ORBIT

OceanTRx™

OceanTRx7™

Maritime Stabilized VSAT System

Technical Note

Antenna Controller Unit (ACU)

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September 2013

COMMUNICATION WITHOUT BOUNDARIES

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Revision History and Control

Revision History

Rev #	Modified by	Date	Comments
.	Albert	September 24, 2013	New Release

About this Manual

This manual is designed to guide you through the procedures required for maintaining the `ACU` for the OceanTRx7™ Maritime Satellite Communication System.

Text Conventions

Style	Indicates	Example
Text	Normal descriptive text	Contents
`Text`	Words or figures that appear on the screen or that should be typed The name of a file or directory	`System Status`
`<Text>`	A key to be pressed	`<ESC>`
`TEXT`	The name of a hardware component	`ANTENNA`
Text	The name of a GUI element	**Operation Screen**
➢	The description of a procedure	➢ **To configure…**

Notations

	Indicates important information that should be noted.
	Indicates a potential hazard.
	Indicates the safest method of installation or an operation that *must be adhered to.*

Effective Releases

This document is effective for OrBand™ and OceanTRx7™ Maritime Satellite Communication Systems.

For a description of the changes between ORBAND™ and OCEANTRX7™, refer to the *OceanTRx7™ Maritime Satellite Communication System Release Notes*.

Table of Contents

1 Introduction

1.1 Purpose

The purpose of this Technical Note is to provide detailed instructions on how to replace and configure an ANTENNA CONTROLLER UNIT (ACU).

1.2 ACU Description

The ACU is a real-time tracking controller with an industry standard CPU, on-board Flash memory and SDRAM. This unit controls the positioning of the ANTENNA via the SERVO SUBSYSTEM on the basis of commands received from the CCU.

The ACU runs a real-time OS that reads all system sensors, performs 3D mathematical transformations, controls the movement of the positioning axes and provides on-line communication with the CCU via a standard Ethernet-LAN connection.

The ACU contains a built-in NARROW BAND RECEIVER (NBR) for step-tracking feedback. A 2-WAY SPLITTER divides the output signal of the LOW NOISE BLOCK (LNB) between the ADMX which communicates the received data to the BDMX and the NBR which uses the signal to stabilize the ANTENNA position.

The ACU is powered by a dedicated +24 VDC power supply and supplies voltage to the other ADE components (with the exception of the BUC and the SERVO SUBSYSTEM which are fed by their own dedicated power supplies). The ACU contains an internal DC-DC power supply that provides the correct DC voltages to the LNB, ADMX, IMU and the GPS MODULE.

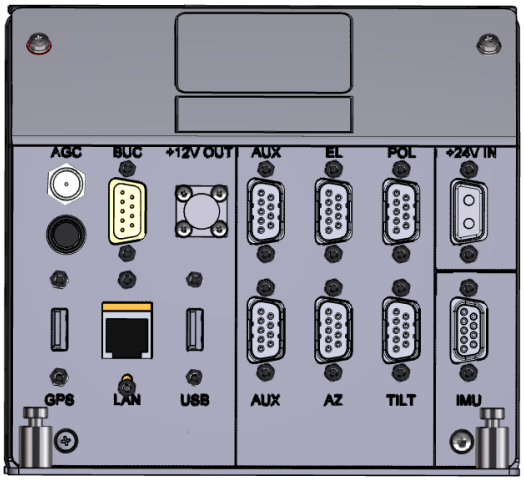


Figure 1-1: ACU Front Panel Connectors

The ACU connects to the other ADE components via its front-panel connectors. The following table describes each connector.

