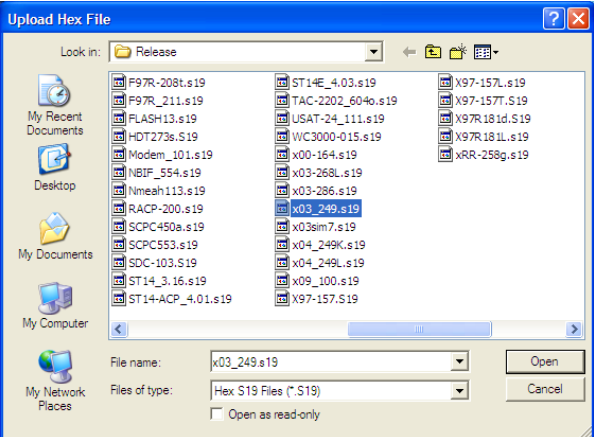
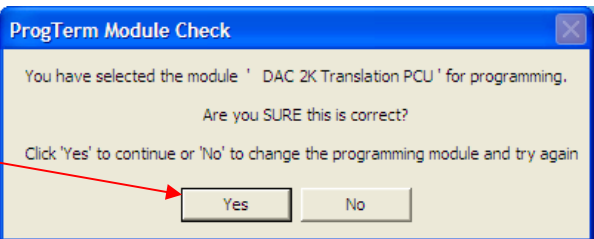
<p>To make it easy to check the ProgTerm setup, the selected serial interface (port and baud rate) and the operating mode (ACU style and program destination) are always shown in the status bar at the bottom of the program window.</p>	
<p>Verify the LED on the right side of the program is GREEN indicating the port is open and functional. Click on the LED or select Port Open from the Comm Port menu to change the active state of the port and the LED.</p>	
<p>Click on the Paper Clip  button and then click on the EyeBall  button in the tool bar. This queries the Module Status and Module Version. The responses will be the Status and Version of the DVB Receiver (such as "DVB VER 4.xx"). Both of these data requests must function properly before you can continue.</p>	
<p>If the DVB does not respond to the Software Query (Eyeball Button) the module may have been erased by a previous action. It can still be programmed but you need to contact the Sea Tel service department for instructions.</p>	
<p>Click on the "Remote Upload / Lock Ports button found under the TOOLS menu. Verify display reads "Ports Locked by M&C (C)"</p>	
<p>Click on Start Programming Sequence. Verify display reads the Checksum and Bootload version as displayed to the right.</p>	
<p>Click on Erase. Verify a single Asterisks (*) is displayed.</p>	
<p>Click on Upload S19 File.</p>	

<p>Browse to the appropriate file location and either double click on the desired file or single click the desired file and click Open.</p>	
<p>ProgTerm will upload the S19 file to the DVB Receiver and will display the final hex line of code as an indication that the upload is completed.</p>	<pre>>0 0000 V30 *16011400FF40PS1C22B82DPS1C40000046S3</pre>
<p>Click on the ACU Reset (V0090) to send a soft reset to the system.</p>	
<p>This completes the upload process, it is recommended that you verify all parameters to ensure that they are properly set to values that is compatible with your antenna and antenna control unit.</p>	

7.11. PCU Software Upload Instructions

<p>Obtain a Copy of the PCU .s19 file and save in a convenient area such as the desktop or in the same directory as the ProgTerm files.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>Size</th> <th>Type</th> <th>Date Modified</th> </tr> </thead> <tbody> <tr> <td>ACU-PCU_Update.pdf</td> <td>54 KB</td> <td>Adobe Acrobat Doc...</td> <td>6/2/2009 1:22 PM</td> </tr> <tr> <td>ProgTerm135_Version.pdf</td> <td>39 KB</td> <td>Adobe Acrobat Doc...</td> <td>6/1/2009 9:08 PM</td> </tr> <tr> <td>Progterm.exe</td> <td>141 KB</td> <td>Application</td> <td>11/13/2009 11:42 AM</td> </tr> <tr> <td>ProgtermIP.exe</td> <td>80 KB</td> <td>Application</td> <td>10/7/2007 8:25 PM</td> </tr> <tr> <td>x03-247.s19</td> <td>22 KB</td> <td>S19 File</td> <td>12/12/2008 1:11 AM</td> </tr> <tr> <td>DAC-2202_605j.s19</td> <td>37 KB</td> <td>S19 File</td> <td>8/27/2009 12:37 AM</td> </tr> <tr> <td>DAC-2302_705j.s19</td> <td>36 KB</td> <td>S19 File</td> <td>8/27/2009 12:41 AM</td> </tr> <tr> <td>F97R-209.s19</td> <td>21 KB</td> <td>S19 File</td> <td>6/1/2009 7:32 PM</td> </tr> <tr> <td>Modem_1_00B.s19</td> <td>18 KB</td> <td>S19 File</td> <td>5/21/2009 8:25 AM</td> </tr> </tbody> </table>	Name	Size	Type	Date Modified	ACU-PCU_Update.pdf	54 KB	Adobe Acrobat Doc...	6/2/2009 1:22 PM	ProgTerm135_Version.pdf	39 KB	Adobe Acrobat Doc...	6/1/2009 9:08 PM	Progterm.exe	141 KB	Application	11/13/2009 11:42 AM	ProgtermIP.exe	80 KB	Application	10/7/2007 8:25 PM	x03-247.s19	22 KB	S19 File	12/12/2008 1:11 AM	DAC-2202_605j.s19	37 KB	S19 File	8/27/2009 12:37 AM	DAC-2302_705j.s19	36 KB	S19 File	8/27/2009 12:41 AM	F97R-209.s19	21 KB	S19 File	6/1/2009 7:32 PM	Modem_1_00B.s19	18 KB	S19 File	5/21/2009 8:25 AM
Name	Size	Type	Date Modified																																						
ACU-PCU_Update.pdf	54 KB	Adobe Acrobat Doc...	6/2/2009 1:22 PM																																						
ProgTerm135_Version.pdf	39 KB	Adobe Acrobat Doc...	6/1/2009 9:08 PM																																						
Progterm.exe	141 KB	Application	11/13/2009 11:42 AM																																						
ProgtermIP.exe	80 KB	Application	10/7/2007 8:25 PM																																						
x03-247.s19	22 KB	S19 File	12/12/2008 1:11 AM																																						
DAC-2202_605j.s19	37 KB	S19 File	8/27/2009 12:37 AM																																						
DAC-2302_705j.s19	36 KB	S19 File	8/27/2009 12:41 AM																																						
F97R-209.s19	21 KB	S19 File	6/1/2009 7:32 PM																																						
Modem_1_00B.s19	18 KB	S19 File	5/21/2009 8:25 AM																																						

<p>Programming Operation: PCU Software Upload</p> <p>Power on ACU and Antenna.</p> <p>From the CommPort menu, select the correct ProgTerm programming mode and destination. I.E. for a DAC2200 / 2202 /2302 to PCU, click the 'DAC 2K to PCU' menu item. It is very important to be sure that you have selected the correct programming mode (DAC-03, DAC-2200, Coastal or Direct) and the correct destination (ACU, PCU or DVB). If you select the incorrect destination and actively override the self-check warnings, you will most certainly render your system inoperable</p>	 <p>Port Open Pacing (Send Text Only) ▸ Hex Data Display</p> <hr/> <p>Data Terminal (19200) WC-3000 Direct (9600) Coastal PCU Direct (9600) Coastal PCU to DVB (9600) Coastal PCU to Panel (9600) DiSEqC ACP / Switch (9600)</p> <hr/> <p>Dac 03 to ACU (4800) Dac 03 to PCU (4800) Dac 03 to DVB (4800) Dac 2K to ACU (9600) Dac 2K to PCU (9600) Dac 2K to DVB (9600) Dac 2K to BDE Modem (9600) Dac 2K to ADE Modem (9600) Dac 2K to MDE (9600)</p> <hr/> <p>USB to PCU USB to MDE</p> <hr/> <p>Properties...</p>
<p>Check the status bar at the bottom edge of the ProgTerm window. It displays the selected serial interface (baud rate and port), the operating mode (DAC Style), and program destination (ACU, PCU, or DVB).</p>	
<p>Verify the LED on the right side of the program is GREEN indicating the port is open and functional. Click on the LED or select Port Open from the Comm Port menu to change the active state of the port and the LED.</p>	 <p>CTS <input checked="" type="checkbox"/> RTS <input checked="" type="checkbox"/> DSR <input type="checkbox"/> DTR <input checked="" type="checkbox"/> DCD <input type="checkbox"/></p>
<p>Click on the Paper Clip  button and then click on the EyeBall  button in the tool bar. These query the PCU for Module Status and Module Version. The responses will be the Status and Version of the PCU which the ACU is connected to (such as "3004 VER 2.xxL"). Both of these data requests must function properly before you can continue.</p>	
<p>If the PCU does not respond to a status request (Paper Clip button), the module may have been erased by a previous action. It can still be programmed but you need to reboot the loader by typing "S9<enter>"</p>	
<p>Click on the "AUTO UPLOAD" button.</p>	

<p>Browse to the appropriate file location and either double click on the desired file or single click the desired file and click Open.</p>	
<p>Confirm that ProgTerm is in the correct translation mode (DAC 2K Translation ACU) and then click on Yes to continue.</p>	
<p>ProgTerm will go through the process of verifying communications with the ACU & PCU, Starting the Remote Upload process, erasing the module, and then finally uploading the .s19 file itself to the PCU.</p>	<pre> PT: Module = DAC 2K Translation PCU PT: File = C:\Documents and Settings\vmiguel\Desktop\Series 09 Training\Release\x03_249.s19 PT: File verification complete! PT: Locking external port access Ports Locked by M&C (C)! > PT: Checking communication with ACU, send 'S' S@@T@L0719 @@ > PT: Normal ACU response, Sending RESET command (V0090) to clear previous state Rx\F ToI PT: Setup ACU for Remote Module Programming Ports Locked by M&C (C)! >m0159 > PT: Checking communication with PCU, send '?' SCH@ PT: PCU responding normally, start Remote Bootloader PT: Bootload Start Try 1 Ports Locked by M&C (C)! > > 0050 V14 PT: Bootloader Active, start Erase PT: Module Erase Try 1 ^0578^ PT: Successful Erase PT: Begin Module Upload S1138000C*00 S11380108*00 </pre>

For each line of hex data that is programmed during the ACU software upload procedure ProgTerm will display one of the following characters:

- “*” (successful programming),
- “_” (failed programming),
- “!” (protected memory access)



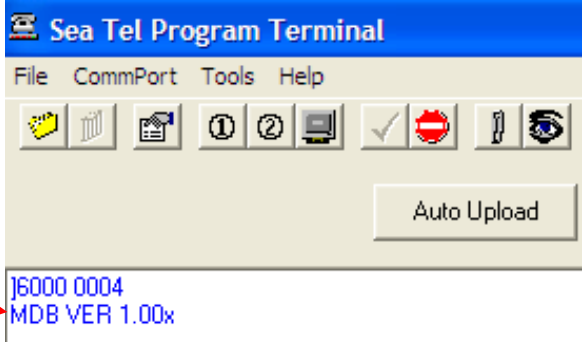

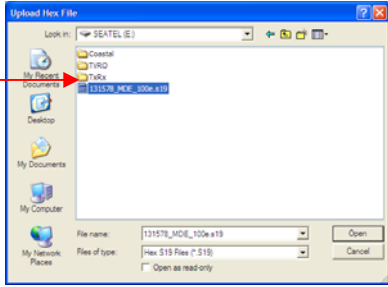
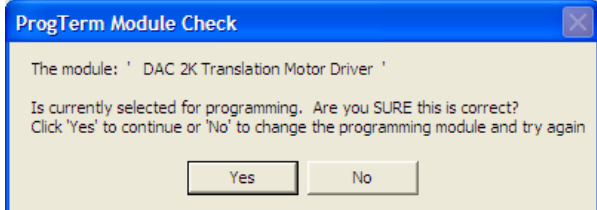
*Although ProgTerm actively monitors the upload process for any errors, If you see any “_” characters while programming it means that the ports did not get locked properly and you must stop the upload (by pressing **Cancel** to abort) immediately and restart the upload sequence.*


The screenshot shows the Sea Tel Program Terminal window with a list of hex addresses (e.g., S113F333A*00) and their corresponding status characters. At the bottom, a status bar indicates: "Status: Settings: 9600,n,8,1, Com 1 DAC 2K Translation PCU 00:01:41".

This completes the upload process, it is recommended that you verify all parameters to ensure that they are properly set to values that is compatible with your antenna and antenna control unit.

7.12. Motor Driver PCB Software Update Instructions

<p>Obtain a Copy of the MDE .s19 file and save in a copy in the same directory as the ProgTerm files.</p>	<p>The screenshot shows a file explorer window with columns for Name, Size, Type, and Date Modified. The file "131578_MDE_100e.s19" is highlighted in blue.</p>
<p>Programming Operation: MDE Software Upload Apply power to both Above and Below Decks equipment and allow time for the system to initialize. From the CommPort menu, Select the DAC2K to MDE translation mode to configure ProgTerm for communicating with the Motor Driver Enclosure. (MDE).</p>	<p>The screenshot shows the ProgTerm CommPort menu. The option "Dac 2K to MDE (9600)" is selected and highlighted in blue.</p>
<p>To make it easy to check the ProgTerm setup, the selected serial interface (port and baud rate) and the operating mode (ACU style and program destination) are always shown in the status bar at the bottom of the program window.</p>	<p>The screenshot shows the status bar at the bottom of the ProgTerm window, displaying: "Status: Settings: Com 1: 9600,n,8,1, Echo Off DAC 2K Translation Motor Driver 00:04:59".</p>
<p>Verify the LED on the right side of the program is GREEN indicating the port is open and functional. Click on the LED or select Port Open from the Comm Port menu to change the active state of the port and the LED.</p>	<p>The screenshot shows the port control panel with a green LED indicator at the top right. Below it are checkboxes for CTS, DSR, DCD, RTS, and DTR, all of which are checked.</p>

<p>Click on the Paper Clip  button and then click on the EyeBall  button in the tool bar. This queries the Module Status and Module Version. The responses will be the Status and Version of the MDE (such as "MDB VER 1.00x"). Both of these data requests must function properly before you can continue.</p>	
<p>Click on the "AUTO UPLOAD" button.</p>	
<p>Browse to the appropriate file location and either double click on the desired file or single click the desired file and click Open.</p>	
<p>Confirm that ProgTerm is in the correct translation mode (DAC 2K Translation Motor Driver) and then click on Yes to continue.</p>	
<p>ProgTerm will go through the process of verifying communications with the ACU, PCU and MDE, starting the upload process, erasing the module, then finally uploading the .s19 file itself.</p>	<pre> PT: Module = DAC 2K Translation Motor Driver PT: File = C:\Program Files\ProgTerm\131578_MDE_100e.s19 PT: File verification complete! PT: Locking external port access Ports Locked by M&C [C]! > PT: Checking communication with ACU, send 'S' S@PKhL0847 P' > PT: Normal ACU response, Sending RESET command (N0090) to clear previous state Rxf Tof PT: Setup ACU for Remote Module Programming Ports Locked by M&C [C]! >m0159 > PT: Checking communication with PCU, send '*S' SCLHE PT: PCU responding normally, start Remote Bootloader PT: Bootload Start Try 1 Ports Locked by M&C [C]! > >Safeloader MDB PT: Bootloader Active, start Erase PT: Module Erase Try 1 Erase* > PT: Successful Erase PT: Begin Module Upload S0S1068801* S105880E* S1238890* S12388A0* S12388C0* S12388E0* S1238900* S1238920* </pre>

