ORBIT

OceanTRx™

OceanTRx™

Maritime Stabilized VSAT Systems

Maintenance and Troubleshooting Manual

Document: MNT-Otrx-001

COMMUNICATION WITHOUT BOUNDARIES

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Revision History and Control

Revision Level	Date	Responsible Person	Description of Change	ECO NO.
-	5/07/2017	Albert.P	New Release	

About this Manual

This manual apply to OceanTRxTM 7-300 and OceanTRxTM 4-500. It's indented for service engineers and installers that passed the Orbit Training course.

Text Conventions

Style	Indicates	Example
Text	Normal descriptive text	Contents
Text	Words or figures that appear on the screen or that should be typed	System Status
	The name of a file or directory	
<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.*

Table of Contents

1.1 Purpose

The purpose of this Troubleshooting document is to provide guidance for field technicians in:

- System software update procedure
- Troubleshooting flow chart based on common scenarios
- Maintenance activities

1.2 Principles

The following flow charts must be followed when troubleshooting problems and failures in this troubleshooting document.

Contact supportgroup@orbit-cs.com for any service related matters

Before start working inside the dome turn off ADE power and Inspect the system inside the radome

Do not operate the system in case of fire or damaged parts inside the dome

Use extreme caution while checking the AC power line

Keep clear from moving parts while performing test

Danger non-ionizing RF radiation

Power on the system and observe proper startup process: boot →communication established → axis able to initialize → 4 minutes for IMU initiation.

1 Troubleshooting

This section includes the following troubleshooting diagrams:

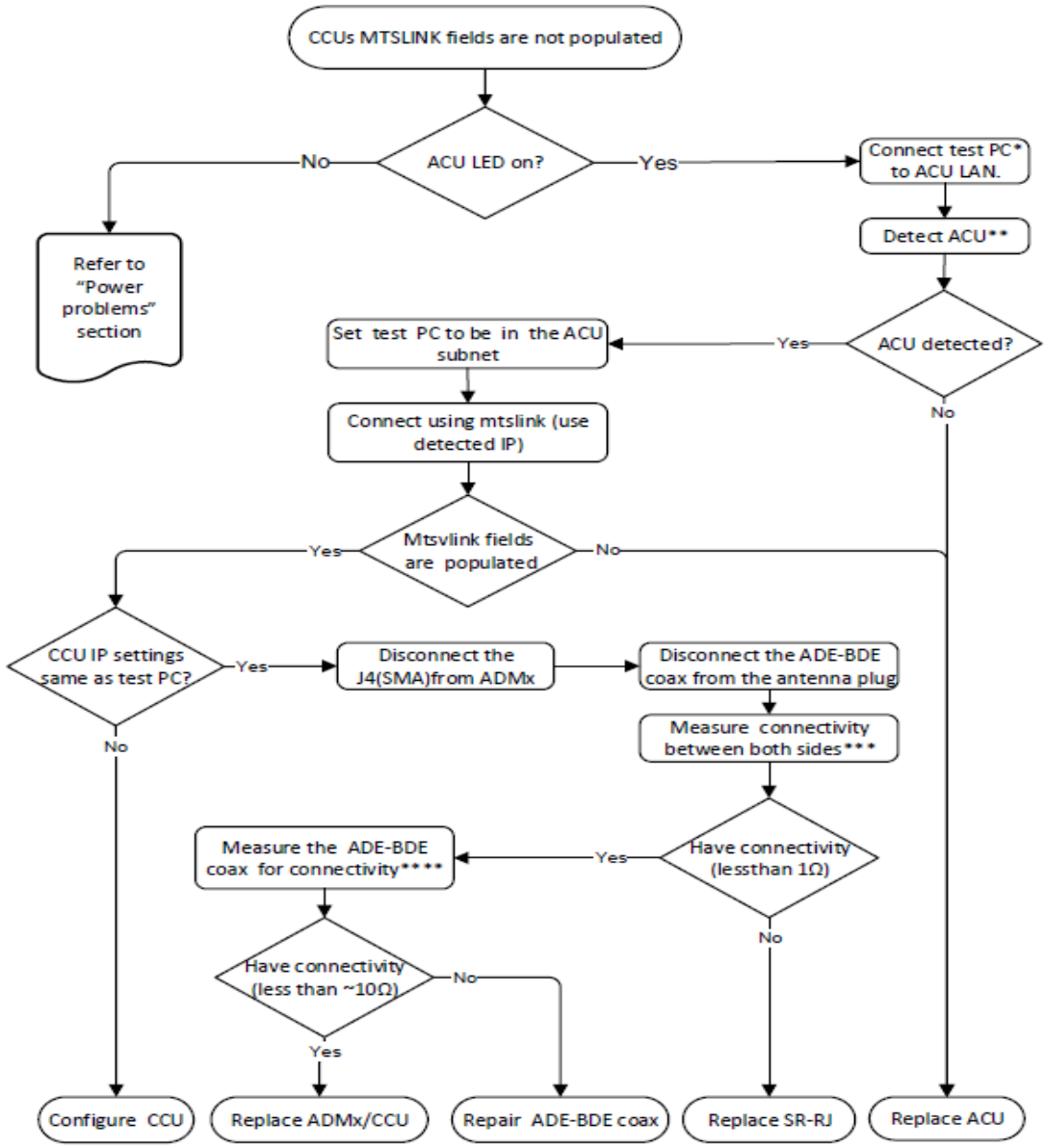
- ADE-BDE Communication Failur

- NMEA Compass Problems
- TX problems
- No or Low AGC
- GPS problems
- Tracking instability
- Synchro Compass problems
- LNB power out of tolerance
- No communication with servo driver
- Power Problems
- Servo System Problems
- IMU problems
- No Rx Lock.

1.1 ADE-BDE Communication Failure

This chapter contains a flow chart illustrating the required chain of operations when the MTSlink application has all data fields empty and system does not responding.

Verify AC power is available at the dome from the power distribution panel

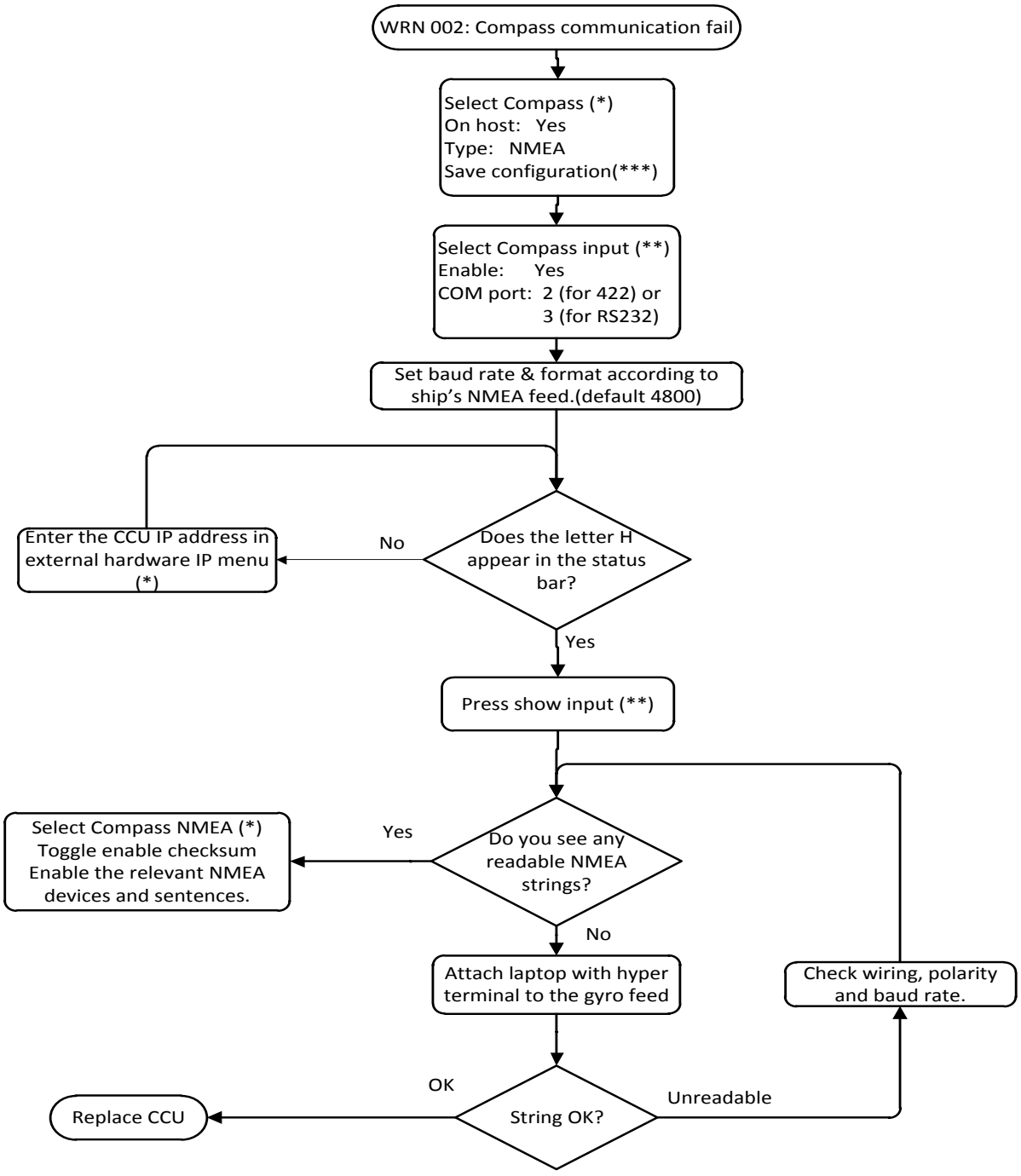


Comments:

* test PC → Laptop with Ethernet NIC with MtsDock and Mtslink
** MTSDock -> ACU -> Detect ACU
*** using DVM measure resistance on central pin (N type) to central (SMA) and shield (body) to shield
****using DVM measure resistance on central pin (N type) to central (N type) and shield (body) to shield resistance depend on the cable length

1.2 NMEA Compass Problems

This chapter contains a flow chart illustrating the required chain of operations when troubleshooting Compass Problems NMEA encountered during system operation.



Comments:

(*): Mtsvlink -> Config
(**): Mtsvlink -> Host -> hardware interface
(***) Mtsvlink -> Commands - > save configuration

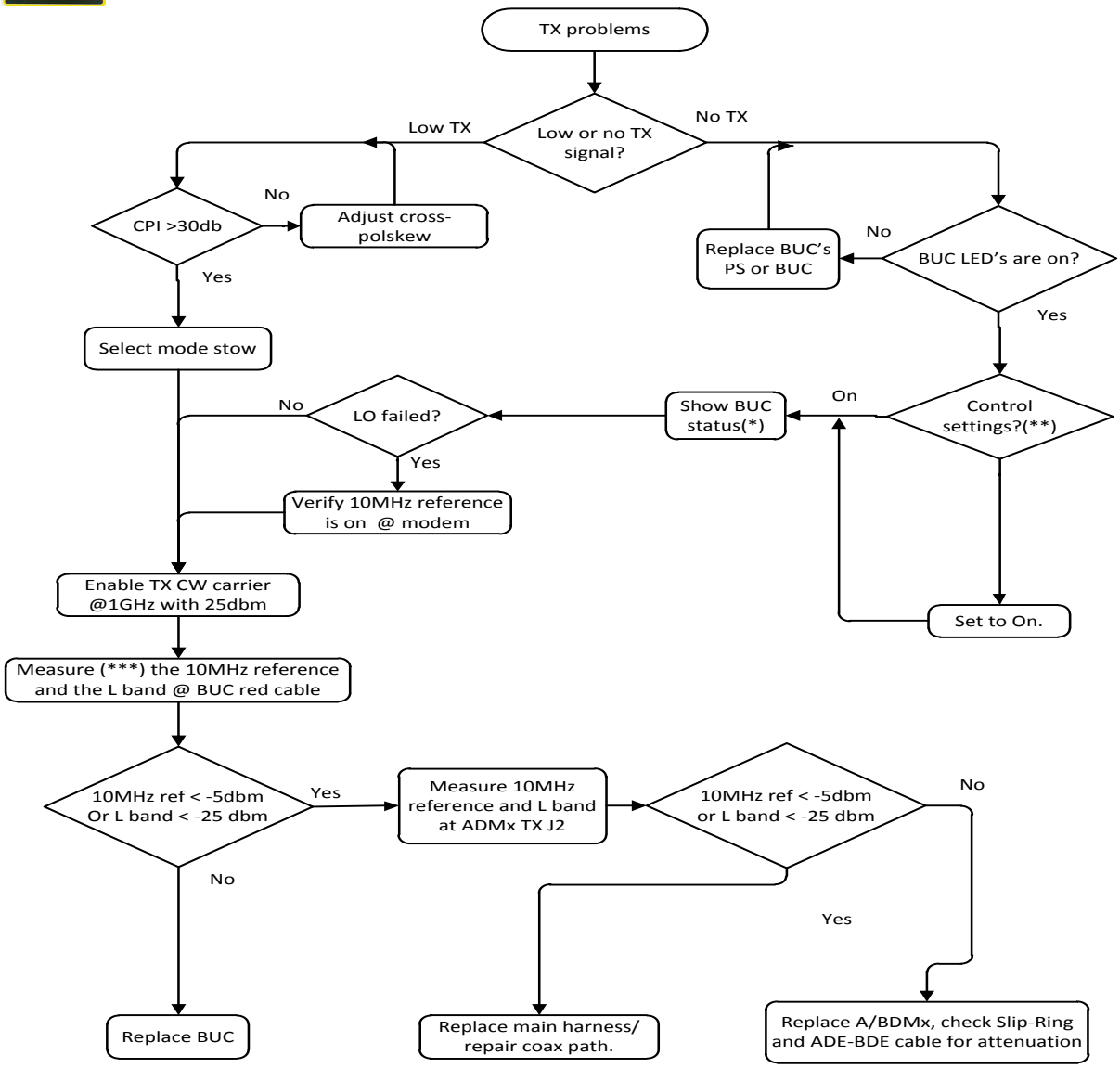
1.3 TX Problems

This Flow Chart illustrating the required chain of operations when the HUB side report low or no TX signal from your system

Never stand in front of the dish when system is transmitting.

Never disconnect BUC output cable while powered on

Danger non-ionizing RF radiation



Comments:

(*): MTSVlink -> Maintenance Screen -> GpsBUC

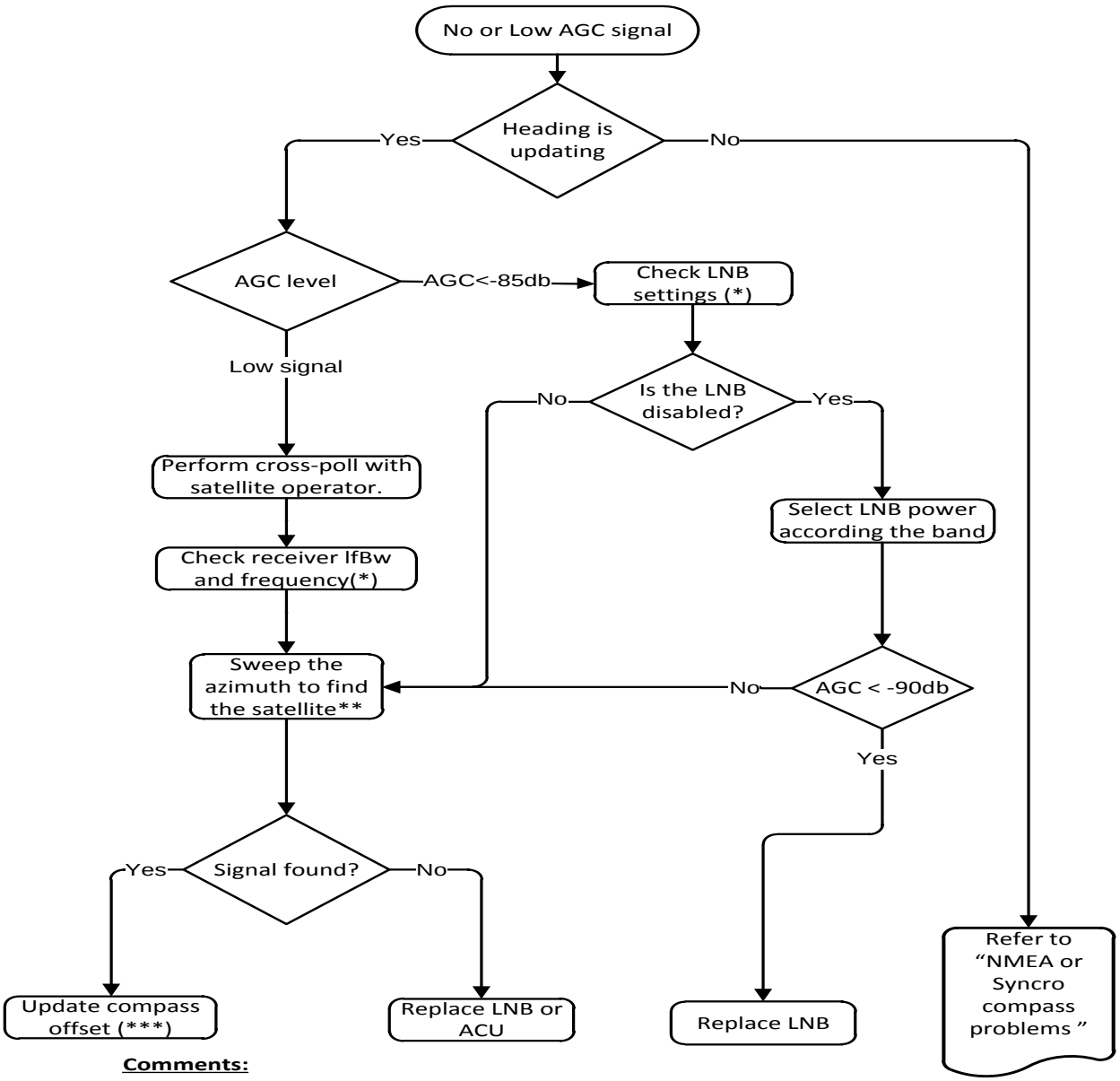
(**): MTSVlink -> Maintenance Screen -> Tx chain

(***): Using a spectrum analyzer

1.4 No or Low AGC Signal

This Flow Chart illustrating the required chain of operations when No or Low received signal issues encountered during system operation while no ERR/WRN messages present.