Table 1-1: ACU Front Panel Connectors

Connector	Type	Function
AGC	F-Type	Connects to the LNB via the SPLITTER
BUC	DB9 female, RS232	Connects to the BUC for M&C communication
+12V OUT	2P R03	Connects to the ADMX DC power input
GPS	USB	Connects to the GPS MODULE
LAN	RJ-45	Connects to the ADMX
USB	USB	Auxiliary USB port,
AUX 1	DB9 male, RS422	Auxiliary connection
EL	DB9 male, RS422	Connects to the Elevation Axis SERVO DRIVER
POL	DB9 male, RS422	Connects to the Polarization Skew Axis SERVO DRIVER
AUX 2	DB9 male, RS422	Auxiliary connection
AZ	DB9 male, RS422	Connects to the Azimuth Axis SERVO DRIVER
TILT	DB9 male, RS422	Connects to the Tilt Axis SERVO DRIVER
+24V IN	F2W2P D-Type	ACU +24VDC power source
IMU	DB9 female, RS422	Connects to the IMU (outputs ±12VDC and +5VDC power to the IMU)

1.3 Spare Kit Contents

The following table provides a list of the parts in the ACU spare kit.

Table 1-2: Spare Part Kit Contents

KIT32-1664-002-SP		
P/N	Description	Quantity
K01000055	PKG BOX 299X213X200	1
L00126002	ANTENNA CONTROL UNIT LNBR	1

1.4 Required Tools and Parts

The following table provides a list of tools and customer-supplied parts that are needed to perform the procedures in this Technical Note.

Table 1-3: Required Tools and Parts

Tool/Part Name	Notes	Figure
Medium Phillips screwdriver		
Tie cutter		
Cable ties		

2 Preliminary Procedures

The preliminary procedures described below must be performed before replacing the ACU.

In case the ACU is not communicating at all, skip these procedures and move to ACU replacement.

2.1 Backing up the ACU Configuration and IMU Calibration Files

➢ **To Backup the ACU Configuration and IMU Calibration Files:**

1. Connect a laptop computer running the MTSDOCK application to the CCU's LAN connector.
2. Activate the MTSDOCK application.
3. Open the **ACU** menu and select **Connect**. The **Connect to ACU** dialog box appears.

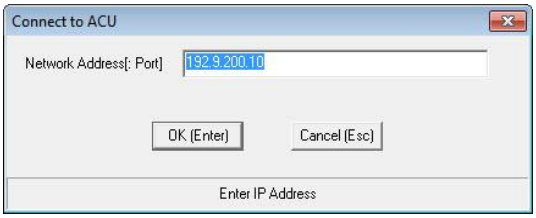


Figure 2-1: Connect to ACU Dialog Box

4. Verify that the correct ACU IP address appears in the **Network Address** field and click **OK (Enter)**. When the connection is established between the CCU and the ACU, a message box appears confirming the connection.
5. Open the **ACU** menu and select **Get Configuration** and save the configuration file.
6. Open the **ACU** menu, select **Calibration**, then **Get IMU Calibration** and save the IMU calibration file.

2.2 Shutting Down

➢ **To Shut Down:**

1. Perform System Shut-Down of the vessel's main power AC Voltage terminal outside the RADOME.
2. Open the RADOME hatch.
3. Switch off the ADE POWER BOX at the ANTENNA PEDESTAL base (located inside the RADOME).
4. Manually rotate the PEDESTAL AXES to gain convenient access to the serviced unit.

In the following procedures, be very careful when tightening and loosening the screws with which the parts are assembled and attached to the system. Some of these screws are delicate and can be damaged by excess force. When using an Allen key make sure to insert the key all the way into the screw head to avoid thread stripping.

WARNING!

The Utility Outlet is connected directly to the vessel's AC voltage input terminals (125 VAC / 250 VAC). Therefore, there still exists live voltage at the Utility Outlet after disconnecting the power supply to the ADE using the Mains Power On/Off Switch.

Only qualified and authorized personnel are allowed to carry out system service/maintenance procedures.