<p>For each line of hex data that is programmed during the ACU software upload procedure ProgTerm will display one of the following characters:</p> <p>“*” (successful programming),</p> <p>“_” (failed programming),</p> <p>“!” (protected memory access).</p>	
<p> Although ProgTerm actively monitors the upload process for any errors, If you see any “_” characters while programming it means that the ports did not get locked properly and you must stop the upload (by pressing Cancel to abort) immediately and restart the upload sequence.</p>	
<p>Upon completion of the upload procedure, Progterm will issue a soft reset commands to the system.</p>	<pre>PT: Motor Driver programming complete, No errors detected!! PT: Re-Booting PCU >PT: Re-booting ACU PT: Re-booting CommIF RxF To! Comm Reset by M&C (C), please wait!</pre>

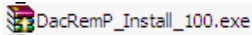
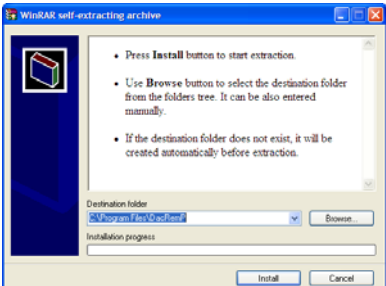
7.13. DacRemP M&C Software

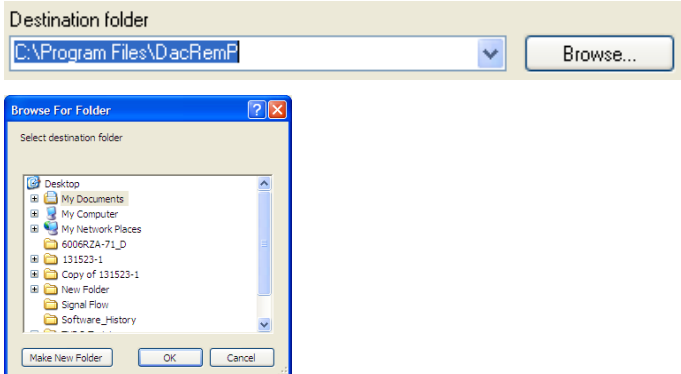
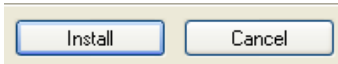
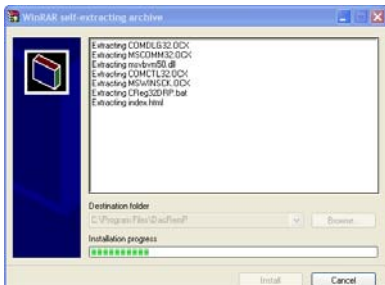
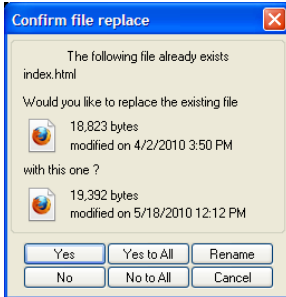

DacRemP (DAC Remote Panel) is a Strip Chart recording program that may be used to:

- Strip Chart Recordings
- Configure all above decks or below software parameter(s).
- Download and/or Upload parameter dump log files.
- Aid in communication fault diagnostics.
- Auto-Discover all local and remote systems that are on the same network as client computer.

The following text describes the installation and some use of this program, for additional help with program tools, select the Help tab or select the tool/button you need help with and press F1. NOTE: It is highly recommended that only a qualified technician perform any of the below procedures as an incorrect set value may render your system inoperable. Any failures caused by an incorrect parameter setting will NOT be covered as part of any currently enforced limited warranty policy.

7.14. DacRemP Software Installation.

<p>Obtain a copy of the DacRemP Installation program. Installation files may be found either on the Sea Tel Dealer support site, on the Diagnostic Support disk provided with the Antenna or from the Sea Tel Service Department.</p>	
<p>Double Click on the DacRemP_Install_1.xx.exe filename. Where xx represents the current software revision. At the time of release of this document DacRemP is at release version 1.00.</p>	
<p>This will bring up the WinRAR self-extracting archive dialog box.</p>	

<p>Although not recommended, click on the “Browse” button to bring up a dialog box to browse through your computer folders to select a different Destination folder in which you wish to have the program installed.</p>	
<p>Once the desired Destination folder has been selected click on Install to begin the installation process.</p>	
<p>The WinRAR dialog box will display the installation progress.</p>	
<p>If you have a previous version of DacRemP installed, you may be prompted to “Confirm File Replacement”. Click on Yes to All to continue.</p>	
<p>When the installation process has completed, the WinRAR Dialog box will disappear. You will find a shortcut to open DacRemP both on your Desktop as well as in the All Programs>SeaTel folder located in your windows Start Menu.</p>	

7.15. DacRemP Electrical Hookup: TCP/IP Based

DacRemP Diagnostic Software may be run in one of two modes, Serial based or TCP/IP Based. TCP/IP electrical hookup is as follows:

7.15.1. PC/Laptop Direct to ACU

Connect a Cross-Over CAT5 cable from your computers Ethernet port to the Ethernet port of the ACU.



Figure 10 DAC-2202 ACU



Figure 11 DAC 2302 ACU

7.15.2. PC/Laptop LAN to ACU

Connect a CAT5 patch cable from your computers Ethernet port to an available LAN port of a Switch/Hub. Connect a CAT5 patch cable from the Ethernet port of the ACU to an available LAN port of a Switch/Hub.

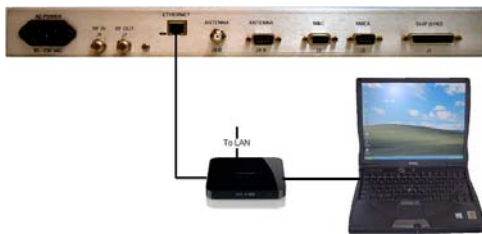


Figure 12 DAC-2202 ACU



Figure 13 DAC 2302 ACU

7.16. DacRemP Electrical Hookup: Serial Based

DacRemP Diagnostic Software may be run in one of two modes, Serial based or TCP/IP Based. Serial electrical hookup is as follows:

7.16.1. PC/Laptop Native 9 Pin Serial Port to ACU

Connect a Straight 9 Pin Serial cable from your computers Native 9 Pin Serial Port to the M&C port of the ACU.

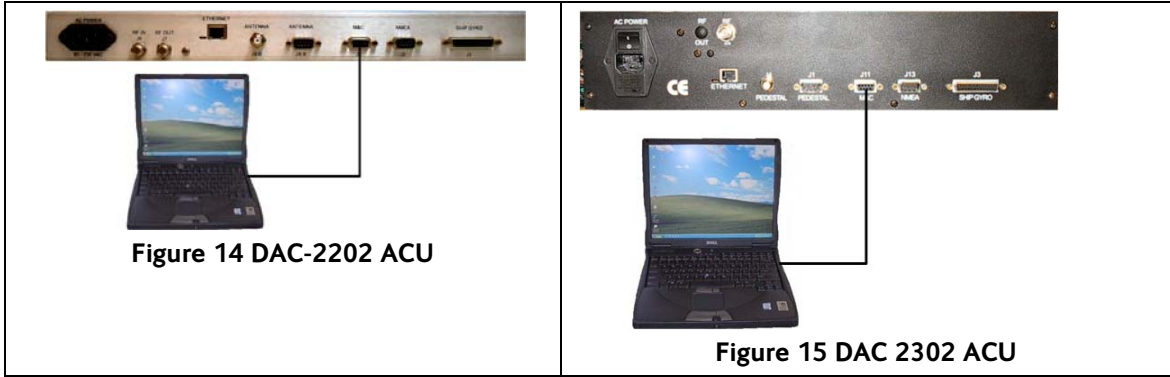


Figure 14 DAC-2202 ACU

Figure 15 DAC 2302 ACU

7.16.2. PC/Laptop USB Port to ACU

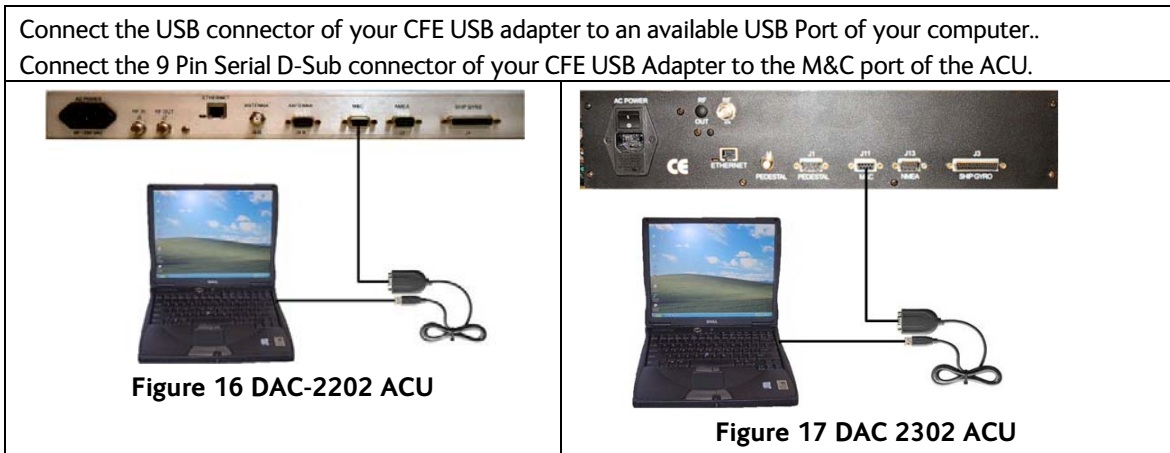


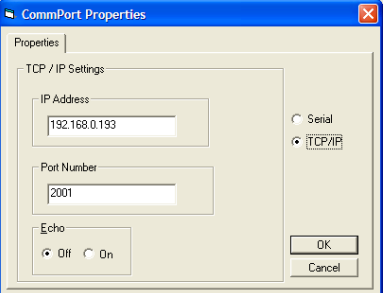

Figure 16 DAC-2202 ACU

Figure 17 DAC 2302 ACU


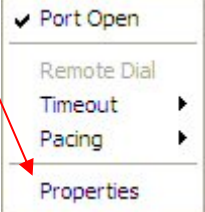
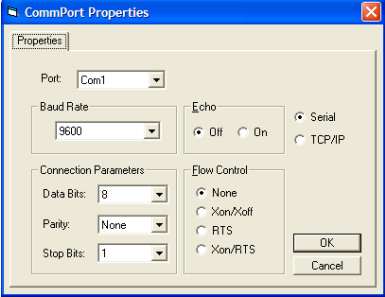
7.17. *PC (DacRemP) to ACU Communication Configuration*

7.17.1. TCP/IP Based

<p>If not already, apply power to the ACU</p>	
<p>Click on the “DacRemP” icon to open the DacRemP program.</p>	
<p>Under the Comm Port Menu, select Properties.</p>	

<p>In the CommPort Properties Dialog box, select the TCP/IP radio button. Enter in the ACU's IP address information Enter in the ACU's Port Number If desired, turn Echo On. (Not required) Click On "OK" to submit and save these communication settings.</p>															
<p>Verify Port Status reports valid communications.</p>		<table border="1"> <thead> <tr> <th>Port Status LED Color</th> <th>Communications State</th> </tr> </thead> <tbody> <tr> <td>Clear</td> <td>Waiting State</td> </tr> <tr> <td>Red</td> <td>No PC to System Communications</td> </tr> <tr> <td>Yellow</td> <td>No Response to Sent Query</td> </tr> <tr> <td>Green</td> <td>Valid Communications</td> </tr> <tr> <td>Blue</td> <td>Time Out Error</td> </tr> </tbody> </table>	Port Status LED Color	Communications State	Clear	Waiting State	Red	No PC to System Communications	Yellow	No Response to Sent Query	Green	Valid Communications	Blue	Time Out Error	
Port Status LED Color	Communications State														
Clear	Waiting State														
Red	No PC to System Communications														
Yellow	No Response to Sent Query														
Green	Valid Communications														
Blue	Time Out Error														
<p>Note: If you experience a communications fault, as evidenced by a RED communications LED, ensure your computers network settings are of the network subnet as that of your ACU. If all settings and cable connections have been verified and you still are not able to establish a connection, Authentication may have been turned on and will not allow a TCP/IP based DacRemP remote connection. Refer to TCP/IP Security text for instructions on how to turn security off.</p>															


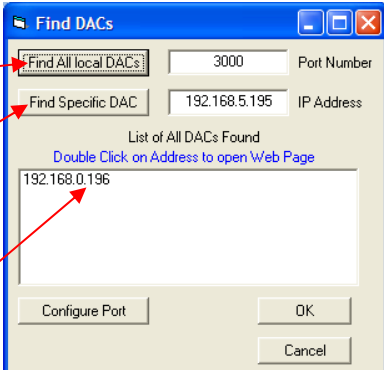
7.17.2. Serial Based

<p>If not already, apply power to the ACU</p>			
<p>Click on the "DacRemP" icon to open the DacRemP diagnostic program.</p>			
<p>Under the Comm Port Menu, select Properties.</p>			
<p>In the CommPort Properties Dialog box, select the Serial radio button. Using the drop down menu, select the Com port number. Using the drop down menu, select the Baud rate of the ACU you are connected to. (All DAC2x02 ACU's are shipped out at 9600) Leave Connection Parameters to 8, None, 1, and None for Flow Control. If desired, turn Echo On. (Not required) Click On "OK" to submit and save these communication settings.</p>			

Note: If you experience a communications fault, as evidenced by a RED communications LED, ensure your communication settings are correct. If you are using a USB to Serial Adapter, verify the Com Port number assigned to it is set correctly, ProgTerm restricts comport selections to up to COM20, if your adapter has assigned a higher value you are required to reconfigure your port. Refer to you computer and/or USB to Serial Adapter manual for detailed information on how to do this.