Verify the dish has clear line of sight to the satellite in not blocked by ship super structure or cranes



Comments:

(*):Mtsvlink -> Config -> receiver
(**):Mtsvlink -> mode -> manual
(***):Mtsvlink -> Config ->compass

1.5 GPS Problems

This Flow Chart illustrating the required chain of operations when troubleshooting GPS related issues encountered during system operation.

WRN 004 will appear if the system is operated indoor this condition is normal. The warning will clear once the system has view to the sky.

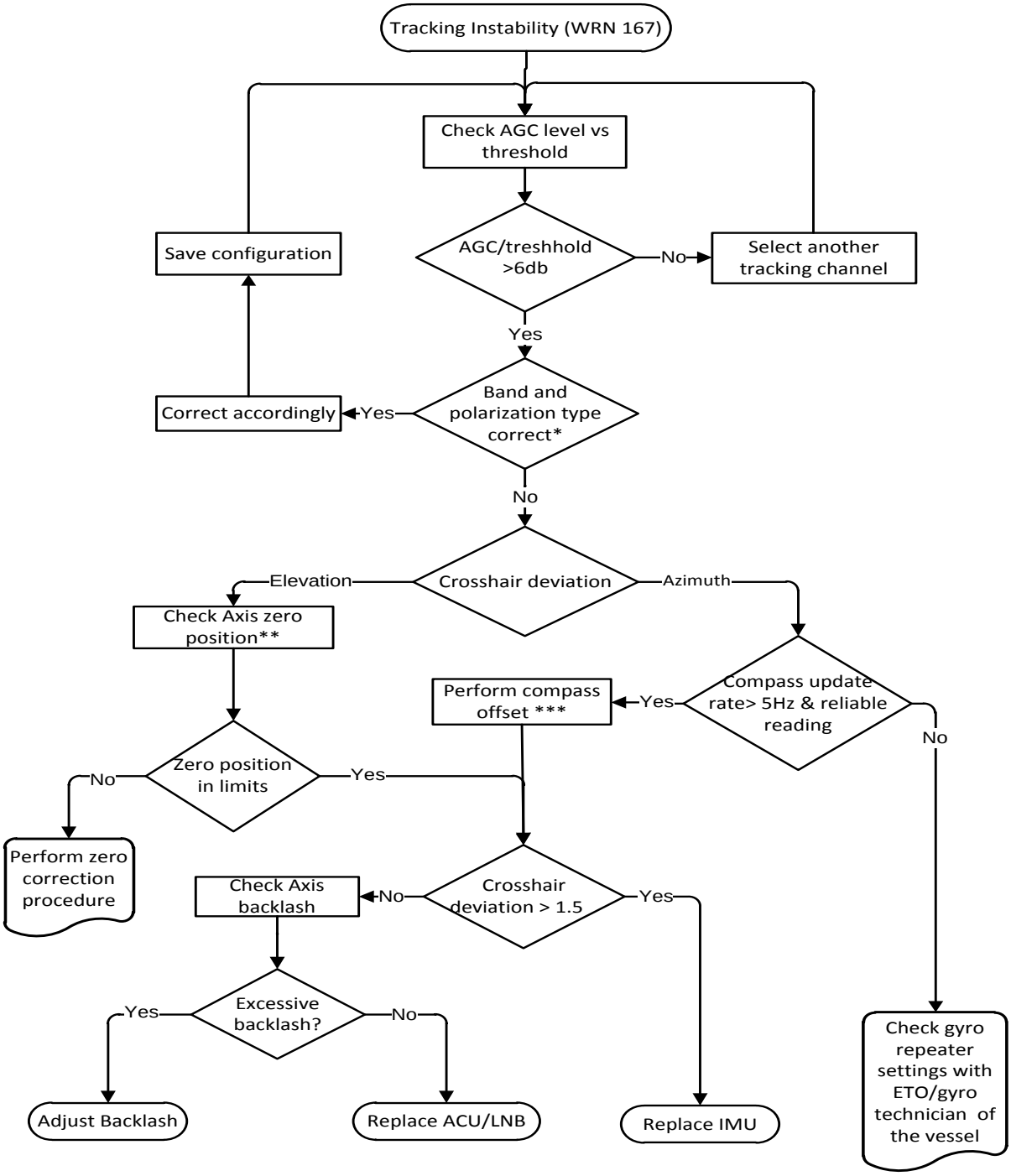
Comments:

(*): Mtsvlink -> Config → Comports →configuration →10
(**): Mtsvlink -> maintanance screen -> GPS
(**): PC -> test laptop running WIN7

Baud rate
GPS P/N E16000006 (old with LED) 9600baud
GPS P/N E16000035 (new) 38400 baud

1.6 Tracking Instability

This Flow Chart illustrating the required chain of operations when you experience instable tracking during operation

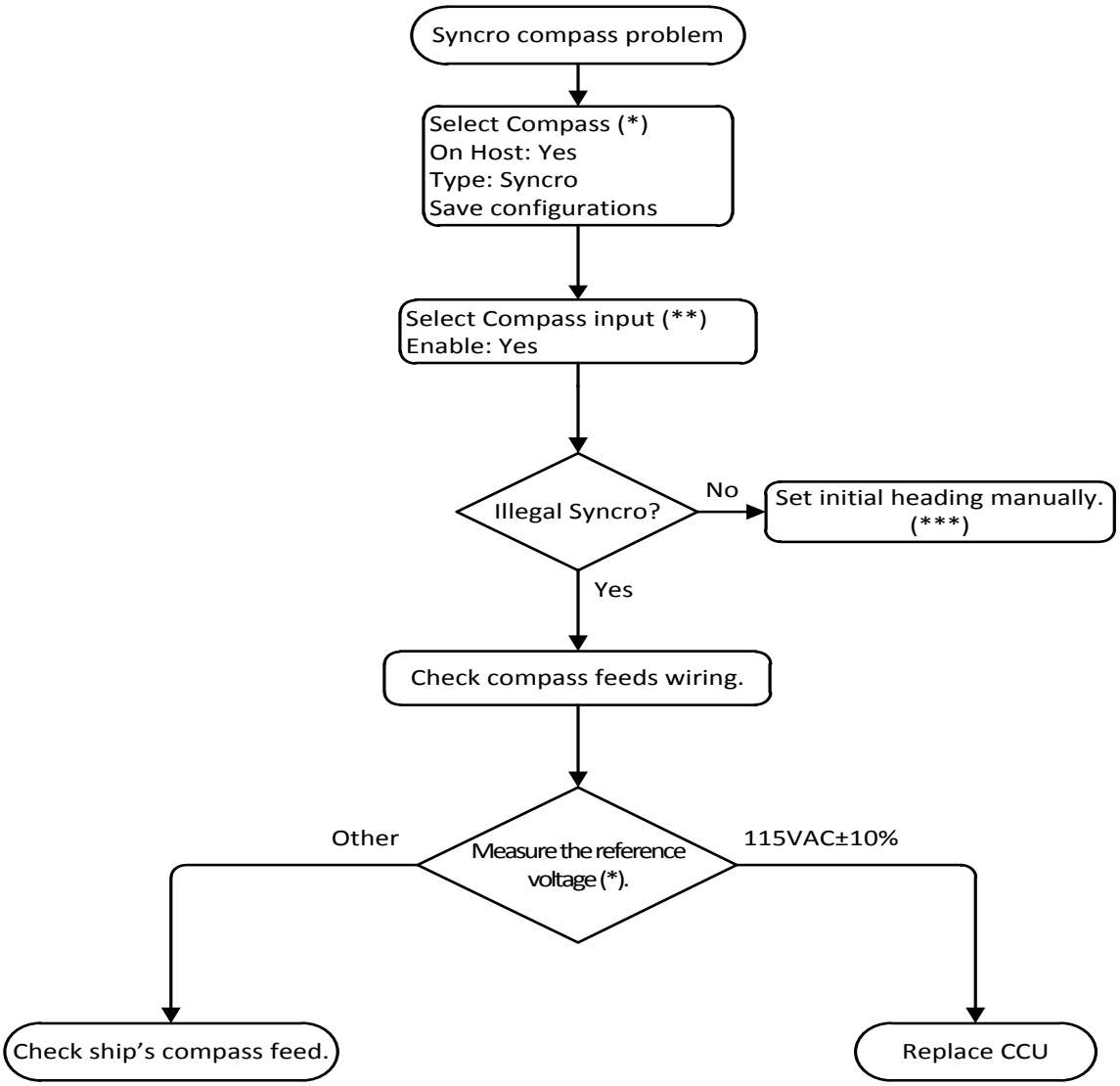


1.7 Synchro Compass Problems

This Flow Chart illustrating the required chain of operations when troubleshooting Syncro Compass Problems issues encountered during system operation.