3 Replacing the ACU

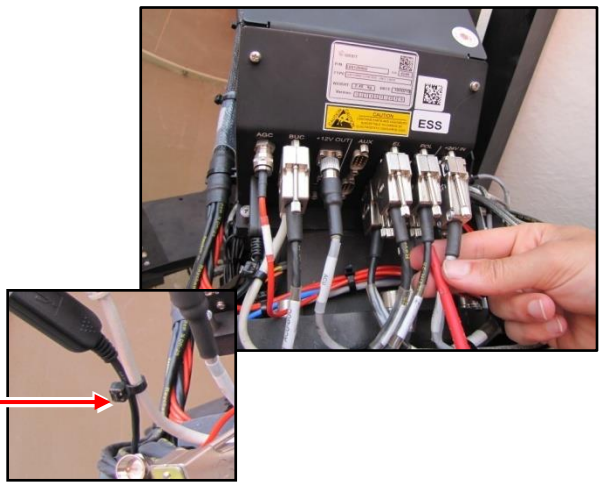
3.1 Removing the ACU

➢ **To Remove the ACU:**

Step 1

Disconnect BUC, EL, POL, +24V, AZ, TILT, and IMU plugs from the ACU connector panel, use flat screwdriver if necessary.

Cut the tie warp that holds the USB connector.



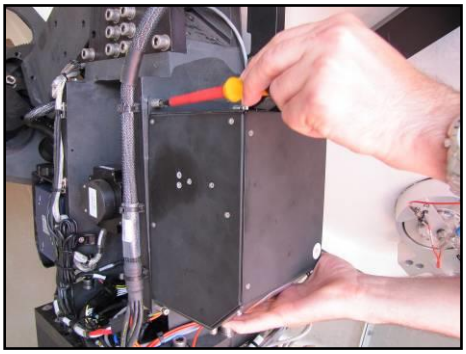
Step 2

Disconnect the RF, USB, LAN and +12V OUT plugs from the ACU connector panel.

Step 3

Use a Phillips screwdriver to remove the four screws securing the ACU to the PEDESTAL.

The ACU is secured to the PEDESTAL with captive screws.

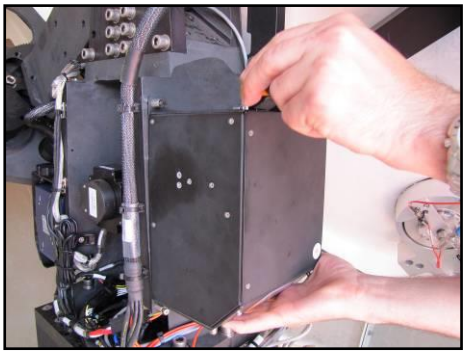


3.2 Installing an ACU

➢ **To Install an ACU:**

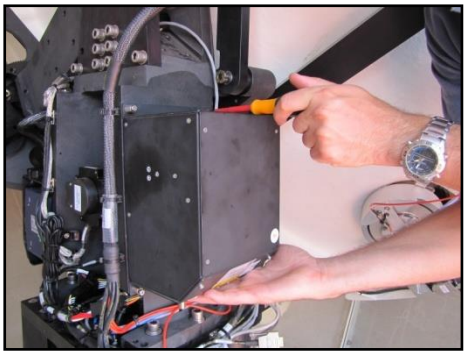
Step 1

Mount the new ACU in its place on the PEDESTAL.



Step 2

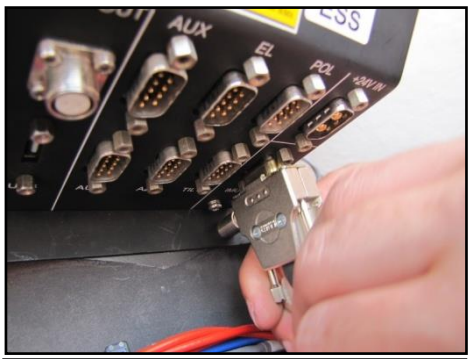
Secure the ACU to the PEDESTAL using a Phillips screwdriver.