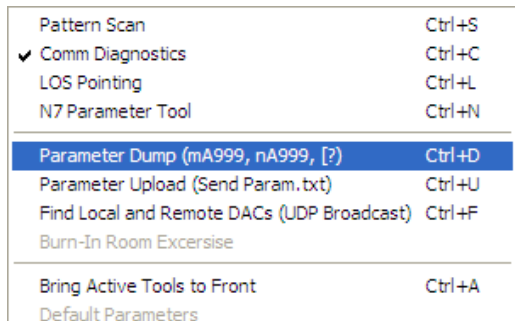
7.18. DacRemP Find Dac's

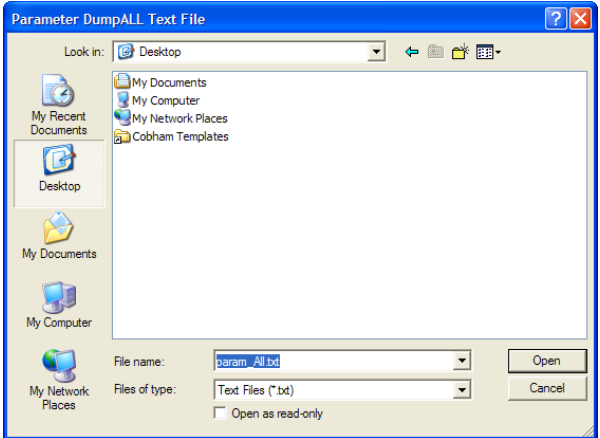
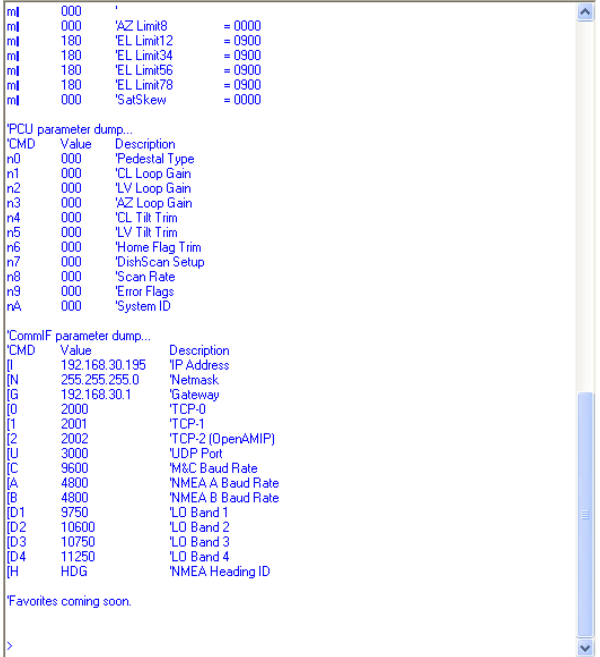
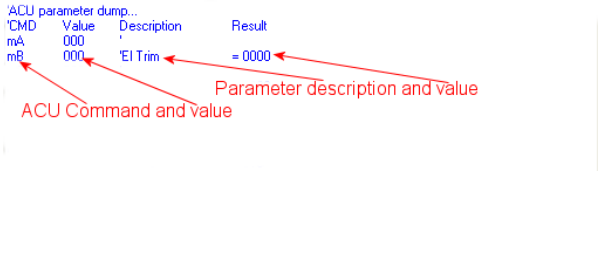
The Find DACs dialog box is a UDP Broadcast (IP Port Number 3000) utility tool, used to identify and locate all Local DAC2202/2302 Antenna Control Units running on the same Network (Subnet) as the client PC running the DacRemP program.

<p>Mouse click on “Tools>Find Local and Remote DACs (UDP Broadcast)” or hit Ctrl+F on your PC’s keyboard to bring up the Find DAC’s utility tool.</p>	
<p>With the Port Number set to 3000, click on Find All local DAC’s. All of the discovered ACU’s will display their respective IP addresses the display window.</p> <p>With the Port Number set to 3000 and the IP address set to a known ACU IP address click on Find Specific DAC. If properly connected, the IP address will be shown as available in the display window.</p> <p>Double mouse click on an IP address to open that ACU’s internal HTML page. To open a TCP/IP based connection to an ACU, click on Configure Port to open up the Comm Ports dialog box.</p>	

7.19. Parameter Dump using DacRemP

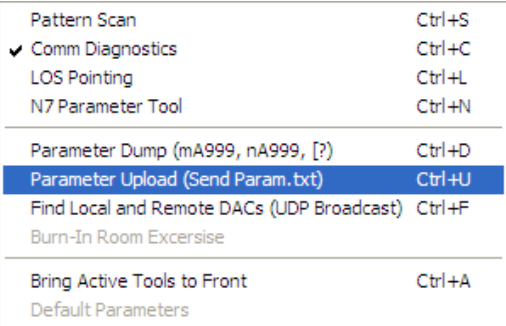

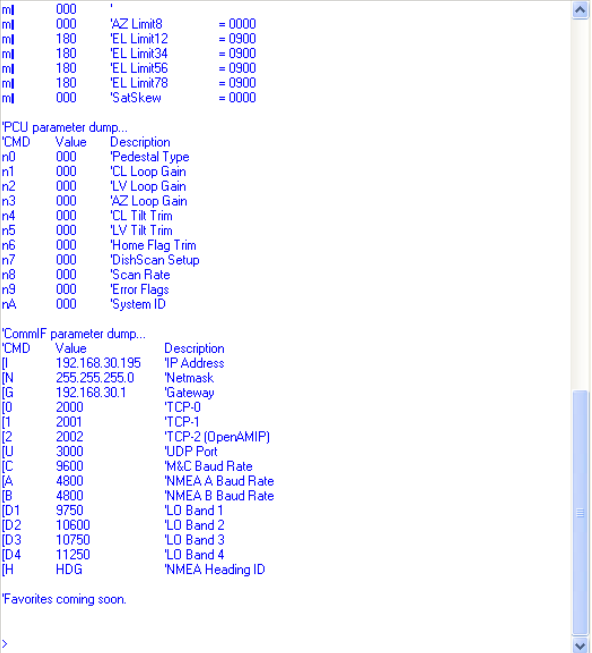
DacRemP versions 1.00 or later provides a means to save all ACU, COMMIF, and PCU parameter settings into a text file. This text file may be used to restore the parameter settings in the system to a known configuration. It is important to verify all settings are correct and your system is operational prior to saving a parameter dump file. Use the procedure(s) below to dump all of the parameter settings to a text file.

<p>Under the Tools menu, Click on the Parameter Dump button.</p>	
--	--

<p>Browse to a location, of your choice, on the PC or memory stick, type in the desired filename and click Open.</p>	
<p>DacRemP will log all of the ACU, COMM IF, and PCU parameters to a text file.</p>	
<p>The text file displays the individual parameter command and value in the two left columns followed by the decoded parameter description and value in the two right columns. All text following the ' character is commented out, and as such is ignored by the system during a parameter upload. This allows an operator to decipher the set parameter description and values without the need of any reference documents (i.e. ACU/PCU command set)</p>	

7.20. Parameter Upload using DacRemP

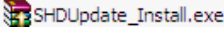
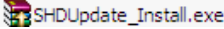
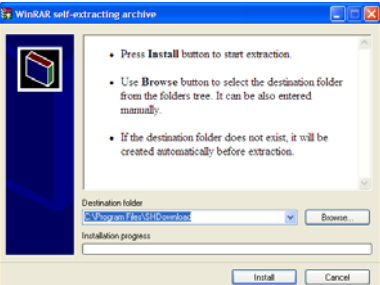
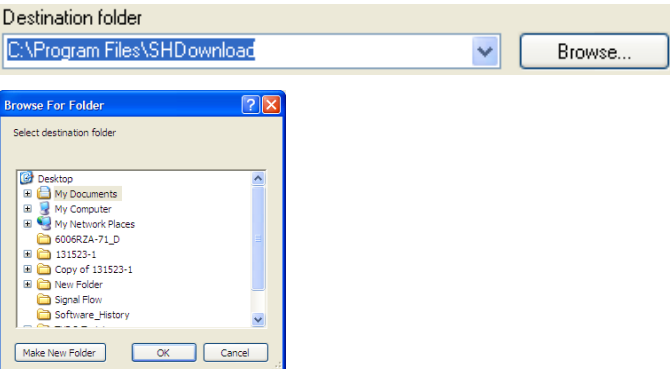
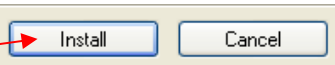
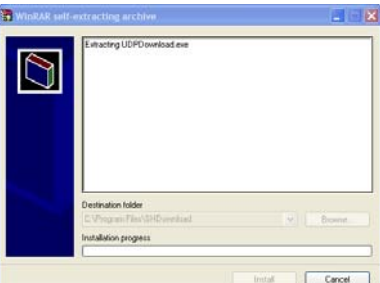
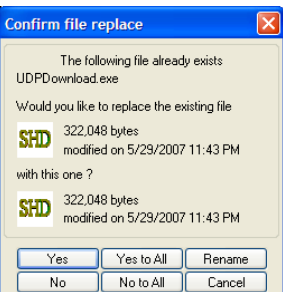
DacRemP versions 1.00 or later provides a means to upload a “parameter dump” text file. This text file may be used to restore the parameter settings in the system to a known working configuration. The following procedure assumes that you have available to you, this text file from a previously performed a “Parameter Dump”.

<p>Under the Tools menu, Click on the Parameter Upload button.</p>	
<p>Browse through your PC or memory stick, where the desired filename is located and click Open.</p>	
<p>DacRemP will submit the log file that contains all of the ACU, COMM IF, and PCU parameters to your system.</p>	 <pre> ml 000 * ml 000 'AZ Lim18 = 0000 ml 180 'EL Lim112 = 0900 ml 180 'EL Lim134 = 0900 ml 180 'EL Lim156 = 0900 ml 180 'EL Lim178 = 0900 ml 000 'SatSkew = 0000 'PCU parameter dump... 'CMD Value Description n0 000 'Pedestal Type n1 000 'CL Loop Gain n2 000 'LV Loop Gain n3 000 'AZ Loop Gain n4 000 'CL Trim n5 000 'LV Trim n6 000 'Home Flag Trim n7 000 'DishScan Setup n8 000 'Scan Rate n9 000 'Error Flags nA 000 'System ID 'CommIF parameter dump... 'CMD Value Description I 192.168.30.195 'IP Address IN 255.255.255.0 'Netmask IG 192.168.30.1 'Gateway I0 2000 'TCP-0 I1 2001 'TCP-1 I2 2002 'TCP-2 (OpenAMIP) IU 3000 'UDP Port IC 9600 'M&C Baud Rate IA 4800 'NMEA A Baud Rate IB 4800 'NMEA B Baud Rate ID1 9750 'LO Band 1 ID2 10600 'LO Band 2 ID3 10750 'LO Band 3 ID4 11250 'LO Band 4 IH HDG 'NMEA Heading ID 'Favorites coming soon. </pre>
<p>Verify normal operation, then save all parameters to memory.</p>	

7.21. SHD CommIF Upload Utility Software

SHD Upload Utility is a 3rd party Network Utility program used to perform updates to the COMMIF Module. The following text describes the installation and use of this program. NOTE: It is highly recommended that only a qualified technician perform any of the below procedures as an incorrectly set value may render your system inoperable. Any failures caused by an incorrect parameter setting will NOT be covered as part of the limited warranty policy.

7.22. SHD Update Utility installation.

<p>A copy of the SHD Update Utility Installation program may be found on the Diagnostic Support disk provided with the Antenna.</p>	
<p>Double Click on the SHDUpdate_Install.exe file name.</p>	
<p>This will bring up the WinRaR self-extracting archive dialog box.</p>	
<p>Although not recommended, click on the “Browse” button to bring up a dialog box to browse through you computer and select a different Destination folder in which you wish to have the program installed.</p>	
<p>Once the desired Destination folder has been selected click on Install to begin the installation process.</p>	
<p>The WinRaR dialog box will display the installation progress.</p>	
<p>If you have a previous version of UPD Download installed, you may be prompted to “Confirm File Replacement”. Click on “Yes to All” to continue.</p>	

When the installation process has completed, the WinRaR Dialog box will disappear. You will find one shortcut to open CommIF Update Utility on your Desktop as well as in the All Programs>SeaTel folder in your windows Start Menu.



7.23. SHD Electrical Hookup: TCP/IP Based

SHD Utility Software must be connected using the TCP/IP Based electrical hookup is as follows:

7.23.1. PC/Laptop Direct to ACU

Connect a Cross-Over CAT5 cable from your computers Ethernet port to the Ethernet port of the ACU.

Figure 18 DAC-2202 ACU

Figure 19 DAC 2302 ACU





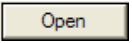
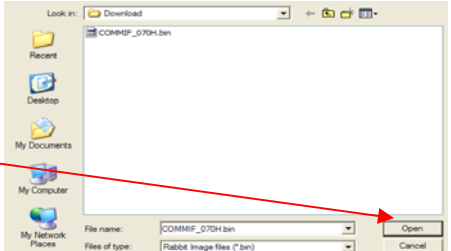
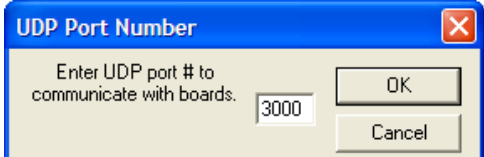
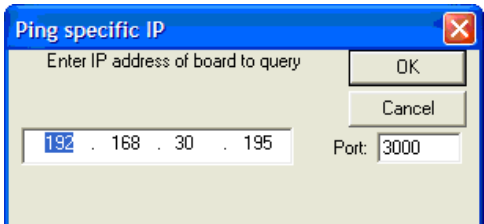
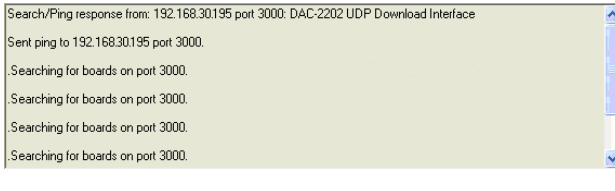
7.23.2. PC/Laptop LAN to ACU

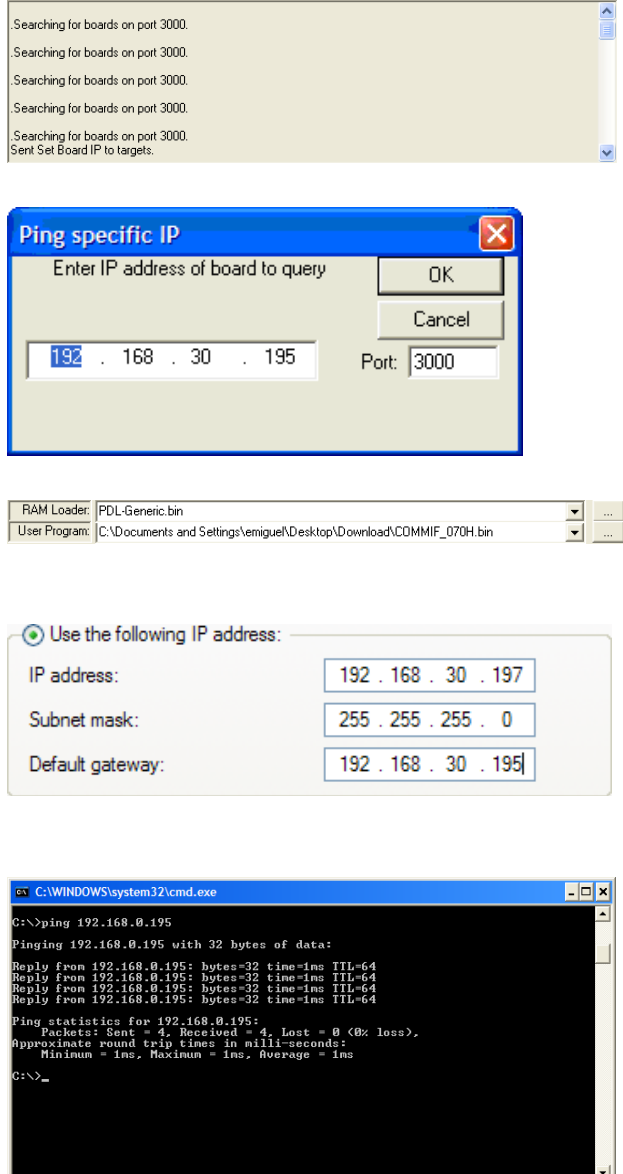
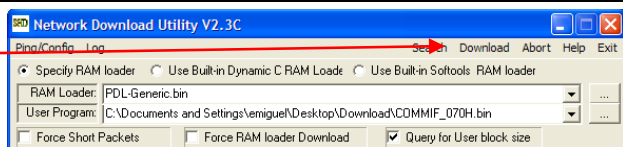
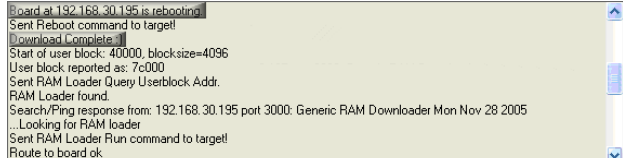
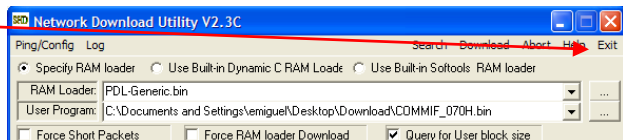
Connect a CAT5 patch cable from your computers Ethernet port to an available LAN port of a Switch/Hub. Connect a CAT5 patch cable from the Ethernet port of the ACU to an available LAN port of a Switch/Hub.