Danger high voltage on the compass input lines

Use extreme caution while checking the reference voltage

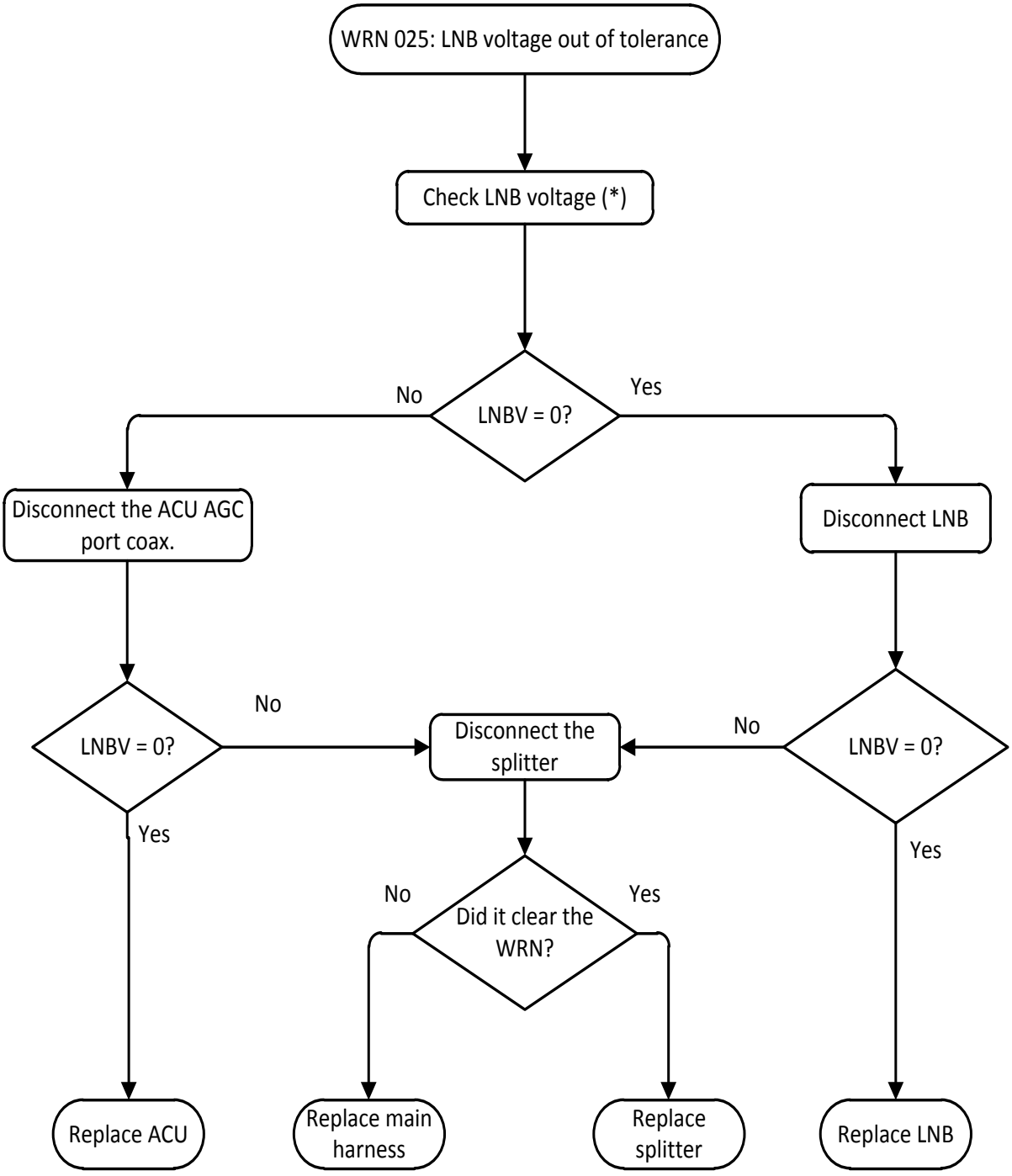


Comments:

(*): MTSVlink -> Config
(**): MTSVlink -> Host -> hardware interface
(***): MTSVlink -> Commands -> Set heading

1.8 LNB Voltage Out of Tolerance

This Flow Chart illustrating the required chain of operations when troubleshooting LNB voltage related Problems issues encountered during system operation.

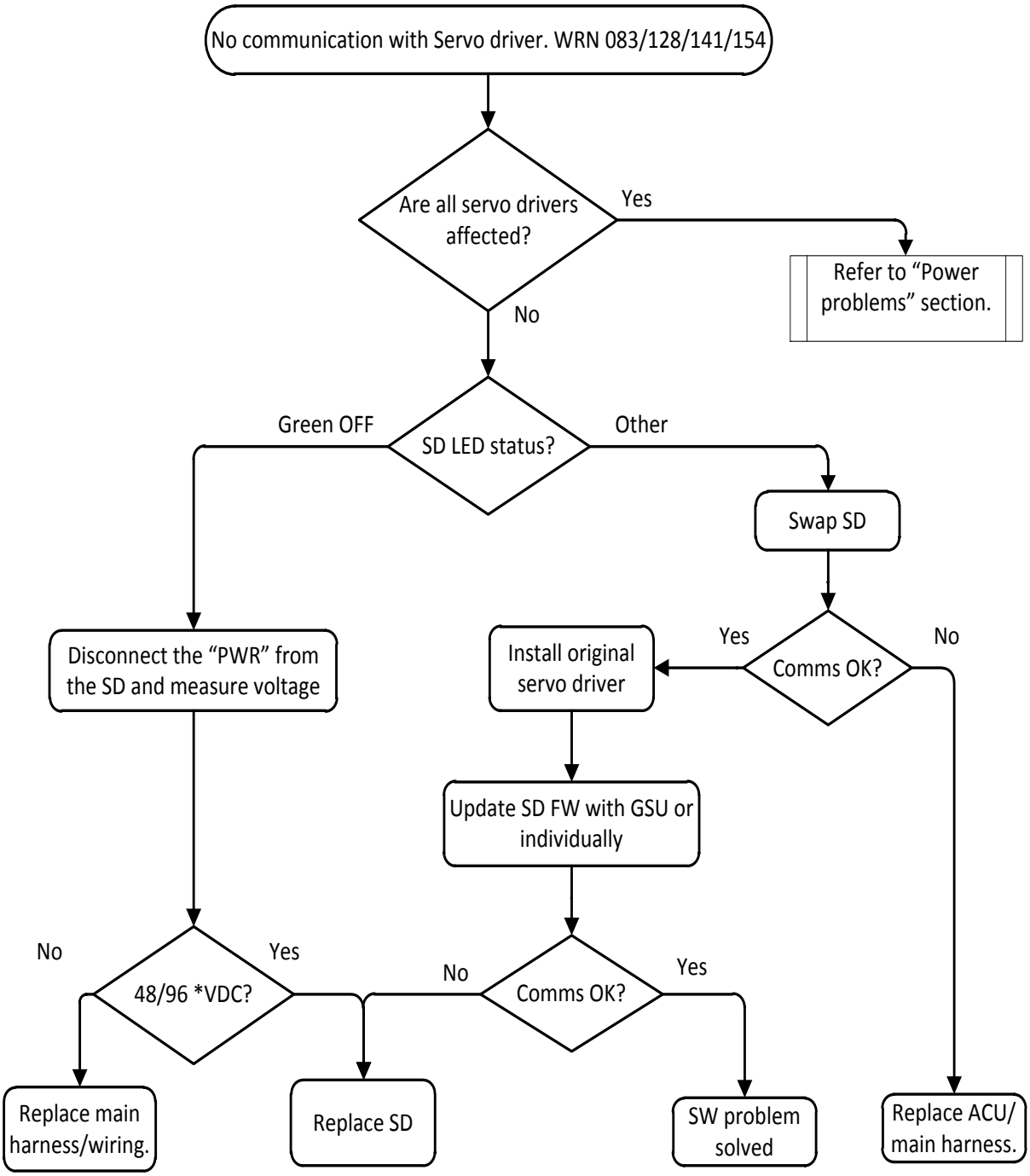


Comments:

(*): Mtsvlink -> Maintenance screen -> Config-view - >Power parameters →LNBV

1.9 No Communication with Servo Driver

This Flow Chart illustrating the required chain of operations when troubleshooting Servo drivers communication fail issues encountered during system operation.
Contact supportgroup@orbit-cs.com for software packages and upgrade procedures.