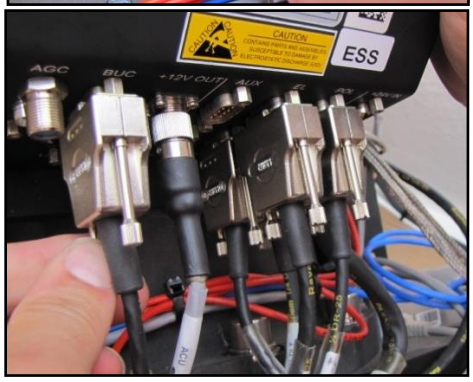


Step 3

Connect the ACU cables to the connector panel starting from the inner connectors- IMU, TILT, AZ, LAN, GPS, BUC, EL, +12V OUT and POL.

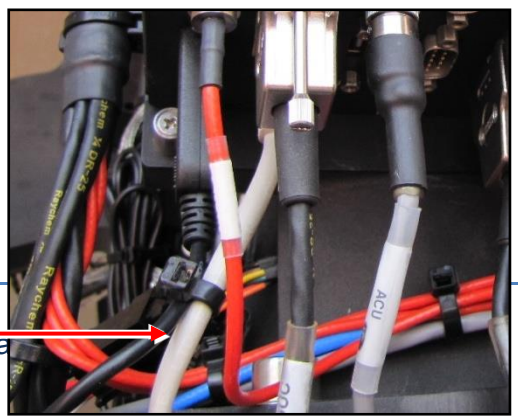
Tighten plugs secure screws using a flat screwdriver.





Step 3

Secure the USB cable using tie wrap.



4 Software

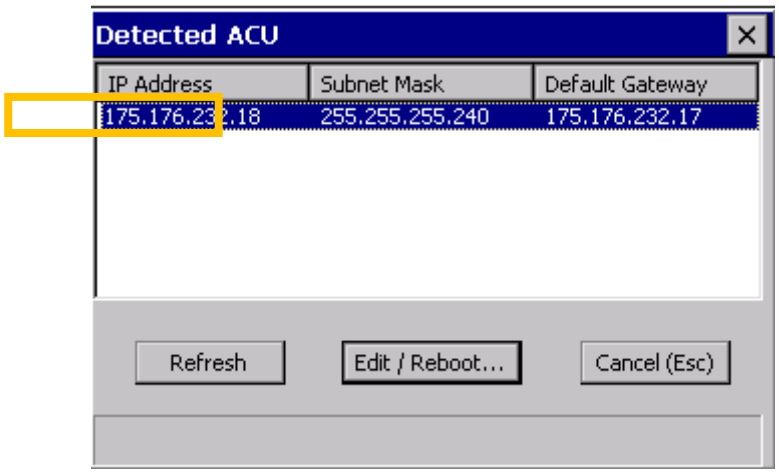
After the ACU has been replaced, perform the software procedures in this chapter.

To avoid pedestal damage before powering up the system, all servo motors plugs (total of 4) must be disconnected from their SERVO DRIVERS!!

4.1 Finding the ACU IP address

➢ **To Find the ACU IP address using MTSDOCK Application:**

1. Start up the system (see the *OceanTRx7™ Installation and Operation Manual*)
2. Open MTSDOCK application.
3. In the MTSDOCK window, open the **ACU** menu and select **Edit Network Parameters** chose **Detect ACU**. The **Detected ACU** dialog box opens.



4. **Figure 4-1: Detected ACU Dialog Box**

5. The ACU IP address and subnet mask appears. Take note of both.
6. Changing the IP address/subnet mask of the ACU may be needed to match existing equipment (CCU, modem and CFE laptop) IP scheme.