Figure 20 DAC-2202 ACU

Figure 21 DAC 2302 ACU

7.24. CommIF Update Procedure


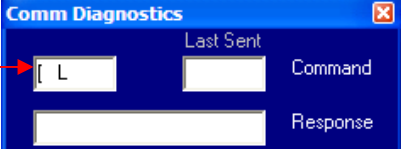
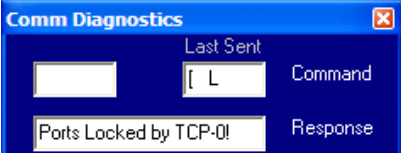
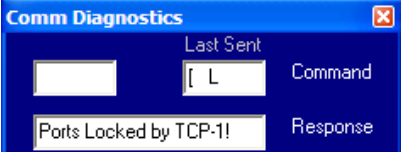
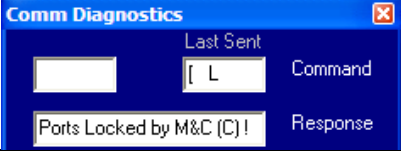
<p>Start the SHD Network Utility called “CommIF Update Utility.exe”</p>	
<p>Ensure that the “RAM Loader” displays as PDL- Generic.bin</p>	
<p>Ensure that the “User Program” field displays the file location & is current software version.</p>	
<p>Select the  icon</p> <p>Browse to the location where the bin file is stored.</p> <p>Select the  icon.</p>	
<p>Click on “Ping/Config” then “UDP Port” and enter 3000</p>	
<p>Press “Reset” key on front panel of ACU.</p> <p>Click on “Ping/Config” then “Ping Specific IP” and enter the address of the DAC2202 then click OK. (One time only)</p>	
<p>Verify “Search/Ping Response from: 192.168.30.195 port 3000: DAC-2202 UDP Download Interface” is displayed in bottom Dialog Box.</p>	

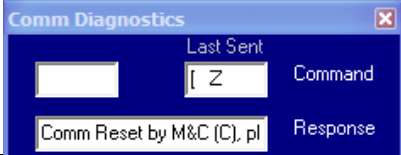
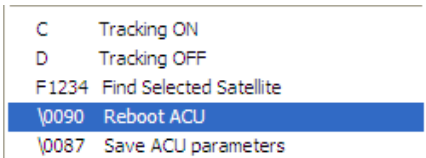
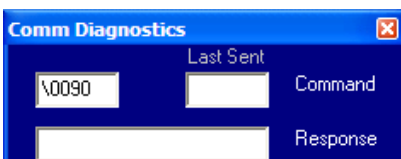
<p>If “Searching for boards on port 3000.” continuously displays on bottom dialog box after sending Ping Request, then the Comm IF PCB is NOT communicating with computers Ethernet port. <u>Possible Failure:</u> Network Download Utility not configured correctly.</p> <p>Check: Verify IP address and Port Number entered in step 11 matches that of the ACU. (Factory Default IP address is 192.168.30.195 with a Subnet mask of 255.255.255.248).</p> <p>Check: Verify “RAM Loader” and “User Program” parameters entered are properly loaded. <u>Possible Failure:</u> Laptop Ethernet Port settings not configured correctly.</p> <p>Check: Verify computer LAN port has been configured with a static IP address on the same Subnet as DAC2x02.</p> <p>Verify ability to Ping ACU Ethernet Port using windows Command Prompt.</p>	
<p>Click on “Download” in the upper right hand corner to start the download process.</p>	
<p>Verify dialog box displays “Download Complete:)” Verify the Network Download Utility sends a Reboot command to the ACU and that the ACU echo’s back “Board at 192.168.30.195 is rebooting”.</p>	
<p>Close Network Download Utility by clicking on “Exit”.</p>	

7.25. Remote Panel Lockout

It may be desired to temporarily lockout the operation of the antenna from the ACU front panel from local users in order to prevent users from interfering with a specific test or calibration procedure being performed from a remote location. Example: A NOC technician, who has an out of band management system that allows him/her remote access to the system, may wish to prevent an end user on board from accidentally or intentionally entering/submitted commands while performing a Cross-Pol Isolation tests.

Use the following procedure to “Lock Out” all front panel keys, with the exception of the RESET key. Note that this command also prevents any ACU/PCU commands to be accepted by all other service ports. (i.e. if you lock out from the TCP-0 port you will not be able to issue any commands to the ACU motherboard or the PCU from either the TCP-1 or Serial M&C ports.)

7.25.1. Panel Lock Out Procedure Using ProgTerm	
Open up ProgTerm and establish a “DAC2K to ACU translation mode” communication session to the ACU.	
Type in the Remote Panel Lockout command “[L” and hit enter.	
ProgTerm will display “Ports Locked by PORTNAME !” as a visual indication that the command was properly accepted by all currently opened ports. Where PORTNAME is the name of the PORT name that locked the panel. i.e the graphics to the right depicts a Remote Panel Lockout command received on TCP-0 / TCP-1 and M&C ports.	<pre>>[L Ports Locked by TCP-0 ! or >[L Ports Locked by TCP-1 ! or [L Ports Locked by M&C (C) !</pre>
The ACU front panel will now display “ REMOTE PANEL LOCKOUT ” as a visual indication that the command was properly accepted.	REMOTE PANEL LOCKOUT
7.25.2. Panel Lock Out Procedure Using DacRemP	
Open up DacRemP and establish a communication session to the ACU.	
In the Remote Command Entry window, type in the Remote Panel Lockout command “[L” and then hit enter. 	
DacRemP will display “Ports Locked by PORTNAME !” as a visual indication that the command was properly accepted by all currently opened ports in the Response window. Where PORTNAME is the name of the PORT name that locked the panel. (i.e. the graphics to the right depicts a Remote Panel Lockout command received on TCP-0 / TCP-1 and M&C ports.)	 <p style="text-align: center;">or</p>  <p style="text-align: center;">or</p> 

7.25.3. To restore operation remotely (from the ProgTerm)	
Under the Tools>COMMIF Tools menu selection, select the COMMIF Reset option or type in “[Z” then press ENTER. Verify ProgTerm displays “COMM Reset by PORTNAME , Please wait!” then shortly (approx. 5 seconds) after that, reports the current COMMIF software version as shown in the graphic to the right.	<pre>>Comm Reset by M&C (C), please wait! >Comm IF Ver 1.12 Port M&C (C) ></pre>
Under the Tools>ACU Tools menu selection, select “ACU Reset” or type in “\0090” then press ENTER. Verify ProgTerm displays “RxIF To!”.	RxIF To!
The system is now back in standard operation mode.	
7.25.4. To restore operation remotely (from the DacRemP)	
In the Remote Command Entry window, type in the Remote Panel Lockout command “[Z” and then hit ENTER.	
Wait at least 5-8 seconds, then under the COMM Diagnostics windows’ ACU AUX Sub-menu, select the “\0090 Reboot ACU” button or in the Remote Command entry window type in “\0090” then hit ENTER.	 <p style="text-align: center;">or</p> 
The system is now back in standard operation mode.	
7.25.5. To restore operation locally (from the front panel)	
On the ACU front panel, press the RESET key.	
The system is now back in standard operation mode.	

NOTE: If your system type parameter includes the value 1(auto load Sat on reset or power up) there will be a temporary disruption of services as the ACU re-targets and locates the desired satellite and the Satellite Modem (VSAT) or Satellite Receiver(s) (TVRO) goes through its nominal authentication process.

8. Maintenance & Troubleshooting

Below are the common adjustments, maintenance and troubleshooting that may be required during the lifetime of your system. If your system includes the OPTIONAL TSC-10 Touch Screen Controller, accomplish the Operator Testing and Troubleshooting in the **Diagnostics** screens.

8.1. 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 Terminal Mounting Strip or the boards inside the ACU.*



CAUTION - *Allow only an **authorized dealer** to install or service your Sea Tel System components. Unauthorized installation or service can be dangerous and can invalidate the warranty.*

8.2. Troubleshooting The ACU

The following paragraphs list the problems you might encounter when performing the functional checkout steps in the previous section of this manual. Following the problems are suggestions of where to start looking to solve the problem. Refer to the Drawings section of this manual and your Antenna manual for any/all pertinent block diagrams, schematics, wiring diagrams and assembly drawings to aid in diagnosing any type of failure.

Try pressing RESET first and then in some cases you may want to turn Power OFF for a short period of time then turn it back ON to see if that restores normal operation. Remember, with most Gyro Compass types (Synchro and SBS inputs) you **MUST** enter the beginning Heading value EVERY time you power-up the ACU, before you will be able to retarget your desired satellite.

Verify that the SETUP PARAMETERS are set correctly (refer to the Setup section of this manual).

8.2.1. ACU display is blank

This indicates no power to the internal electronics. Assure that the front panel Power switch is ON. Check the AC line voltage on the Power Cord. Check the cables on the rear panel of the ACU to assure they are properly connected. If AC Line voltage is Ok, one at a time disconnect (and check display status) the cables plugged into J1 Gyro Compass, then J2 NMEA, then J3 M&C to see if one of these cables is shorting the ACU Power. Call your dealer to report this failure and arrange for repair service.

8.2.2. ACU Status displays "REMOTE NOT RESPONDING"

This indicates a problem in the Antenna Control coax cable or communications modems in the ACU and/or Antenna PCU. Check the Antenna Control Cable connections at the J4 "Antenna" jack on the rear of the ACU and at the antenna pedestal inside the radome. If the connections are good, call your dealer to report this failure and arrange for repair service.

8.3. 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.

8.3.1. 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 4 connections to A, B, C and COMMON.
3. Check the connections to the Terminal Mounting Strip 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.

8.3.2. 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 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 Ship's 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.

8.3.3. 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.

8.4. Display Offsets / Optimizing Targeting

If the antenna does not target to within +/- 1.0 degrees of the satellite actual Elevation and Azimuth location of the desired satellite, the EL & AZ TRIM parameters need to be optimized. This is because the targeted positions may be different than the calculated look angles due to mechanical installation or antenna alignment offsets.

Targeting should have been optimized when the system was installed and should not need to be re-adjusted in normal operation. However, you will need to re-evaluate the elevation trim if the antenna has been re-balanced.

You may correct the displayed positions to optimize targeting by following the procedure described in the Maintenance section of your antenna pedestal manual.

8.5. Pedestal Control Unit Configuration

If the power up display of the ACU says SEA TEL – REMOTE “xx97 VER 1.xx” the PCU is not configured for a specific Series 96, 97 or 00 MODEL number. The configuration information that is unique to each pedestal type is stored in a Non Volatile Random Access Memory (NVRAM) in the PCU enclosure. If the PCU is replaced or the NVRAM in the PCU should become corrupt, the PCU must be re-configured to operate with the pedestal it is installed on. The default configuration for the PCU is model “xx97” (or xx96, or xx00). *In this configuration the Level Cage will be driven normally but the PCU will not drive any of the three torque motors to prevent damage to the unknown pedestal.* To configure the PCU refer to the Maintenance section of your antenna pedestal manual.

8.6. Configuring the COMM IF ports of the DAC-2202 ACU

The Monitor and Control (M&C J3) port allows external control from a PC using a communications program such as Sea Tel's ProgTerm or DacRemP via a straight 9 wire serial cable. This Port is used in conjunction with a diagnostic software connection to configure all communications settings, and/or for an **Authorized Sea Tel Dealer** to perform software uploads to the PCU, ACU Main PCB, and DVB Receiver.



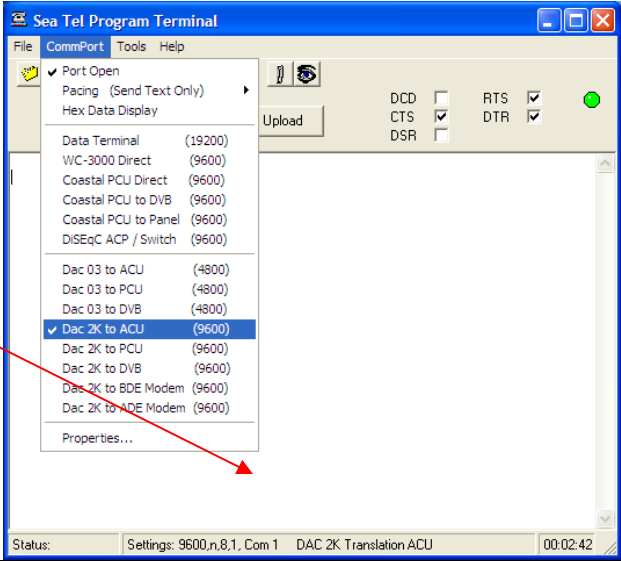


The Ethernet Port allows use of a LAN connection to login into the ACU's internal webpage's to view or change system parameters using a web browser such as Internet Explorer or Mozilla Firefox. This 10BaseT Ethernet Port has a configurable static IP address with 2 TCP/IP connections for diagnostic software connections and a UPD Port for an **Authorized Sea Tel Dealer** to perform a software upload to the Comm IF Module.