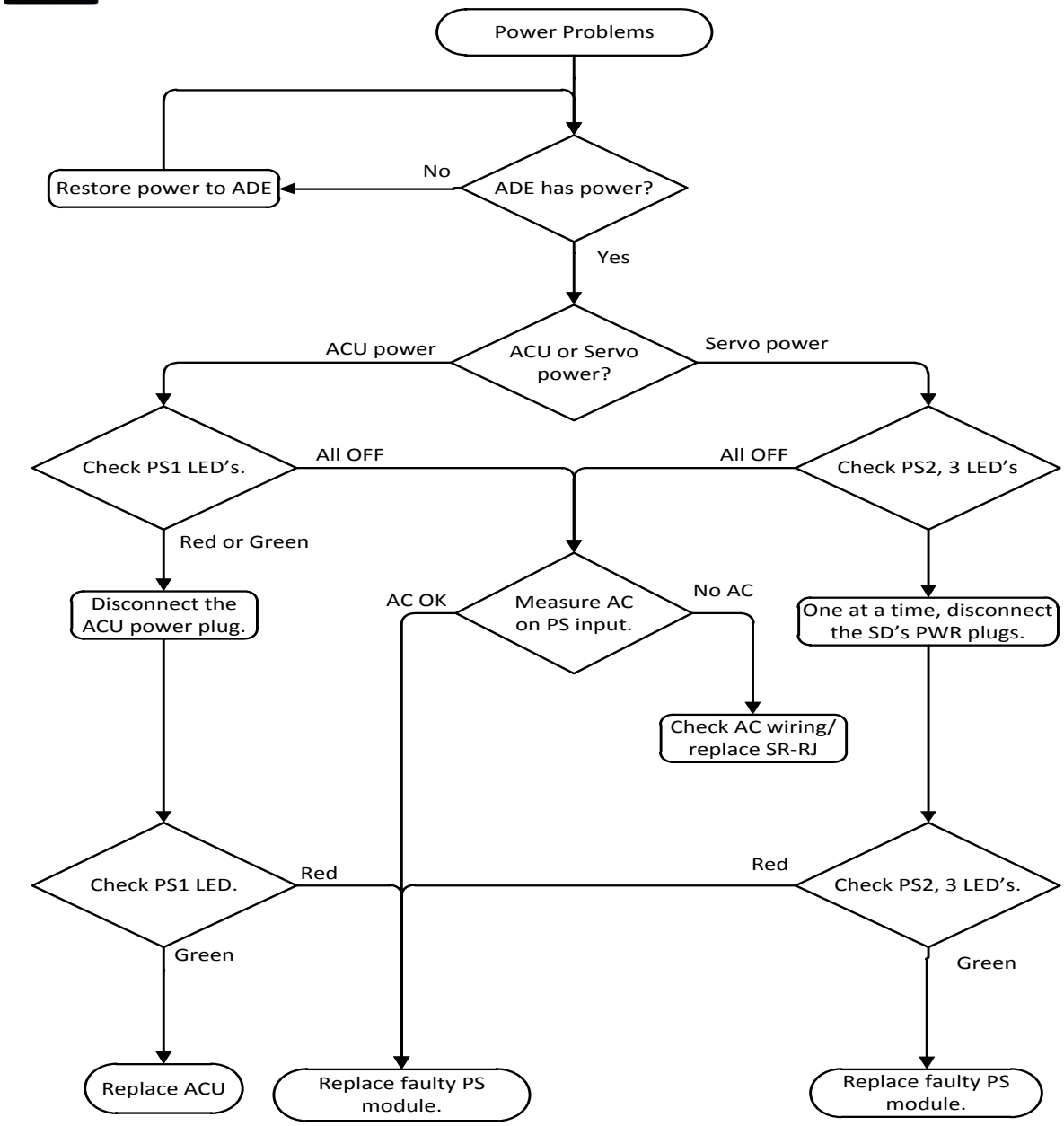
* 48VDC for OTRx 4-500 or 96VDC for OTRx7-300

1.10 Power Problems

This Flow Chart illustrating the required chain of operations when encounter no ADE-BDE communication or loss of communication with all servo drivers together.

Danger high voltage on the AC and DC supply line

Use extreme caution while checking the AC power line



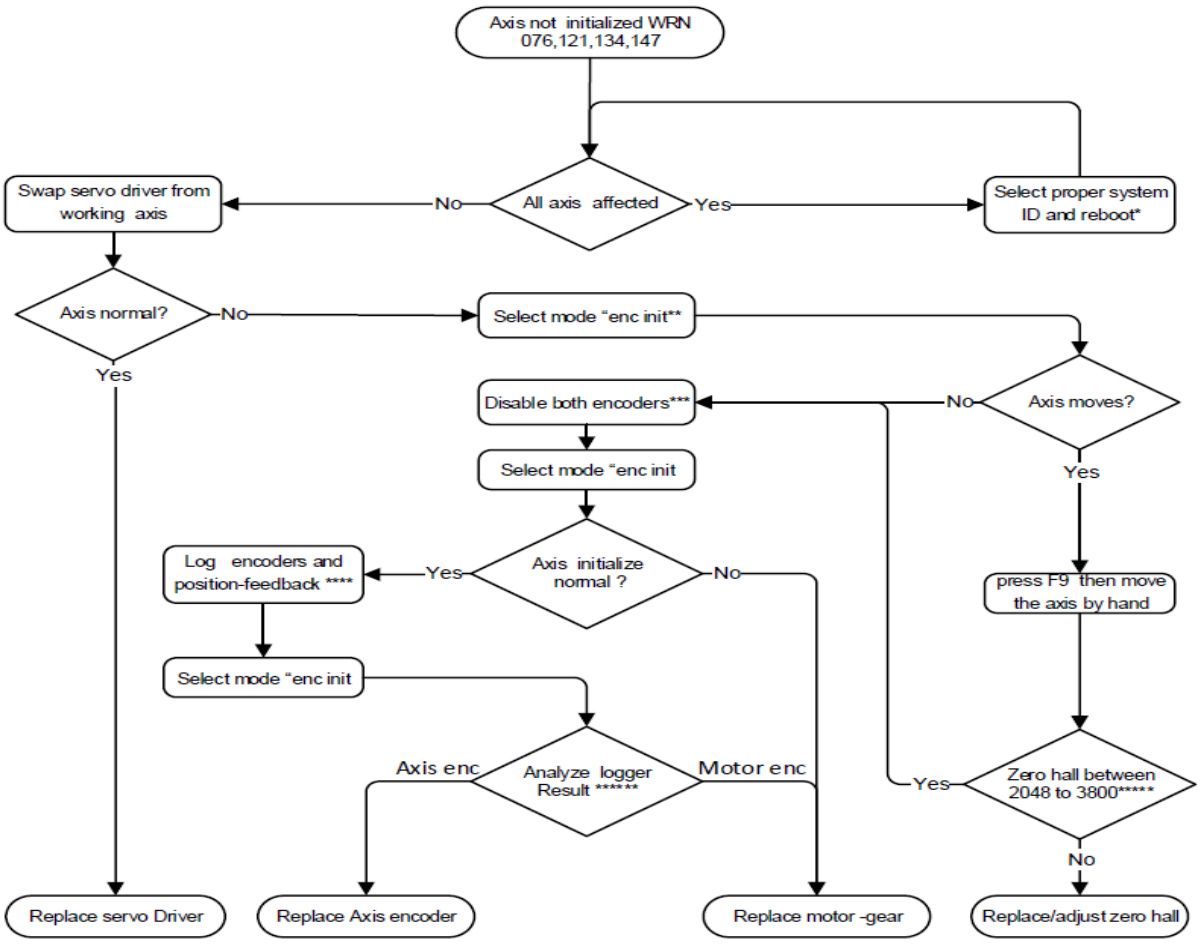
1.11 Servo System Problems

This Flow Chart illustrating the required chain of operations when you have issues with axis initialization, encoder fail or axis stuck

High voltage on the Servo Driver power lines

Keep clear from moving parts while performing test

Load latest software version including system configuration using GSU prior troubleshooting



Comments:

* Mtsvlink → main screen → press U → enter "high password"→ Commands →Set system ID

** Mtsvlink → Maintenance → Az/El/Tl/Pl →Mode →Enc init

*** Mtsvlink → main screen → press U → enter "high password" -> Maintenance → Az/El/Tl/Pl →Open →Servo drive config →Control bits →Remove check from box from "motor Comm" and "Ax Fdbc"→Save →OK