7. To change the ACU IP address press Edit/Reboot. New dialog **Detected ACU Network parameters** will pop up.

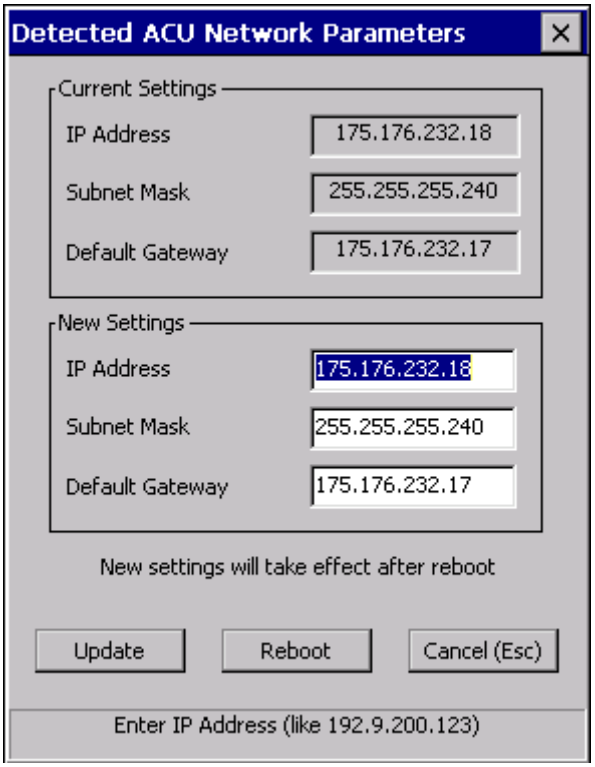


Figure 4-2: Detected ACU Network parameters

8. Enter the proper IP address with subnet mask. This address should be in the same subnet as the CCU and other IP equipment
9. To arrow remote connection IP address of the default gateway has to be configured.
10. Press **Update** and then **Reboot**.

The ACU default IP address is 192.9.200.10 with subnet mask 255.255.255.0

4.2 Configuring the ACU

If the configuration file is not available default OTRx 7-300 configuration will be factory preloaded. You have to update the update the compass offset manually and select satellite. Refer to the *OceanTRx7™ Installation and Operation Manual*

➢ **To Configure the ACU:**

1. Start up the system (see the *OceanTRx7™ Installation and Operation Manual* for instructions).
2. Use the CCU or connect a laptop computer running the MTSDOCK application to the CCU's LAN connector.
3. Activate the MTSDOCK application.
4. Open the ACU menu and select **Connect**. The **Connect to ACU** dialog box appears.

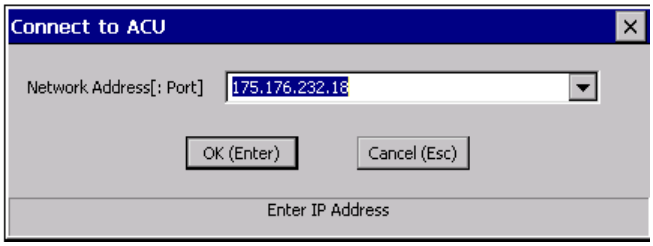


Figure 4-3: Connect to ACU Dialog Box

5. Verify that the correct ACU IP address appears in the **Network Address** field and click **OK (Enter)**. When the connection is established between the CCU and the ACU, a message box appears confirming the connection.
6. Open the ACU menu, select **Put Configuration** and
7. Load the configuration file downloaded via the preliminary procedure.

4.3 Loading the IMU Calibration File

➢ **To Load the IMU Calibration File:**

If the calibration file is not available (preliminary procedure) contact Orbit support to obtain IMU calibration file based on serial number

1. Activate the MTSDOCK application.

   Open the ACU menu and select **Connect**. The **Connect to ACU** dialog box appears.

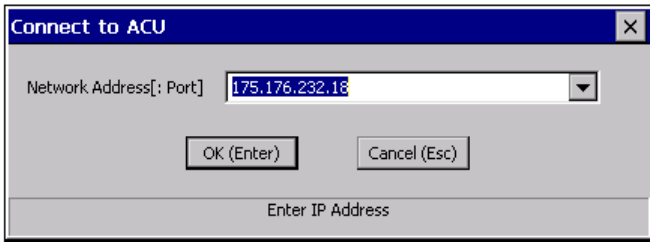


Figure 4-4: Connect to ACU Dialog Box

2. Verify that the correct ACU IP address appears in the **Network Address** field and click **OK (Enter)**.
3. Open the ACU menu and select **Calibration**, chose **Put IMU Calibration**.
4. Load the IMU calibration file download via the preliminary procedure

Use **ACU** menu and select **Put Any Relevant File**, chose **Copy files.**

In case you have the non-zipped IMU calibration file [IMUSAVE]

4.4 Perform Noise Floor Calibration

Refer to OceanTRx 7 I&O manual for the detailed procedure.