The NMEA J2 Port allows 2 simultaneous NMEA-0183 connections on the same DB9 connector, defined as NMEA A and NMEA B. Both NMEA A (J2-Pin1 Rx+ and J2-Pin3 Tx-) and NMEA B (J2-Pin7 Rxe+ and J2-8 Txe-) Ports have selectable baud rates independent of each other. The following procedure describes the process of connecting the ACU to your Laptop and configuring all Comm IF Properties.

Hardware/Software Requirements:

- Laptop/Desktop with an available Serial Com Port and ProgTerm Version 1.33 (Build 11.Mar.2007 or later). If no DB9 Serial port is available use a USB to Serial Adapter or use IP version of ProgTerm. Standard Straight 9 wire serial cable (Sea Tel Part Number 120643-25 or equiv.)

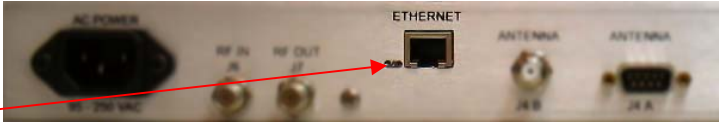
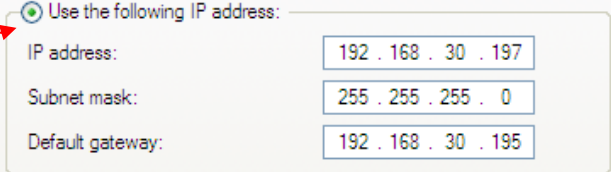
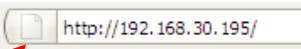
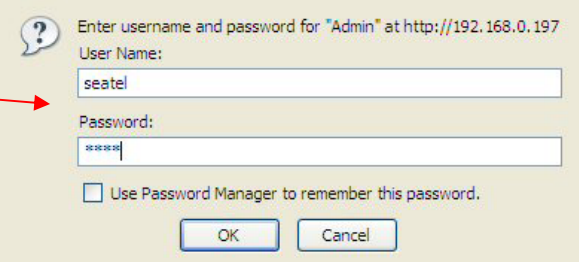
- DAC2202 Antenna Control Unit

<p>1. Turn Power off to ACU</p>	
<p>2. Connect J3 M&C Port to Computer Com Port using a Male to Female RS232 Straight 9 wire serial cable</p>	
<p>3. Turn Power on to ACU and then open Sea Tel's ProgTerm M&C software program.</p>	
<p>4. Configure ProgTerm's Translation Mode. Click on "CommPort" then select "Dac 2K to ACU (9600)".</p> <p>Insure that the bottom of screen reads "DAC 2K Translation ACU"</p>	
<p>5. Mouse Click on the Paper Clip icon and verify response to ACU status query similar to what's shown.</p>	
<p>6. Mouse click on the Eyeball icon and verify response to ACU software version query.</p>	
<p>7. To View Communication settings type in "[? ↵]". That's left bracket, question mark, <carriage return></p> <p>(Typed characters will not display unless "Echo" is turned on in the Comm Port Properties.)</p>	<p>DAC2202 Comm IF Commands:</p> <p>[Innn.nnn.nnn.nnn ↵ Set IP address</p> <p>[Nnnn.nnn.nnn.nnn ↵ Set Net mask.</p> <p>[Gnnn.nnn.nnn.nnn ↵ Set Gateway address</p> <p>[0nnnn ↵ Set TCP/IP-0 (Port 0) port number</p> <p>[1nnnn ↵ Set TCP/IP-1 (Port 1) port number</p> <p>[Unnnn ↵ Set UDP (Software Upload) port number</p> <p>[Cnnnn ↵ Set M&C (Port C) baud rate</p> <p>[Bnnnn ↵ Set NMEA B (Port B) baud rate</p> <p>[Annnn ↵ Set NMEA A (Port A) baud rate</p> <p>[? ↵ View Settings IP, NM, GW, Port 0,1, baud C, B, A</p> <p>[V ↵ View Comm IF PCB Software Version</p> <p>[L ↵ Lock out ports for download</p>

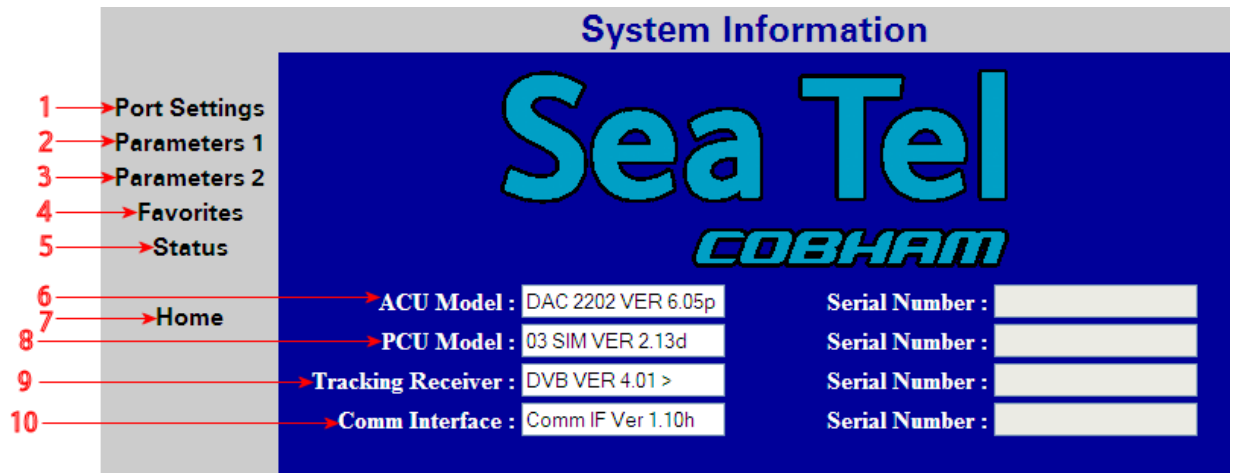
<p><u>IP</u> is the ACU IP address (Factory Default 192.168.30.195) <u>NM</u> is the ACU Subnet Mask (Factory Default 255.255.255.0) <u>GW</u> is the ACU Gateway (Factory Default 192.168.30.1) <u>TCP 0</u> is the first of two available TCP/IP Port's (Factory Default 2000) <u>TCP 1</u> is second of two available TCP/IP Port's (Factory Default is 2001) <u>UDP</u> is the Comm IF PCB Software Upload port (Factory Default 3000) <u>M&C (C)</u> is the M&C RS232 Port C (J3) Baud Rate (Factory Default 9600) <u>NMEA B</u> is the NMEA RS232 Port B (J2) Baud Rate (Factory Default 4800) <u>NMEA A</u> is the NMEA RS232 Port A (J2)Baud Rate (Factory Default 4800)</p>	<pre>S@@T@L1050 >DAC 2202 VER 6.00c >[? IP=192.168.0.195 >NM=255.255.255.0 >GW=192.168.0.1 >TCP-0=2000 >TCP-1=2001 >UDP =3000 >M&C (C)=9600 >NMEA(A)=4800 >NMEA(B)=4800</pre>
<p>8. To change Communication Settings Type “[Control Codenn<cr>”. That’s left bracket, control code alpha/numeric digit, parameter, <carriage return> (No Spaces). Example: Change ACU IP address to 192.168.30.195 type: “[I192.168.30.195<cr>” Example: Change J2 NMEA Port B Baud Rate to 9600 type: “[B9600<cr>”</p>	<pre>S@@T@L1101 >DAC 2202 VER 6.00d >[I192.168.30.195 > S@@T@L1019 >DAC 2202 VER 6.00d >[B9600 ></pre>
<p>9. To save parameters to Flash (Comm IF PCB) Type “[W<cr>”. That’s Left Bracket, Capital “W”, <carriage return>(No Spaces). Verify “Done” is displayed after Saving Comm parameters. **Do not turn power off to ACU until finished**</p>	<pre>S@@T@L1101 >DAC 2202 VER 6.00d >[I192.168.30.195 >[W Saving Comm parameters: Done! ></pre>
<p>10. To reboot Comm IF software Type “[Z<cr>”. That’s Left Bracket, Capital “Z”, <carriage return> (No Spaces). Verify “Comm IF Ver x.xx Port M&C (C)” is displayed.</p>	<pre>>[W Saving Comm parameters: Done! > ? >[Z Comm Reset by M&C (C), please wait! >Comm IF Ver 0.63a Port M&C (C) ></pre>

8.7. Internal HTML Page

The following procedure(s) define the process of connecting and logging into the ACU's internal HTML page with COMMIF-1.10h software installed. **If the ACU's IP address is unknown, use the "Configuring the COMM IF Module" procedure to view or change connection settings, including but not limited to TCP Port assignment for existing LAN firewall purposes.

<p>1. Connect the "ETHERNET" port of the rear panel of the ACU to a Local Area Network (LAN) Connection or directly to an available Ethernet port on a Laptop/Desktop using a standard CAT5 cable.</p>	
<p>2. If not done so previously, apply Power to the ACU.</p>	
<p>3. Configure the connected LAN connection with a static IP address that is on the same sub net as the ACU.</p>	
<p>4. Start up your Internet Browser (i.e. Internet Explorer, Mozilla Firefox, etc.) and type in the IP address of the ACU into the address bar.</p>	
<p>5. Log into the ACU by typing in Username and Password information. USERNAME: seatel PASSWORD: 1234</p>	

8.8. System Information



The System Information page, also known as the HOME page, displays current antenna software and model configurations.

Number	Description
1	Click to select to the Port Settings Page. This page displays the TCP connection and baud rate settings for the Comm If Module.
2	Click to select to the DAC Parameters 1 Page. This page displays the current ACU configuration parameter values stored in the ACU.
3	Click to select to the DAC Parameters 2 Page. This page displays the current Satellite Tracking parameter values stored in the ACU. This page also contains the currently defined blockage zones (Az Limits 1-6).
4	Click to select to the Favorites Page. This page displays an editable list of 5 “Preset” satellites and their respective tracking parameters.
5	Click to select to the Status page. This page displays current system status, including Tracking condition, Antenna Position, Vessel Location / Orientation, and decoded error conditions.
6	The ACU Model field displays the software version currently installed in the ACU M/B.
7	Click to refresh the field values described below, while on any other page, the Home link redirects you to this page.
8	The PCU Model field displays the Antenna model configuration and the software version currently installed in the PCU.
9	The Comm Interface field displays the software version currently installed onto the Comm IF Module.
10	The Tracking Receiver field displays the software version currently installed onto the ACU’s internal tracking receiver.



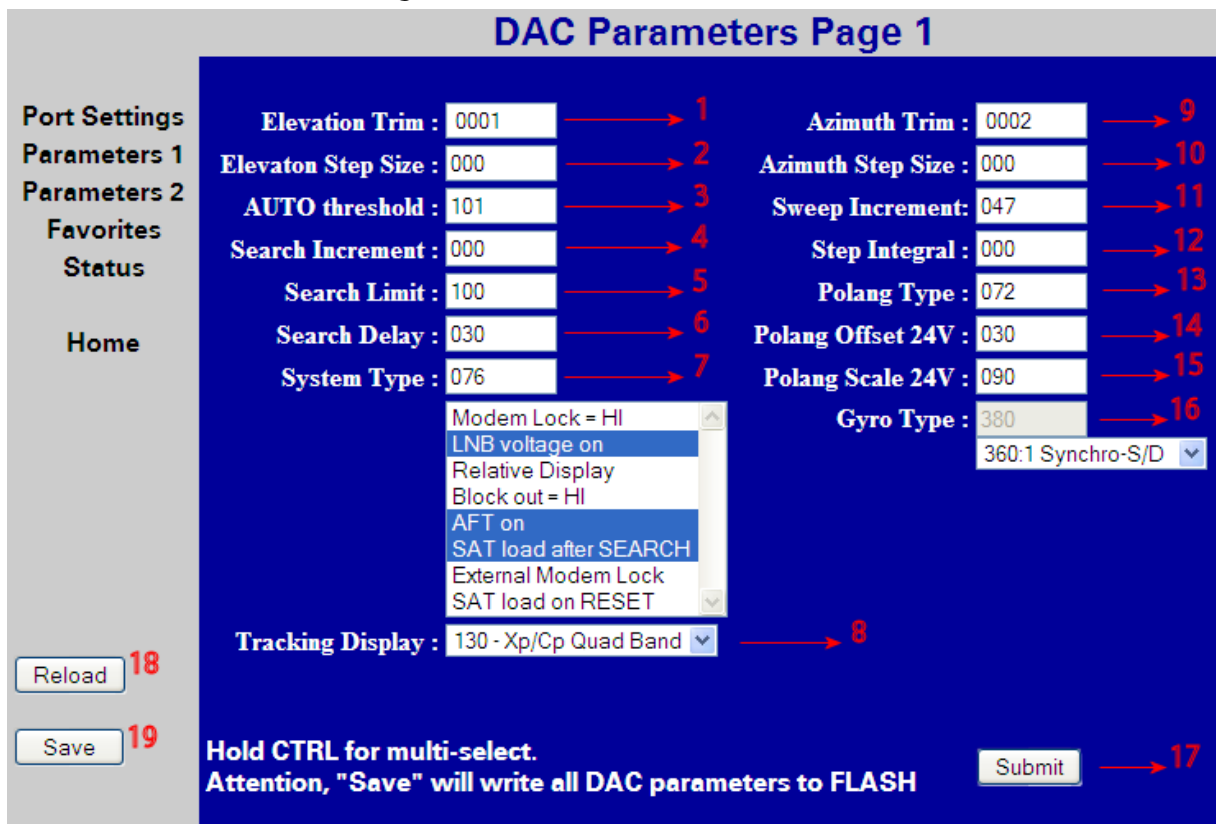
The **Serial Number** display fields are NOT being used in this software revision.

8.9. Communication Port Settings

Number	Description
1	The IP Address field displays the Static Internet Protocol address value currently stored in the Comm IF module (Flash). To change the IP address to match an existing LAN info structure, type in the desired value and click on the SUBMIT button. If the parameter change causes desirable operation click on the SAVE button to store value to memory. This address must conform to the <i>nnn.nnn.nnn.nnn</i> format where <i>nnn</i> is a number between 0 and 255.
2	The Net Mask field displays the Subnet Mask address value currently stored in the Comm IF module. To change the Subnet to match an existing LAN info structure, type in the desired value and click on the SUBMIT button. If the parameter change causes desirable operation click on the SAVE button to store value to Flash. This address must conform to the <i>nnn.nnn.nnn.nnn</i> format where <i>nnn</i> is a number between 0 and 255.
3	The Gateway field displays the Static Gateway Internet Protocol address value currently stored in the Comm IF module. To change the Gateway IP address to match an existing LAN info structure, type in the desired value and click on the SUBMIT button. If the parameter change causes desirable operation click on the SAVE button to store value to Flash. This address must conform to the <i>nnn.nnn.nnn.nnn</i> format where <i>nnn</i> is a number between 0 and 255.
4	The TCP Port 0 field displays the Transmission Control Protocol Port 0 value currently stored in the Comm IF Module. To change the Port value to match an existing LAN info structure, type in the desired value and click on the SUBMIT button. If the parameter change causes desirable operation click on the SAVE button to store value to Flash. This address must conform to the <i>nnnn</i> format where <i>nnnn</i> is a number between 0 and 65535.
5	The TCP Port 1 field displays the Transmission Control Protocol Port 1 value currently stored in the Comm IF Module. To change the Port value to match an existing LAN info structure, type in the desired value and click on the SUBMIT button. If the parameter change causes desirable operation click on the SAVE button to store value to Flash. This address must conform to the <i>nnnn</i> format where <i>nnnn</i> is a number between 0 and 65535.
6	The OpenAMIP Port field displays the Open Antenna-Modem Interface Protocol port value. This port is specifically used to communicate with an “Open AMIP” compatible satellite modem and should not be changed from the factory default.
7	The UDP Port displays the User Datagram Protocol Port value stored in the Comm IF Module. This port is specifically used to perform software upgrades to the Comm IF Module and should NOT be changed.