**** Mtsvlink→Logger →Add parameter Az/El/Tl/Pl "position" →"Feedback"

**** Mtsvlink→Logger →The position feedback and motor encoder and axis encoder have to be identical

**** Mtsvlink→Logger →Add parameter Az/El/Tl/Pl servo drive"Motor encoder" and "axis encoder"

*****Mtsvlink -> Maintenance → Az/El/Tl/Pl Open → Servo drive state → Zero hall

Legend:

Az-azimuth window

El -elevation window

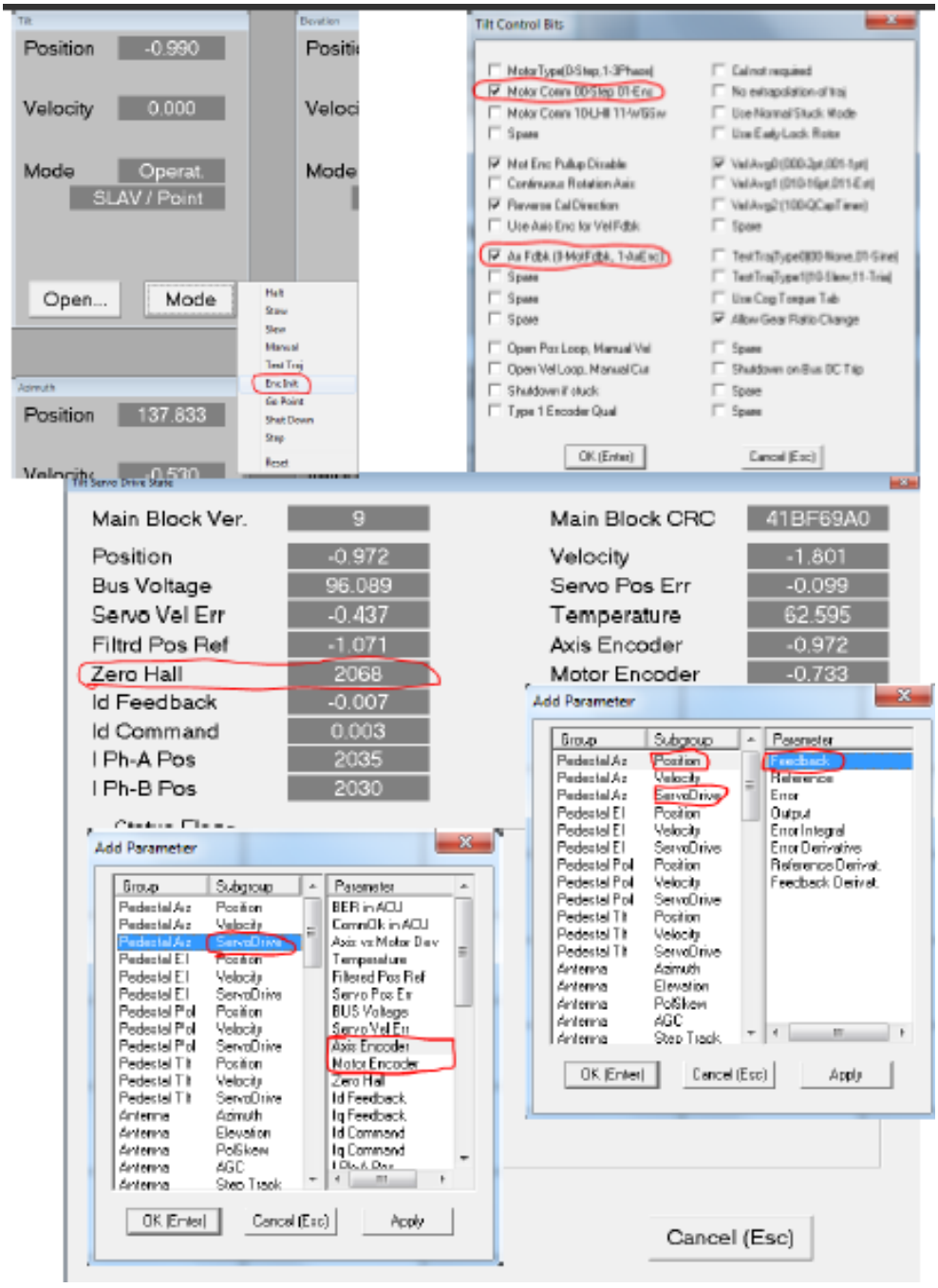
Tl-Tilt window

Pl pol-skew window

enc -encoder

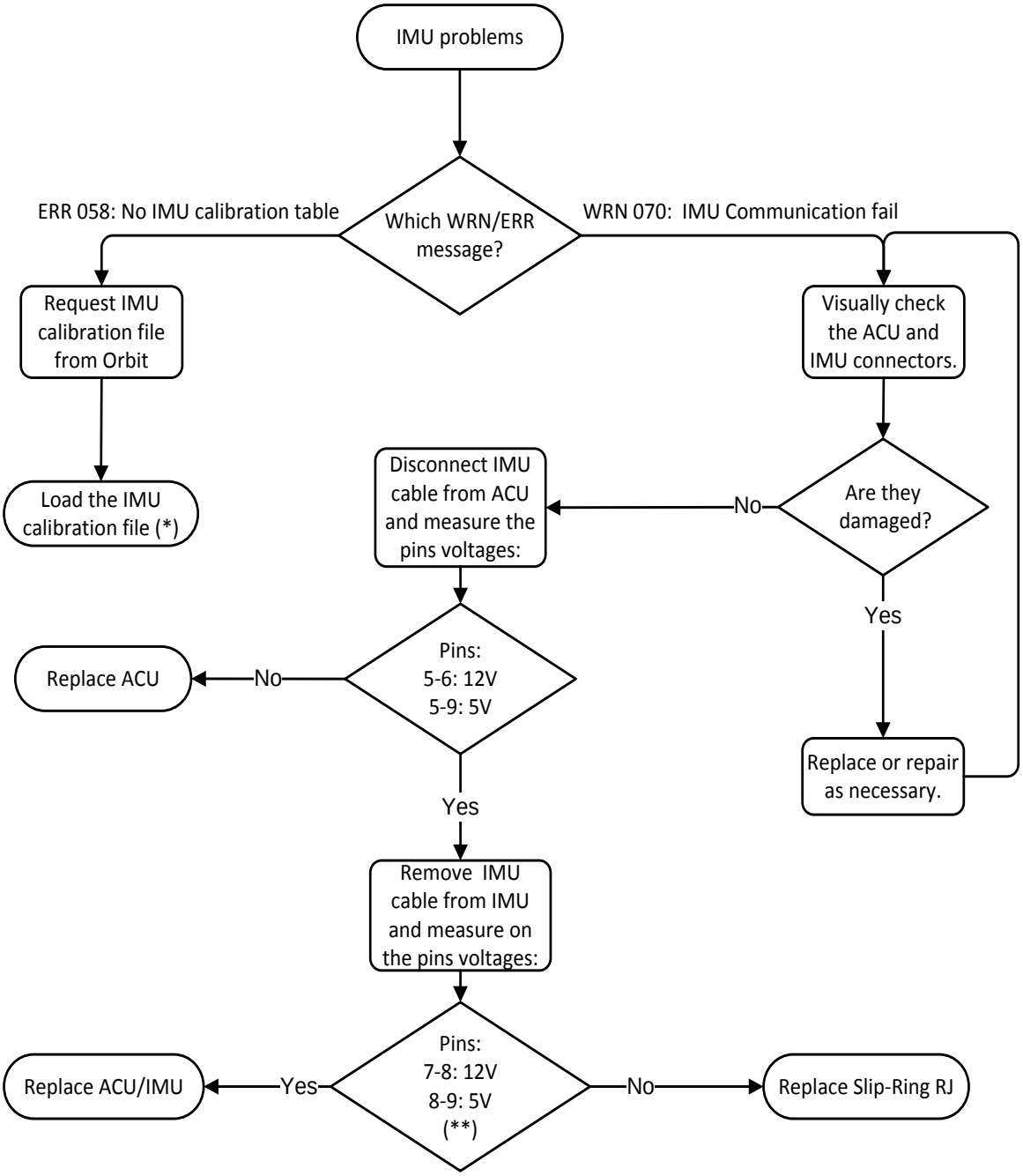
High technical password is dynamic password based on the CCU date

You can request the high technical password from orbit service "supportgroup@orbit-cs.com"



1.12 IMU Problems

This Flow Chart illustrating the required chain of operations when troubleshooting IMU related Problems issues encountered during system operation.
IMU ships with USB drive that contains its calibration file. This file is unique per serial number Please contact supportgroup@orbit-cs.com to get the file in case the USB is missing



Comments:

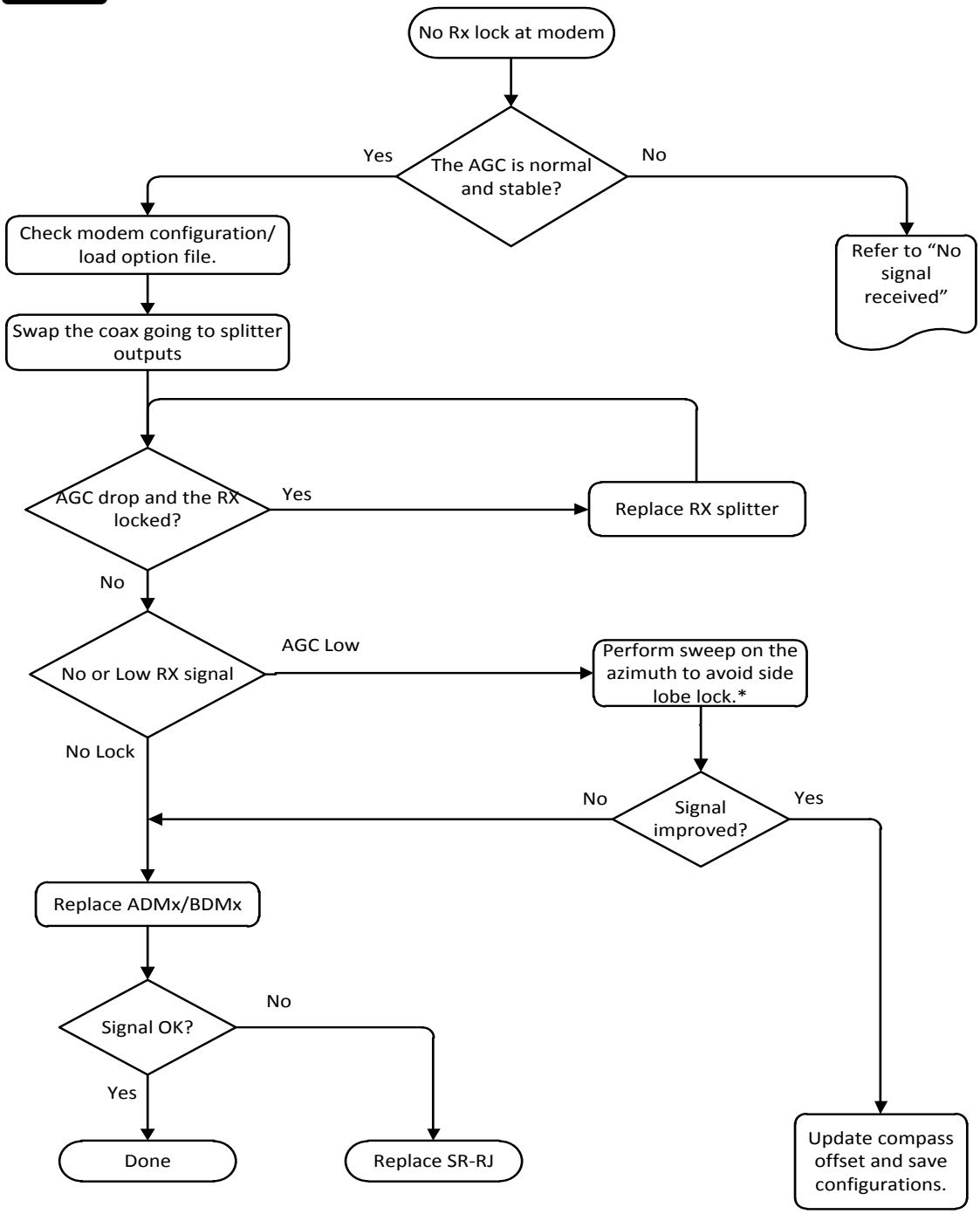
(*): MTSDock -> ACU -> calibration -> IMU calibration -> PUT

(**): Pin numbers may vary depending on IMU model.

1.13 No Rx modem Lock

This Flow Chart illustrating the required chain of operations when AGC is normal but no RX lock on the satellite modem

Contact airtime provider for updated modem configuration(option file) or modem operation guidance



*MtsVlink → mode → Manual

2 Maintenance

This section includes:

- System inspection
- Field replaceable units
- Software update
- Wiring diagram
- TX chain test points

2.1 Preventive Maintenance

2.1.1 Health check

OceanTRx systems are maintenance free. This means the system does not require scheduled mandatory maintenance.

Nevertheless, health check (inspection) its recommended to extend the service life by reducing normal wear of mechanical components, and improve system performance by mechanical adjustment and/or via software upgrades.

This can be done by Orbit trained technicians(passed Orbit training course) or by Orbit service engineers

Contact supportgrupup@orbit-cs.com for more information

Check/verify items in below table.

Item to check	Status	Note
Signs of water ingestion.		
Radome sealing		
visual damage parts on the pedestal		
wiring routing and insulation		
Signs of wear and tear		
Observe normal startup sequence		
Listen for abnormal noises		

2.1.2 Check and Adjust

Below table, describe the recommended activities during the health check procedure.

Renewing the greasing on the cogwheel will protect it from the humid and salty environment.

Backlash closing is important for the tracking performance. With the time, the backlash between the cogwheels will increase and the tracking stability will degrade. Closing the backlash will restore normal tracking stability

Activity	OTRx 7-300	OTRx 4-500
Cog wheel greasing (Az,El,Tl)	Renew greasing	N/A
Backlash	Close and adjust	N/A
Belt condition (Az,El,Tl)	N/A	Replace if damaged
Belt tension	N/A	Tight and adjust

2.2 Field replaceable units (FRUs) replacement

Field service engineers that passed the training course by ORBIT are arrowed to do FRU replacement.

The FRUs are available for purchase from Orbit in form of spare part KITs. Each include the part itself, consummative (fasteners, tie wraps) and documentation (called Tech notes)

You will find the technical notes as per spare parts (i.e. ACU) in attached USB flash drive that is part of the spare part KIT

If you encounter any problem contact supportgroup@orbit-cs.com to receive technical support.

2.3 Software update

Updating system Software with GSU

1. Launch MtsDOCK access **ThisHost** and chose **General Software Update...**

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

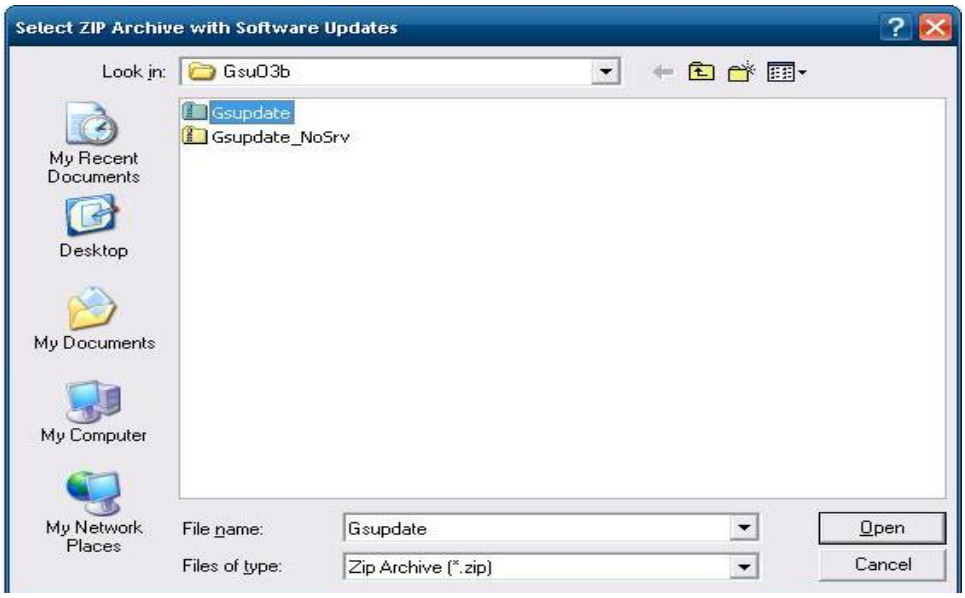


Figure 2-1: Select ZIP Archive with Software Updates **Dialog Box**

2. Select the `GSU` file from the USB Flash drive.
3. Click **Open (Enter)**. New dialog box will pop up ask to enter the IP address of the system units. Remove the checkbox from ACU3 and CCU2