4.5 Updating the System Software

➢ **To Update the System Software:**

This chapter describes the following procedures:

- Updating the system with General Software update module (GSU)
- Verify actual SW version of the system units

4.5.1 Updating the System with General Software Update Module (GSU)

➢ **To Update the System with General Software Update Module (GSU):**

1. Request the latest GSU & MTSDOCK files (*GSUXXX.zip* and MtsDockCE.exe or MtsDock.exe) from Orbit.
2. Copy the zipped and the executable files to a USB flash drive.
3. Connect the flash drive to the USB port in the `CCU` front panel.
4. Run the `MTSDOCK` utility from the USB Flash drive or on external Laptop
5. Select **ThisHost** menu and chose **General Software Update...**

6. The **Select ZIP Archive with Software Updates** dialog box appears.

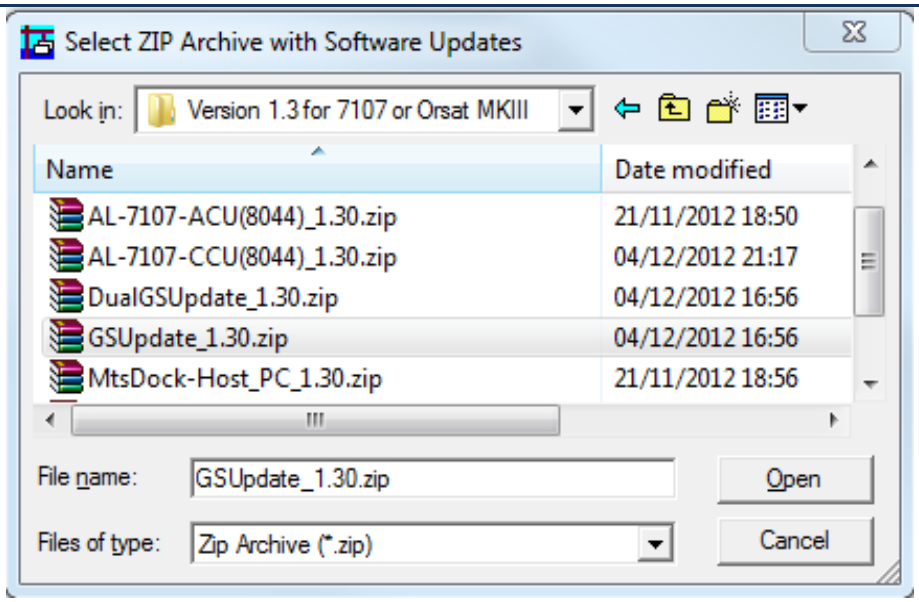


Figure 4-5: Select ZIP Archive with Software Updates Dialog Box

7. Select the GSU file from the USB Flash drive.

If you are using a Laptop to perform the upgrade you have to NIC IP address within range with the system IP subnet (default 192.9.200.xx .255.255.255.0)

8. Click **Open (Enter)**. New dialog box will pop up ask to enter the ACU and the CCU IP address, Enter the address previous found.