8	The M&C Baudrate field displays the J3 M&C Port Baud rate value currently stored in the Comm IF Module. To change the Baud rate, type in the desired value and click on the SUBMIT button or click on the SAVE button to store value to Flash. Acceptable baud rate values are 4800 or 9600.
9	The NMEA A Baudrate field displays the J2 NMEA Port A Baud rate value currently stored in the Comm IF Module. To change the Baud rate, type in the desired value and click on the SUBMIT button or click on the SAVE button to store value to Flash. Acceptable baud rate values are 4800 or 9600.
10	The NMEA B Baudrate field displays the J2 NMEA Port B Baud rate value currently stored in the Comm IF Module. To change the Baud rate, type in the desired value and click on the SUBMIT button or click on the SAVE button to store value to Flash. Acceptable baud rate values are 4800 or 9600.
11	The LO Band 1 field displays a drop down selection list for the Local Oscillator value to be used when Band 1 is selected for tracking purposes.
12	The LO Band 2 field displays a drop down selection list for the Local Oscillator value to be used when Band 2 is selected for tracking purposes.
13	The LO Band 3 field displays a drop down selection list for the Local Oscillator value to be used when Band 3 is selected for tracking purposes.
14	The LO Band 4 field displays a drop down selection list for the Local Oscillator value to be used when Band 4 is selected for tracking purposes.
15	The NMEA Heading ID displays a drop down selection list for NMEA 0183 compliant heading inputs into the ACU. Current selections available are HDT, HDM, HDD, & HDG.
16	Click the SUBMIT button to transfer all currently displayed parameters to the Comm IF module operating software variables table. NOTE: The submit button will not store the values to NVRAM; an ACU reset or power cycle will revert to the settings saved in memory.
17	Click the SAVE button to store all current parameters in the operating software variables table to Flash (Comm IF). **THIS DOES NOT SAVE DISPLAYED PARAMETERS UNLESS THE SUBMIT BUTTON IS PRESSED FIRST**
18	The Command field displays an entry field for line based utility or configuration commands. Enter in the desired command string and then select the Send button to submit the command. For a complete list of available commands, refer to your antenna manual or the appropriate command set documentation
19	The Response field displays a display value or string based, whenever a sent remote command involves a displayed response.

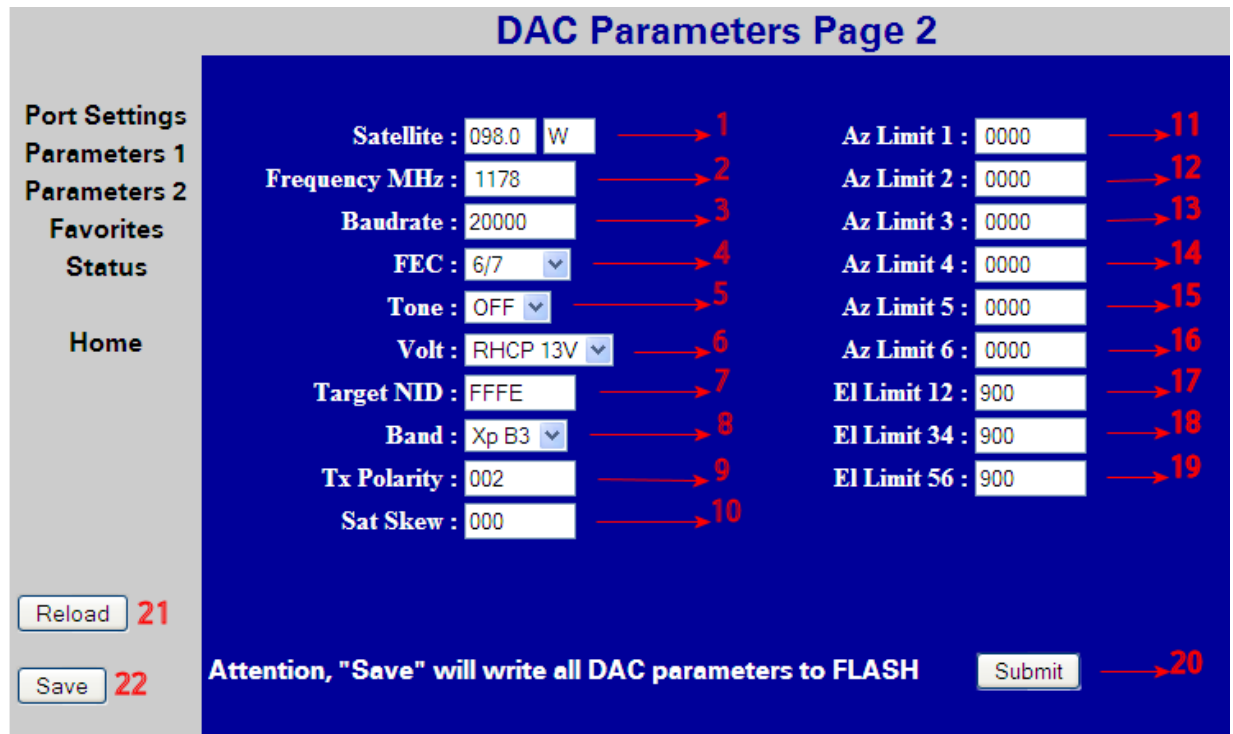
8.10. DAC Parameters Page 1



Number	Description
	To change a parameter value mouse click inside the entry field and type in the desired value or select from the drop down list and click on the SUBMIT button. If the parameter value change(s) causes desirable operation click on the SAVE button to store into Flash.
1	The Elevation Trim field displays the numeric value currently set in RAM.
2	The Elevation Step Size field displays the numeric value currently set in RAM.
3	The AUTO Threshold field displays the numeric value currently set in RAM.
4	The Search Increment field displays the numeric value currently set in RAM.
5	The Search Limit field displays the numeric value currently set in RAM.
6	The Search delay field displays the numeric value currently set in RAM.
7	The System Type field displays the sum of the numeric values currently set in RAM. This List box below the displayed parameter displays the decoded System Type parameter currently stored in Flash. The applicable ACU system options are highlighted in blue, when the System Type value is entered. Changes to this list box itself is possible, Select the desired options and the correlating parameter value for System Type will be displayed in the entry field.
8	The Tracking Display dropdown menu list displays the value currently set in RAM.
9	The Azimuth Trim field displays the numeric value currently set in RAM.
10	The Azimuth Step Size field displays the numeric value currently set in RAM.
11	The Sweep Increment field displays the numeric value currently set in RAM.
12	The Step Integral field displays the numeric value currently set in RAM.
13	The Polang Type field displays the numeric value currently set in RAM.
14	The Polang Offset 24V field displays the numeric value currently set in RAM.
15	The Polang Scale 24V field displays the numeric value currently set in RAM.

16	The Gyro Type field displays the numeric value currently set in RAM. Select the desired Gyro Interface from the drop down menu selection list and the correlating parameter value for Gyro Type will be displayed in the entry field
17	Click the SUBMIT button to transfer all currently displayed parameters to the operating software variables table (working memory). NOTE: The submit button will not store the values to memory; an ACU reset or power cycle will revert to the old settings saved in NVRAM.
18	Click the “RELOAD” button to refresh the screen to the current ACU parameter values
19	Click the SAVE button to store all currently displayed parameters to Flash (68HC08).

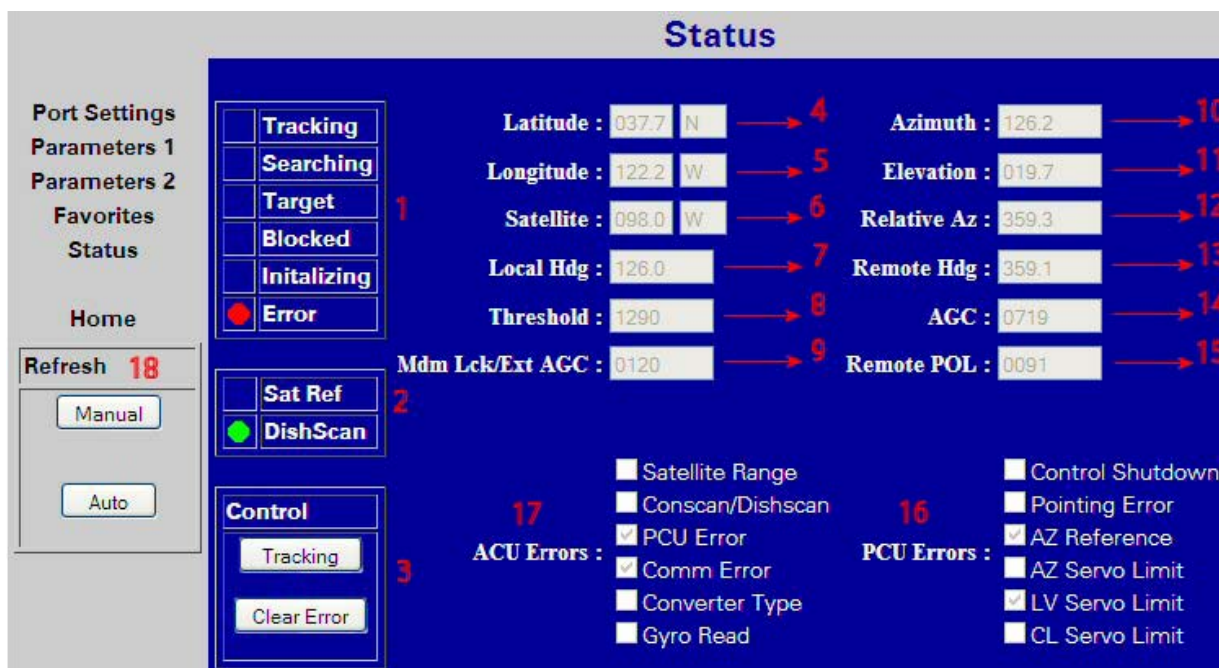
8.11. DAC Parameters Page 2



Number	Description
1	The SATELLITE field(s) present longitudinal position of the currently stored (or last targeted) satellite.
2	The Frequency MHZ field displays the numeric value currently stored in RAM.
3	The Baudrate field displays the numeric value currently stored in RAM.
4	The FEC field displays the selected value currently stored in RAM.
5	The Tone field displays the selected state currently stored in RAM.
6	The VOLT field displays the selected value currently stored in RAM.
7	The Target NID field displays the hexadecimal value currently stored in RAM.
8	The Band field displays the selected value currently stored in RAM.
9	The Tx Polarity field displays the selected value currently stored in RAM.
10	The Sat Skew field displays the numeric value currently stored in RAM.
11	The Az Limit 1 field displays the numeric value currently stored in RAM.
12	The Az Limit 2 field displays the numeric value currently stored in RAM.
13	The Az Limit 3 field displays the numeric value currently stored in RAM.

14	The Az Limit 4 field displays the numeric value currently stored in RAM.
15	The Az Limit 5 field displays the numeric value currently stored in RAM.
16	The Az Limit 6 field displays the numeric value currently stored in RAM.
17	The EL Limit 12 field displays the numeric value currently stored in RAM.
18	The EL Limit 34 field displays the numeric value currently stored in RAM.
19	The EL Limit 56 field displays the numeric value currently stored in RAM.
20	Click the SUBMIT button to transfer all currently displayed parameters to the operating software variables table (working memory). NOTE: The submit button will not store the values to memory, an ACU reset or Power cycle will revert to the old settings saved in NVRAM.
21	Click the RELOAD button to refresh the screen to display the current ACU parameter values
22	Click the SAVE button to store all currently displayed parameters to memory (NVRAM).

8.12. Status Page



Number	Description
1	These fields present the current antenna status as reported by the ACU.
2	These fields present the current DishScan and Satellite Reference mode status as reported by the ACU and PCU.
3	The Control field buttons allow the user to Toggle the antennas' current tracking condition or to clear any reported errors as reported in fields 16 and 17.
4	The Latitude field displays the numeric and hemispheric value currently stored in RAM.
5	The Longitude field displays the numeric and hemispheric value currently stored in RAM.
6	The SATELLITE field(s) present longitudinal and hemispheric position of the currently stored (or last targeted) satellite.
7	The Local HDG field displays the numeric value currently stored in RAM. (Gyro compass input to ACU)
8	The Threshold field displays the numeric value currently reported by the ACU.
9	The Mdm Lck/Ext AGC field displays the numeric value currently reported by the ACU.

10	The Azimuth field displays the Antenna’s True North Azimuth pointing angle.
11	The Elevation field displays the Antenna’s Elevation pointing angle referenced to the horizon.
12	The Relative AZ field displays the Antenna’s Azimuth pointing angle referenced to the vessels bow marker.
13	The Remote field displays the numeric value currently reported by the PCU. (Azimuth Stabilization Loop’s Heading Registry)
14	The AGC field displays the numeric value currently reported by the ACU.
15	The Remote POL field displays the numeric value currently reported by the PCU.
16	The PCU Errors box is a read only field that displays Pedestal reported errors currently triggered.
17	The ACU Errors box is a read only field that displays the decoded ACU reported errors currently triggered.
18	The Refresh field allows the user to adjust the page refresh settings, AUTO is selected by default, which refreshes the displayed page every 5 seconds

8.13. Favorite Satellites Page

Number	Description
1	These NAME fields present the current satellite preset name for each respective Favorite Satellite Column. You may not use the ‘ (apostrophe) character in the name field
2	The SAT Lon fields present the longitudinal satellite position for each respective Favorite Satellite Column.
3	The Frequency fields present the IF tracking parameter value for each respective Favorite Satellite Column.
4	The Baud Rate fields present the Baud /Symbol Rate for each respective Favorite Satellite Column.

5	The FEC fields present the F orward E rror C orrection Rate for each respective Favorite Satellite Column.
6	The Tone fields present the 22Khz Tone State for each respective Favorite Satellite Column.
7	The Volt fields present the BDE voltage state for each respective Favorite Satellite Column.
8	The Target NID fields present the Hexadecimal N etwork I dentification value for each respective Favorite Satellite Column.
9	The Band fields present a drop down listing of the available LNB Band selection for each respective Favorite Satellite Column.
10	The Tx Pol fields present the transmit for each respective Favorite Satellite Column.
11	The Sat Skew fields present the satellite Polarization Offset value for each respective Favorite Satellite Column.
12	Click on the Select button to submit the respective Favorite Satellite Column parameters into RAM
13	Click on the Save button to submit the respective Favorite Satellite Column parameters to Flash.