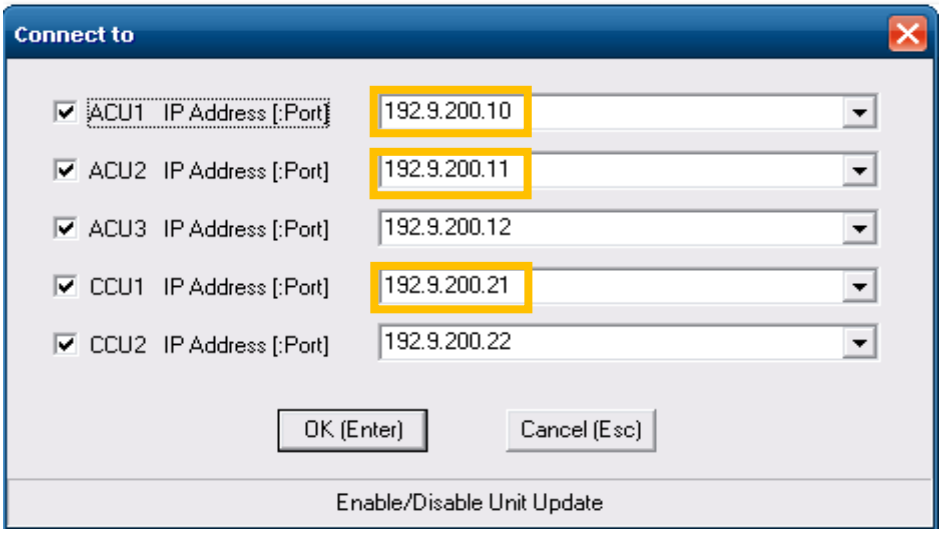


Figure 2-2: Connect ACU, CCU Message Box

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

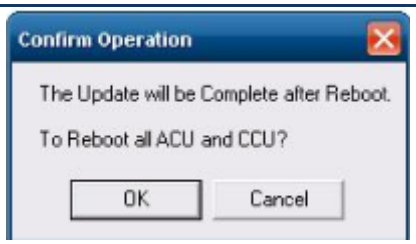


Figure 3 Reboot prompt

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

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

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.

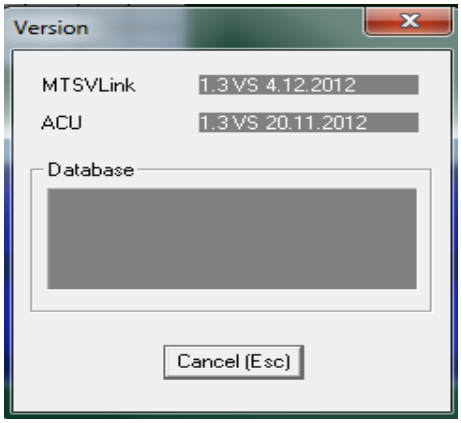
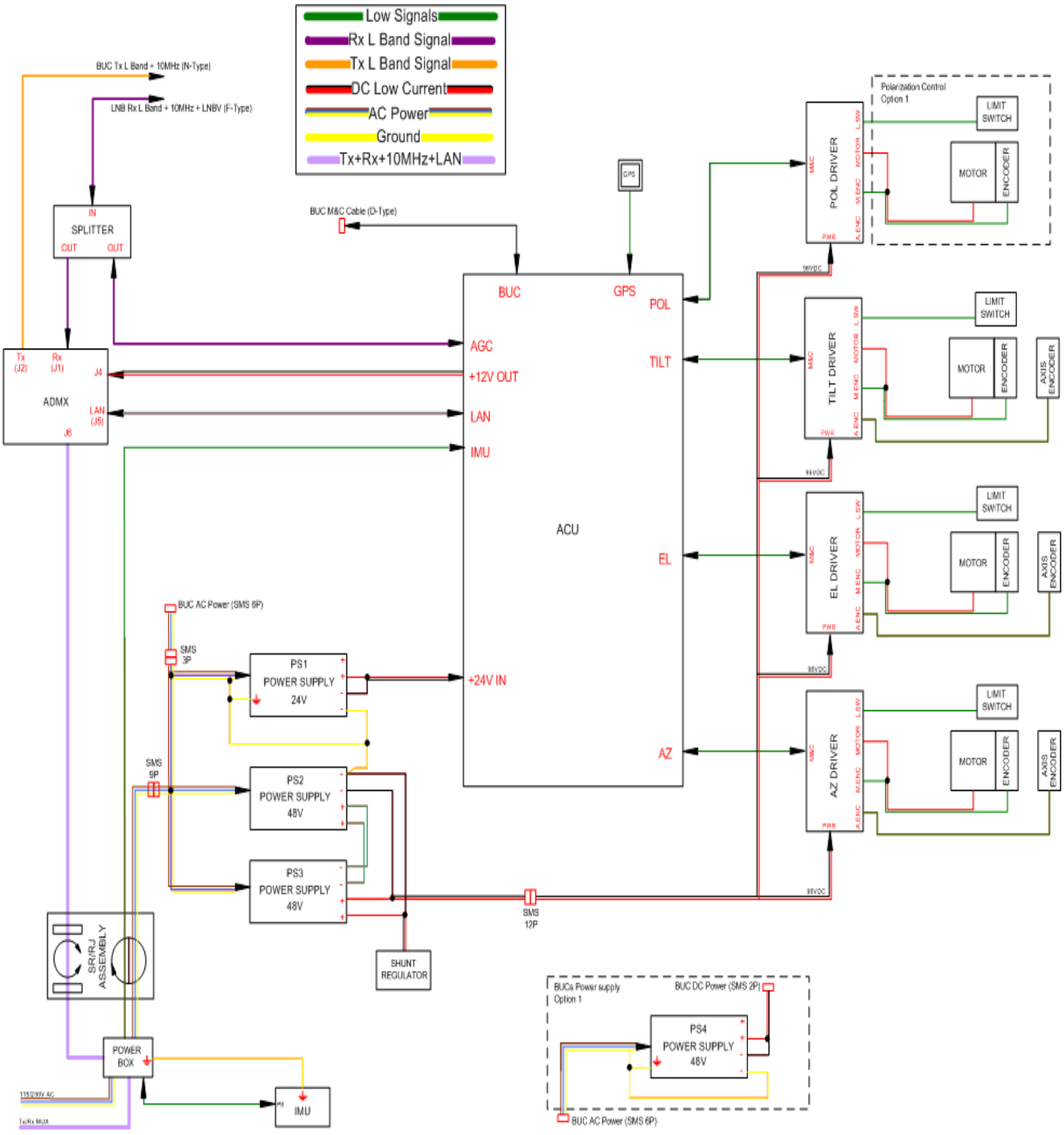


Figure 2-5: Version Message Box

2.4 Wiring diagram

OTRx conection diagram



2.5 TX chain test points

Use drawing below to have better understanding of the TX chain. The ADMx and BDMx transfer the L-band TX signal together with the 10MHz reference from the CCU to the BUC at the ADE.In order to perform the checks you need to configure the VSAT modem to transmit CW test carrier. Consult with air time provide for more information

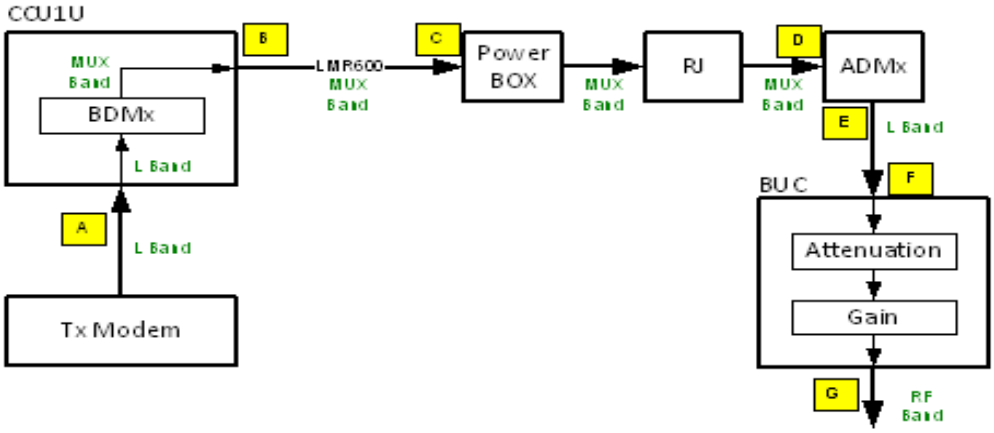


Figure 4 TX Signal flow

Point	Parameter	Unit	Value
A	L band signal from VSAT modem (set test frequency 1Ghz)	GHz	1
A	10MHz reference signal from VSAT modem	dBm	0 +/-5
B	L band shifted frequency by BDMx LO of 5.7GHz (inverting)	GHz	4.7
B	10MHz reference shifted frequency by BDMx to	Mhz	70
B→C	Same as above but attenuated by the ADE-BDE cable depending on length and type	dB	12.0
C→D	Same as above but attenuated by the power box and slip-ring-RJ assembly (attenuation)	dB	5
E	L band signal from VSAT modem	GHz	1
E	10MHz reference signal from VSAT modem	MHz	10
E →F	L band signal @Main harness max attenuation @ L-band	dB	4.5
F	L band signal @Main harness frequency	GHz	1
F	10MHz reference signal @Main harness power	dB	0+/-5