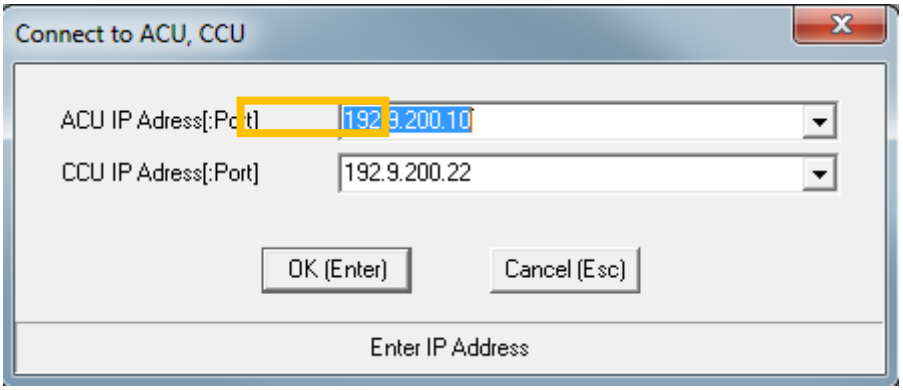


Figure 4-6: Connect ACU, CCU Message Box

9. Click **Open (Enter)**. The automated upgrade process will start. It will update the ACU (VSATWORKS) executable, CCUs MTSVLINK and also the Servo Drives FIRMWARE if applicable.

10. Reboot prompt will be issued at end of the process. Reboot by pressing **OK**.

CCU IP Address will be asked only if the `MTSDOCK` is running from laptop connected to the system network. Otherwise the CCU IP will not appear

4.5.2 Verify Actual Software Version of the System Units

➢ **To Verify the Actual Software Version of the System Units:**

When communication is reestablished between the SBC/ACU and the CCU,

1. Click the **Version** command on the MTSLINK Menu Bar and verify that the new version was successfully installed and matches the software version used by the CCU.

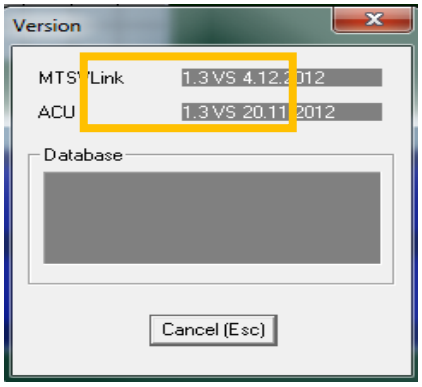


Figure 4-5: Version Message Box

Proceed to step 2 only for system equipped with Servo Drivers (OTRx X-XXX)

2. Open the **Config** on the **MtsLink** Menu Bar and select **Hardware ID** verify that the Servo drive version (000X-XXXXXXXX) was successfully installed on all SD and matches the firmware version in the release note.

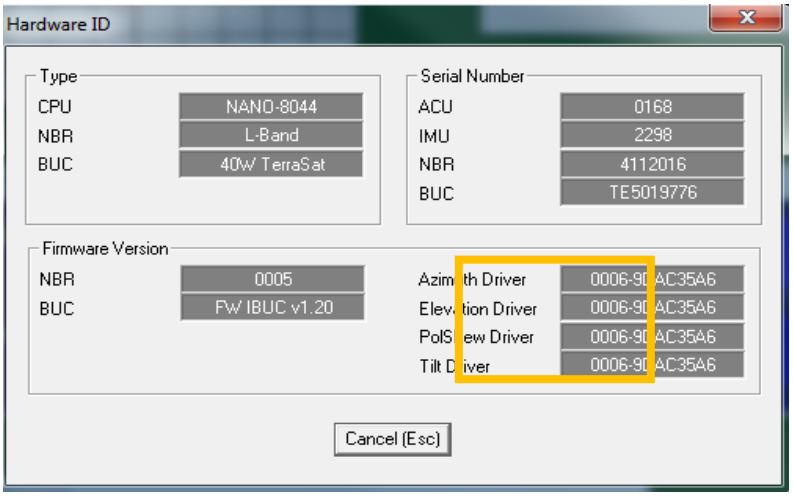
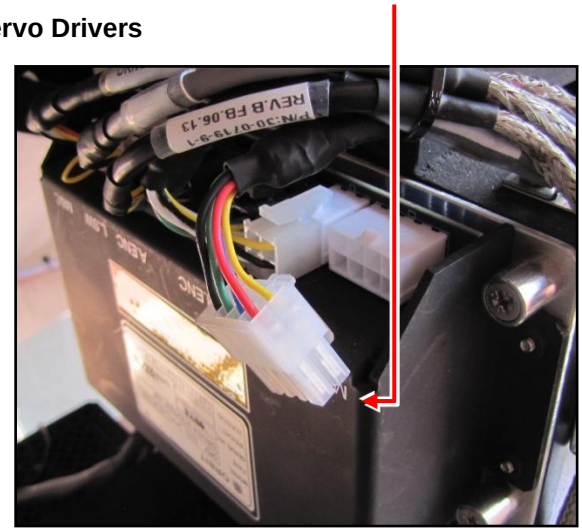