9. Technical Specifications

The technical specifications for the DAC-2202 ACU and some of the specifications for general Below Decks are:

9.1. DAC-2202 Antenna Control Unit

The technical specifications for the DAC-2202 ACU are:

9.1.1. General

Physical Dimensions:	Rackmount: 1.75" x 17" x 14"
Input Voltage:	110/220 VAC, 50/60 Hz
Power Requirements:	160 Watts maximum
Weight	2.8 kg (6.2 lbs)

9.1.2. Front Panel

Status Indicator Display:	6 LED enunciators for Tracking, Searching, Target, Power, Initializing, and Error
Alpha Numeric Display:	2 Line 20 Character Alpha Numeric
Next Button	Cycles display between Ship, Satellite, Antenna, and Status
4-Position Keypad	Cycles cursor Up / Down / Left / Right
Enter Button	
Reset Button	
Controls:	AC Power On/Off

9.1.3. Rear Panel

Connectors:

J1 "Ship Gyro"	25 pin female D-Subminiature
J2 "NMEA" RS-422 Serial I/O	9 pin male D-Subminiature
J3 "M&C" RS-422 Serial I/O	9 pin female D-Subminiature
J4A "Antenna" RS-422 Pedestal M&C	9 pin female D-Subminiature
J4B "Antenna" Control IF and Pedestal DC Power	Type F female
J6 "RF IN" Tracking Receiver IF Input	Type F female
J7 "RF OUT" Tracking Receiver IF Output	Type F female
"Ethernet"	RJ-45
"AC Input Power 95-250VAC"	IEC receptacle

9.1.4. J4A "Antenna" Pedestal M&C Interface

Communications Parameters:	9600 Baud, 8 bits, No parity, 1Stop Bit
Interface Protocol:	Full Duplex RS-422
Base Modem Power:	30 Volts DC
Interface Connector:	9 pin male D-Subminiature

9.1.5. J4B “Antenna” Pedestal M&C Interface

Communications Parameters: 9600 Baud, 8 bits, No parity, 1Stop Bit
 Interface Protocol: Full Duplex FSK Modulated at 70 KHz (TX) & 120 KHz (RX)
 Antenna Power: 30 Volts DC
 Interface Connector: Type F female

9.1.6. J3 “M&C” Aux Serial Interface

Communications Parameters: 9600 Baud, 8 bits, No parity, 1Stop Bit
 Interface Protocol: Optically Isolated RS-422/RS232
 Interface Connector: DE9S

9.1.7. J2 “NMEA A” Interface

Communications Parameters: (Selectable) 4800 Baud, 8, N, 1
 Interface Protocol: Optically isolated RS-422 Receive
 RS-232 Transmit (Pseudo GGA echo sentence)
 Interface Connector: DE9P
 NMEA GPS Sentence: xxGLL typically GPGLL or LCGLL
 NMEA Heading Sentence: xxHDT or xxHDM typically HCHDM or HCHDT

9.1.8. J2 “NMEA B” Interface

Communications Parameters: (Selectable) 4800 Baud, 8, N, 1
 Interface Protocol: Optically isolated RS-422 Receive
 Interface Connector: DE9P
 NMEA GPS Sentence: xxGLL typically GPGLL or LCGLL
 NMEA Heading Sentence: xxHDT or xxHDM typically HCHDM or HCHDT

9.1.9. Ethernet

Interface Protocol: 10BaseT
 Interface Connector: RJ-45
 Interface Ports: 2 TCP M&C (Ports 2000, 2001)
 1 UPD Upload (Port 3000)
 1 Multi-User HTML (Port 80)

9.1.10. DVB Compliant Tracking Receiver

Internal Satellite Identification Receiver

Tuning range	950 to 2150 MHz in 1 MHz increments in DVB Mode.
Input RF Level	-85 to -25 dBm typical
Output RF Level	Input level +/- 1 dB typical
Sensitivity	30 mV / dB typical
Bandwidth	Selectable in DVB Mode, 7.5MHz with a Baud Rate =< 5k 20 MHz with a Baud Rate >5k)
Polarity switching	13 VDC output to select Vertical or RHCP polarity. 18 VDC to output select Horizontal or LHCP polarity
Band Switching:	22kHz continuous tone output to select High band, No tone to select Low band.
Satellite ID	Network ID for DVB signals. QPSK demodulator and FEC decoder lock for DSS, or DVB without NID (forced NID).
QPSK Demodulator	3000 to 30000 baud (kps)
FEC Decoder	1/2, 2/3, 3/4, 5/6, 6/7, 7/8, or Automatic.
Pipeline Decoder	DVB or DSS compatible.

9.1.11. L-Band SCPC Narrow Band Tracking Receiver

Internal Satellite Identification Receiver

Tuning range	950 to 2150 MHz in 1 KHz increments.
Input RF Level	-85 to -25 dBm typical
Output RF Level	Input level +/- 1 dB typical
Sensitivity	30 mV / dB typical
Bandwidth	300 KHz
Voltage switching	13 VDC/18 VDC output for Band and/or Polarity Switching
Tone Switching:	22kHz continuous tone output to for Band Selection

9.1.12. L-Band NBIF Narrow Band Tracking Receiver

Internal Satellite Identification Receiver

Tuning range	950 to 2150 MHz in 1 KHz increments.
Input RF Level	-85 to -25 dBm typical
Output RF Level	Input level +/- 1 dB typical
Sensitivity	30 mV / dB typical
Bandwidth	60 KHz Nominal
Voltage switching	13 VDC/18 VDC output for Band and/or Polarity Switching
Tone Switching:	22kHz continuous tone output to for Band Selection

9.1.13. Narrow Band SCPC receiver (DAC-2302 ONLY):

Frequency Range:	60 - 80 MHz (70 MHz SCPC) Narrow Tuning Range 52 - 88 MHz (70 MHz SCPC) Wide Tuning Range 110 - 170 (140 MHz SCPC)
Input Level:	-90 to -30 dBm
Detection Bandwidth:	30 kHz

9.2. Terminal Mounting Strip

9.2.1. Synchro Interface:

Connectors	5 screw terminal connections
Input Voltage Level	36-110 VDC, 400 or 60 hertz
Synchro Ratios	1:1, 36:1, 90 or 180:1 and 360:1 with Synchro-Digital converter 360:1 with Synchro-SBS converter
Impedance:	1M ohm

9.2.2. SBS Interface

Connectors	4 screw terminal connections
Input Voltage Level	20-90 VDC
Interface	Opto-Isolated,
Polarity	Auto switching
Ratio	6 steps per degree
Impedance:	10K ohm

9.2.3. Control Interface

9.2.3.1. External AGC

External AGC or Satellite Modem Lock Input.

Connections	2 screw terminal connections (AGC and GND)
Voltage Level:	0-5 VDC
Impedance:	30K ohm
Control:	Low Level (<1.25Vdc) = Modem Lock* High Level (>1.25Vdc) = Modem Unlock*

*The logic sense of the external Satellite Modem Lock input can be reversed by adding 128 to the SYSTEM TYPE Parameter.

9.2.3.2. SW1 Local Band Select Output

Control local (BDE) band select switch(s) or tone generator(s).

Connections	1 screw terminal connection (SW1)
Control Level:	Low Band = OPEN circuit High Band = SHORT to ground Controlled by MODE – TRACKING – Band Selection. Current sink of 0.5 amps <i>max</i>

9.2.3.3. SW2 Blockage / TX Mute Output

Blockage output to Dual Antenna Arbitrator coax switch panel OR TX Mute output to Satellite Modem for RF radiation hazard and/or FCC compliance.

Connections	1 screw terminal connection (SW2)
Control Level:	Not Blocked or Not mispointed = OPEN circuit* Blocked or mispointed = SHORT to ground * Current sink of 0.5 amps <i>max</i>

*The logic level output can be reversed by adding 16 to the SYSTEM TYPE parameter.

9.2.4. NMEA Interface

This interface allows up to two simultaneous external GPS or NMEA 0183 compliant Heading inputs and an echoed GPS (GPGGA) output and is connected to the ACU via ribbon cable(s).

Connections	5 Screw terminal connections (RXA+ / RXA- input, RXB+ / RXB-input, and TXA+ output)
Rx Sentence Format:	Global Positioning System \$xxGLL,DDmm.mmmm,N,DDDmm.mmmm,W (,UTC <i>optional</i>) (*CS <i>optional</i>) <cr> Heading \$xxHDT,xxx.x <cr>
Tx Sentence Format	Global Positioning System \$GPGGA,0,DDmm,N,DDDmm,W <cr> <lf>

9.3. Environmental Conditions

The following requirements apply to equipment installed in weather protected locations.

Temperature	0 to 40 degrees C
Humidity	Up to 100% @ 40 degrees C, Non-condensing

9.4. Cables

9.4.1. DAC-2200 AC Power Cable

Voltage:	100-240 VAC, 1 Phase
Cycle:	47-63Hz
Power:	160 Watts (max)

9.4.2. Antenna Control Cable

Refer to your antenna manual for connection to J4A using a multi-conductor cable assembly or to J4B using a coax cable.

9.4.3. IF Signal Cables

Please refer to the “Antenna L-Band IF Coax Cables” section of the specification chapter of your antenna manual for coaxial cable recommendations.

9.4.4. SBS/Synchro 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:	18 AWG
Insulation:	600 VAC

9.4.5. Audio / Video cables

Customer supplied. Connects the DSS receiver outputs to you video monitor, TV, or stereo system.

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10. Drawings

The drawings listed below are provided as a part of this manual for use as a diagnostic reference.

10.1. *DAC-2202 Antenna Control Unit Drawings*

Drawing	Title	
125411-1_K	DAC-2202 w/ DVB Rackmount General Assembly	10-3
125411-3_K	DAC-2202 w/ SCPC Rackmount General Assembly	10-5

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SINGLE LEVEL MFG BILL OF MATERIAL

FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	124265	E1	ENCLOSURE, 1U RACKMOUNT, DAC-2200 SER	
2	1 EA	122300	F	LID, DAC-2200 SERIES ENCLOSURE	
5	1 EA	120385-2	B	BRACKET, LID, ACU ASS'Y	
7	1 EA	122445	B	FRONT PANEL ASS'Y, DAC-2202	
9	1 EA	122307-1	J	DVB RECEIVER ASS'Y, STD ACU	
11	1 EA	124813-1	N	PCB ASS'Y, DAC-2202 ACU	
16	1 EA	114836	A	PCB ASS'Y, S/D CONVERTER, 12 BIT	
17	1 EA	123046-3	C1	HARNESS, DC POWER	
18	1 EA	125343-6	A2	POWER SUPPLY, COSEL PBA150F-24-N	
19	1 EA	112646-13	C	PCB ASS'Y, DC-DC CONVERTER	
21	1 EA	122660-4	D	HARNESS, AC ENTRY, SINGLE	
24	1 EA	112918-9	C1	CABLE ASS'Y, RIBBON, 20 PIN	
25	1 EA	120740	A	CABLE ASS'Y, DVB RECEIVER	
30	1 EA	123070		DECAL, HIGH VOLTAGE WARNING	
41	8 EA	110941-3	B	SCREW, JACK, 4-40 X .312 LG	
42	1 EA	114587-106		SCREW, RND HD, PHIL, 4-40X1/4, S.S	
44	7 EA	114588-144		SCREW, PAN HD, PHIL, 6-32 x 1/4, S.S.	
45	6 EA	114576-106		SCREW, FLAT HD, PHIL, 4-40 x 1/4, S.S	
46	1 EA	114588-146		SCREW, PAN HD, PHIL, 6-32 x 3/8, S.S.	
47	1 EA	114580-007		WASHER, FLAT, #6, S.S.	
49	4 EA	119967	A	NUT, HEX, PANEL, 3/8-32	
50	3 EA	126264-13	A1	WASHER, STAR, INTERNAL TOOTH, NARROW	
58	1 EA	120090-17	C	MICRO ASS'Y, 12-BIT SDC	
65	2 EA	120452-32	B	SCREW, RND HD, PHIL, 6-32 X 3/8, BLAC	
68	8 EA	127956-2	A	NUT, HEX KEPS, 6-32, S.S.	
69	1 EA	124791	A	LABEL CAUTION, MICROWAVE HAZARD	
72	4 EA	120077-118		SCREW, FLAT HD, PHIL, M3 X 8, S.S.	
73	1 EA	125193	1.11f	SOFTWARE, DAC-2202 ACU, COMM_IF	

Sea Tel
COBHAM

DAC-2202, DVB RCVR, COAX IF

PROD FAMILY COMMON	EFF. DATE 4/27/2010	SHT 1 OF 2	DRAWING NUMBER 125411-1	REV K
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SINGLE LEVEL MFG BILL OF MATERIAL

FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
74	1 EA	124871	6.06	SOFTWARE, DAC-2202 ACU, GP32, STD	
76	1 EA	108929-2	C1	POWER CORD, 110V AC	(NOT SHOWN)
77	1 EA	109752-3		POWER CORD, 220V AC	(NOT SHOWN)
78	1 EA	110959-1	C2	DECAL, SERIAL NUMBER/PATENT, SMALL	
79	5 EA	115697-2	B	CABLE TIE MOUNT, .75 X .75 X .18, ABM	
80	5 EA	119801-012	B	CABLE TIE, NYLON, 4 IN, NATURAL	
81	3 EA	110924-1	A	JUMPER, .100 SPACING, 2 POS, CLOSED	

<h1 style="margin: 0;">Sea Tel</h1> <p style="margin: 0;"><i>COBHAM</i></p>				
<p>DAC-2202, DVB RCVR, COAX IF</p>				
<p>PROD FAMILY COMMON</p>	<p>EFF. DATE 4/27/2010</p>	<p>SHT 2 OF 2</p>	<p>DRAWING NUMBER 125411-1</p>	<p>REV K</p>