Figure 4-5: Hardware ID Message Box

4.5.3 Reconnect all Systems Motors (Total of 4) Plug to their SERVO DRIVERS!!

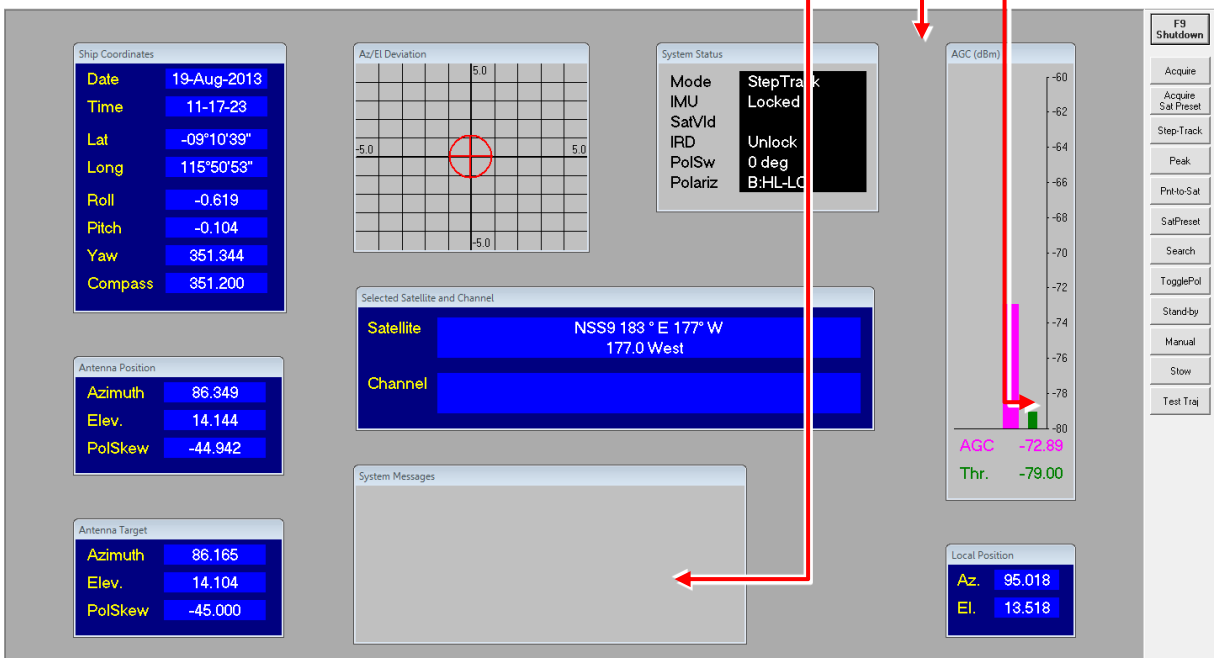
- **To Reconnect all Systems Motors Plug to their Servo Drivers**



4.5.4 Performing Verification Test

➢ **To Perform Verification Test:**

1. Verify the cable routing is correct and properly secured.
2. Power up the system and confirm system initializes properly.
3. To make sure the technical process completed successfully click on **Test Traj**
4. Make sure no error messages appear in the **System Messages** window.
5. Acquire satellite and verify you have proper AGC.



6. Verify the Modem Rx EbNo and TX power with NOC.