SINGLE LEVEL MFG BILL OF MATERIAL

FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
1	1 EA	124265	E1	ENCLOSURE, 1U RACKMOUNT, DAC-2200 SER	
2	1 EA	122300	F	LID, DAC-2200 SERIES ENCLOSURE	
5	1 EA	120385-2	B	BRACKET, LID, ACU ASS'Y	
7	1 EA	122445	B	FRONT PANEL ASS'Y, DAC-2202	
9	1 EA	127166-1	D	SCPC RECEIVER ASS'Y, ACU / PCU, V5	
11	1 EA	124813-1	N	PCB ASS'Y, DAC-2202 ACU	
16	1 EA	114836	A	PCB ASS'Y, S/D CONVERTER, 12 BIT	
17	1 EA	123046-3	C1	HARNESS, DC POWER	
18	1 EA	125343-6	A2	POWER SUPPLY, COSEL PBA150F-24-N	
19	1 EA	112646-13	C	PCB ASS'Y, DC-DC CONVERTER	
21	1 EA	122660-4	D	HARNESS, AC ENTRY, SINGLE	
24	1 EA	112918-9	C1	CABLE ASS'Y, RIBBON, 20 PIN	
25	1 EA	120740	A	CABLE ASS'Y, DVB RECEIVER	
30	1 EA	123070		DECAL, HIGH VOLTAGE WARNING	
41	8 EA	110941-3	B	SCREW, JACK, 4-40 X .312 LG	
42	1 EA	114587-106		SCREW, RND HD, PHIL, 4-40X1/4, S.S	
44	7 EA	114588-144		SCREW, PAN HD, PHIL, 6-32 x 1/4, S.S.	
45	6 EA	114576-106		SCREW, FLAT HD, PHIL, 4-40 x 1/4, S.S	
46	1 EA	114588-146		SCREW, PAN HD, PHIL, 6-32 x 3/8, S.S.	
47	1 EA	114580-007		WASHER, FLAT, #6, S.S.	
49	4 EA	119967	A	NUT, HEX, PANEL, 3/8-32	
50	3 EA	126264-13	A1	WASHER, STAR, INTERNAL TOOTH, NARROW	
58	1 EA	120090-17	C	MICRO ASS'Y, 12-BIT SDC	
65	2 EA	120452-32	B	SCREW, RND HD, PHIL, 6-32 X 3/8, BLAC	
68	8 EA	127956-2	A	NUT, HEX KEPS, 6-32, S.S.	
69	1 EA	124791	A	LABEL CAUTION, MICROWAVE HAZARD	
72	4 EA	120077-118		SCREW, FLAT HD, PHIL, M3 X 8, S.S.	
73	1 EA	125193	1.11f	SOFTWARE, DAC-2202 ACU, COMM_IF	

Sea Tel
COBHAM

DAC-2202, SCPC RCVR, 9 WIRE IF

PROD FAMILY COMMON	EFF. DATE 4/27/2010	SHT 1 OF 2	DRAWING NUMBER 125411-3	REV K
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SINGLE LEVEL MFG BILL OF MATERIAL

FIND	QTY	PART NO	REV	DESCRIPTION	REFERENCE DESIGNATOR
74	1 EA	124871	6.06	SOFTWARE, DAC-2202 ACU, GP32, STD	
76	1 EA	108929-2	C1	POWER CORD, 110V AC	(NOT SHOWN)
77	1 EA	109752-3		POWER CORD, 220V AC	(NOT SHOWN)
78	1 EA	110959-1	C2	DECAL, SERIAL NUMBER/PATENT, SMALL	
79	5 EA	115697-2	B	CABLE TIE MOUNT, .75 X .75 X .18, ABM	
80	5 EA	119801-012	B	CABLE TIE, NYLON, 4 IN, NATURAL	
81	3 EA	110924-1	A	JUMPER, .100 SPACING, 2 POS, CLOSED	

<h1 style="margin: 0;">Sea Tel</h1> <p style="margin: 0;"><i>COBHAM</i></p>				
<p>DAC-2202, SCPC RCVR, 9 WIRE IF</p>				
PROD FAMILY COMMON	EFF. DATE 4/27/2010	SHT 2 OF 2	DRAWING NUMBER 125411-3	REV K

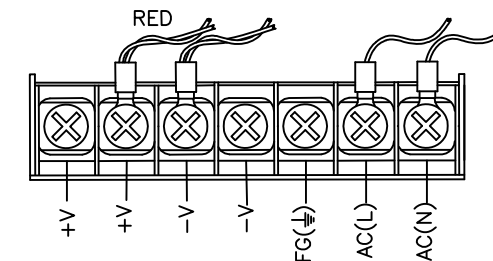
REVISION HISTORY				
REV	ECO#	DATE	DESCRIPTION	BY
H	6522	2/10/09	UPDATE VIEW AND UPDATE NOTES PER SEA TEL STARDAR AS REDLINE.	SL
H1	6577	3-11-09	ADD -6 & 7.	SL
J	6746	6-29-09	ADD -12. ADD APPLICATION COLUMN IN DASH TABLE.	SL
J1	NONE	02-4-10	UPDATE -12 TO INDICATE 9 WIRE NOT COAX.	HT
K	7095	02-5-10	-8 & SHEETS 2 & 3 ADDED; BASH TABLE UPDATED	MSF

NOTES, UNLESS OTHERWISE SPECIFIED:

1. APPLY ADHESIVE PER SEA TEL SPEC 121730.
2. LOCATE LABEL, APPROX. WHERE SHOWN.
3. INSTALLED JUMPERS:
JP2 1-2
JP3 SEE DASH TABLE
JP4 1-2
4. MARK FPI PCB WITH P/N, REV AND S/N PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
5. MARK ACU PCB P/N, REV AND S/N PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
6. MARK RECEIVER ASS'Y P/N, REV AND S/N PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
7. MARK S/D CONVERTER PCB P/N, REV AND S/N PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
8. MARK DC / DC CONVERTER PCB P/N, REV AND S/N PER SEATEL SPEC 122930 APPROX. WHERE SHOWN.
9. APPLY LABEL PER SEA TEL SPEC 122930 & 125174 APPROX. WHERE SHOWN.
10. NOTE ORIENTATION OF IC & PCB AS SHOWN.
11. ALL PCB ASSY & REWORK SHALL COMPLY WITH IPC-A-610 REV. D.
12. PROGRAM & TEST PER AS SEA TEL SPEC 126883.

DASH TABLE

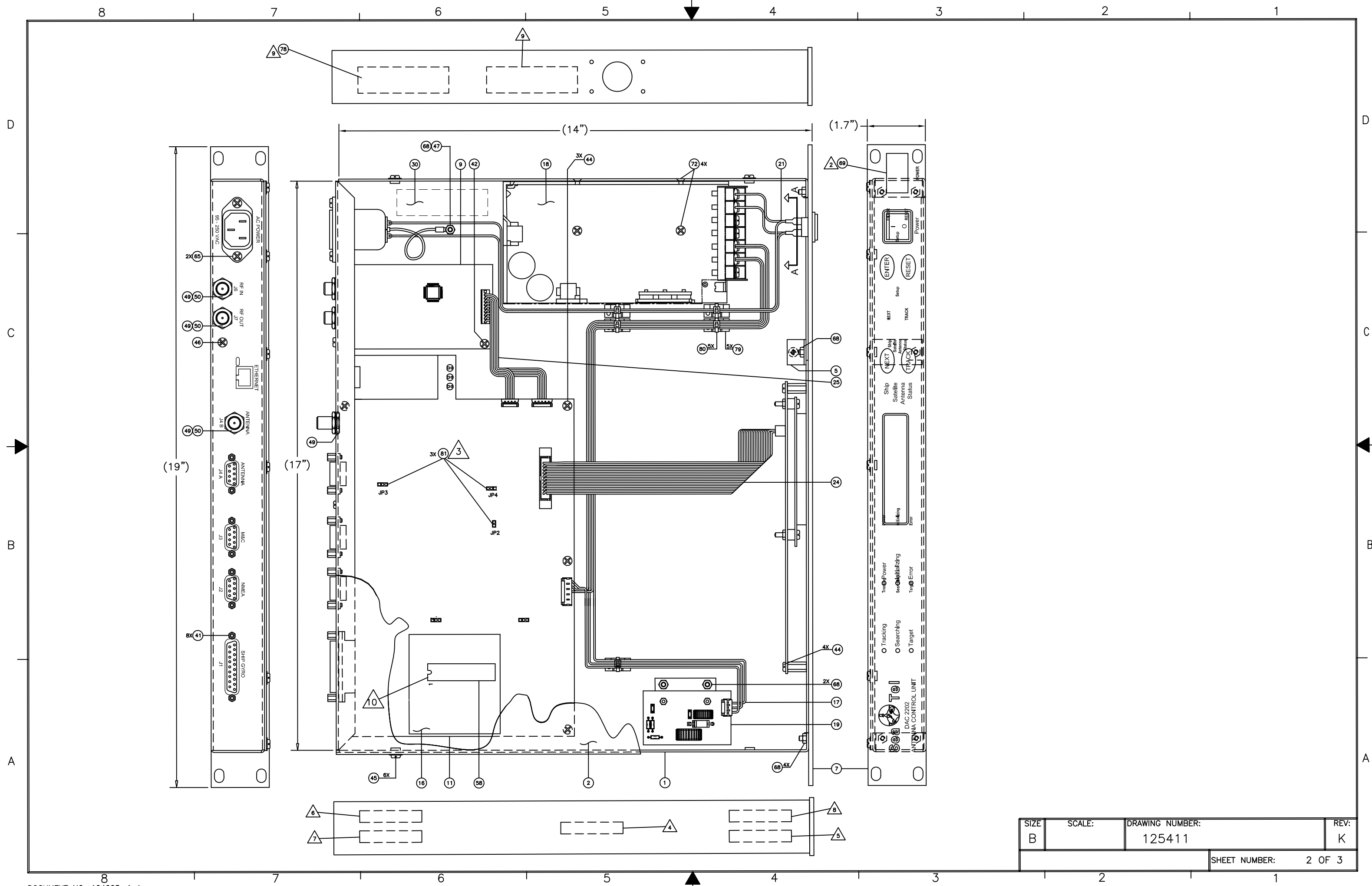
DASH	APPLICATION	RECEIVER	ANTENNA	JP3	SHEET #
-1	TVRO	DVB	COAX	2-3	2
-2	TXRX	DVB	9 WIRE	1-2	2
-3	USAT	SCPC	9 WIRE	1-2	2
-4	TXRX	SCPC	COAX	2-3	2
-6	DAC	NBIF	9 WIRE	1-2	2
-7	DAC	NBIF	COAX	2-3	2
-8	POLAR TRACK	720MHz	9 WIRE	1-2	3
-12	TAC-C	DVB	9 WIRE	1-2	2



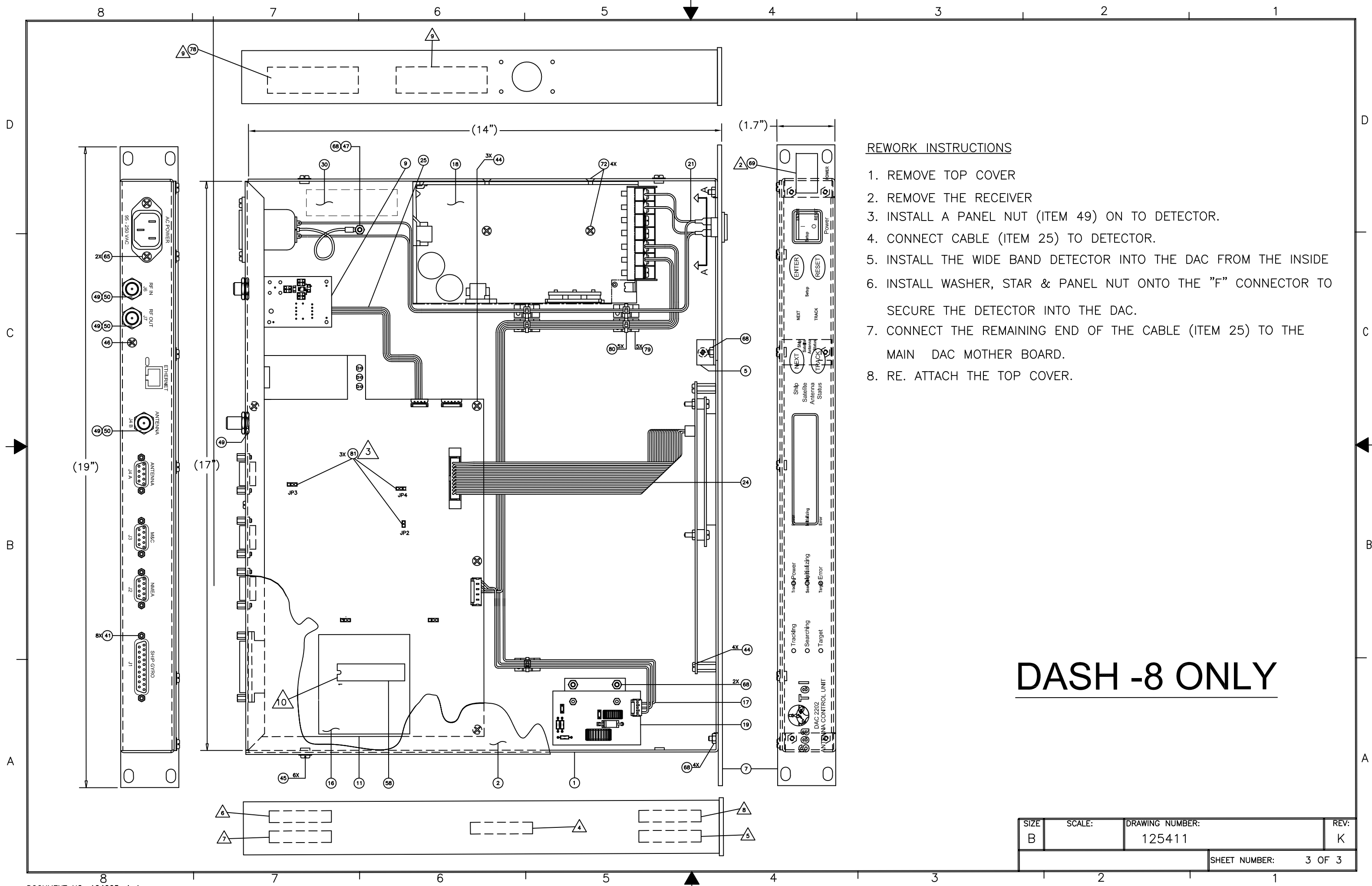
VIEW A-A
SCALE: 2:1
POWER SUPPLY CONNECTIONS

REFERENCE DRAWINGS:
126881 WIRING DIAGRAM, DAC 2202

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: LAE		 Tel. 925-798-7979 Fax. 925-798-7986	
	DRAWN DATE: 5/17/06			
MATERIAL: SEE BOM	APPROVED BY:		TITLE: DAC 2202	
FINISH: N/A	APPROVED DATE:	DRAWING NUMBER: 125411		REV: K
3rd ANGLE PROJECTION		FIRST USED:	SHEET NUMBER: 1 OF 3	



SIZE	SCALE:	DRAWING NUMBER:	REV:
B		125411	K
SHEET NUMBER:		2 OF 3	



REWORK INSTRUCTIONS

1. REMOVE TOP COVER
2. REMOVE THE RECEIVER
3. INSTALL A PANEL NUT (ITEM 49) ON TO DETECTOR.
4. CONNECT CABLE (ITEM 25) TO DETECTOR.
5. INSTALL THE WIDE BAND DETECTOR INTO THE DAC FROM THE INSIDE
6. INSTALL WASHER, STAR & PANEL NUT ONTO THE "F" CONNECTOR TO SECURE THE DETECTOR INTO THE DAC.
7. CONNECT THE REMAINING END OF THE CABLE (ITEM 25) TO THE MAIN DAC MOTHER BOARD.
8. RE. ATTACH THE TOP COVER.

DASH -8 ONLY

SIZE	SCALE:	DRAWING NUMBER:	REV:
B		125411	K
		SHEET NUMBER:	3 OF 3