6 Antenna Systems

As mentioned in section 2.1 (p. 32), SCANTER 6002 is available with three antenna system configurations:

- Compact antenna with fixed turning unit
- Dual Beam High Gain+ (DBHG+) antenna with fixed turning unit
- Lightweight Stabilized Antenna System (LSAS)

The antenna systems are briefly described in the following sections. For further specifications and maintenance information, refer to applicable manuals (see section 1.7 (p. 29)).

6.1 Antennas with Fixed Turning Unit

Antennas having a fixed turning unit are controlled by an ACU. See section 7 (p. 103).

6.1.1 Compact Antenna

The SCANTER 6002 is available with a 7', 9' or 12' Compact antenna. The antenna is horizontally polarized (HP).

The Compact antenna with fixed turning unit is mounted on a gearbox including:

- gearing providing a fixed antenna rotation speed of 24/48 RPM or rotation controlled by an antenna control unit (ACU): 10-48 RPM
- 1.5 kW motor (50 Hz)
- rotary joint
- encoder to indicate the antenna position

Fig. 6.1 Compact antenna with fixed turning unit

6.1.2 Dual Beam High Gain+ Antenna

The Dual Beam High Gain+ antenna is a switchable circularly polarized (CP) and horizontally polarized (HP) planar array antenna.

The SCANTER 6002 system is available with a 9' or 12' DBHG+ antenna.
IFF antenna is available as option.

The Dual Beam High Gain+ (DBHG+) antenna with fixed turning unit and optional IFF antenna is mounted on a gearbox including:

- rotary joint
- 4.0 kW motor
- gearing providing an antenna rotation speed of up to 40 RPM
- encoder to indicate the antenna position

Fig. 6.2 DBHG+ antenna with fixed turning unit and with optional IFF antenna

6.2 Lightweight Stabilized Antenna System (LSAS)

The LSAS consists of a Dual Beam High Gain+ antenna (9’ or 12’) with optional IFF antenna, mounted on a Lightweight Stabilized Antenna Platform (LSAP). The antenna is switchable, circularly/horizontally polarized (HP/CP).

The LSAP provides the motion functions for the LSAS. It controls the speed of the antenna rotation in azimuth and provides two-axis stabilization in pitch and roll of the azimuth axis against the ship’s motion.

The LSAP is made up from two distinct major components: an above deck 3-axis stabilized platform and a below deck Control Electronics Unit (CEU) as well as electromechanical interfaces to the radar antenna and radar control system.

Fig. 6.3 LSAS with optional IFF antenna

6.2.1 LSAP Controller (CEU)

The LSAP and the antenna are powered by the Control Electronics Unit (CEU). The CEU may be integrated in an installation rack.

A local control unit is located directly on the LSAP platform and functions as a junction for directing signals from the CEU to the LSAP and for transforming the power for driving the motors.

Fig. 6.4 CEU

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7 Antenna Control Unit (ACU)

The Antenna Control Unit (ACU) is used for controlling antennas with a fixed turning unit.

The ACU variant ACS-880 is intended for use with the SCANTER 6002 transceiver.

The ACU housing is available with different built-in types of frequency converter drives. The drives are specially selected to optimum performance with the different types of SCANTER antennas, with respect to available power supply and motor power needs.

For details on the ACU, refer to doc. no. 978100-HT.

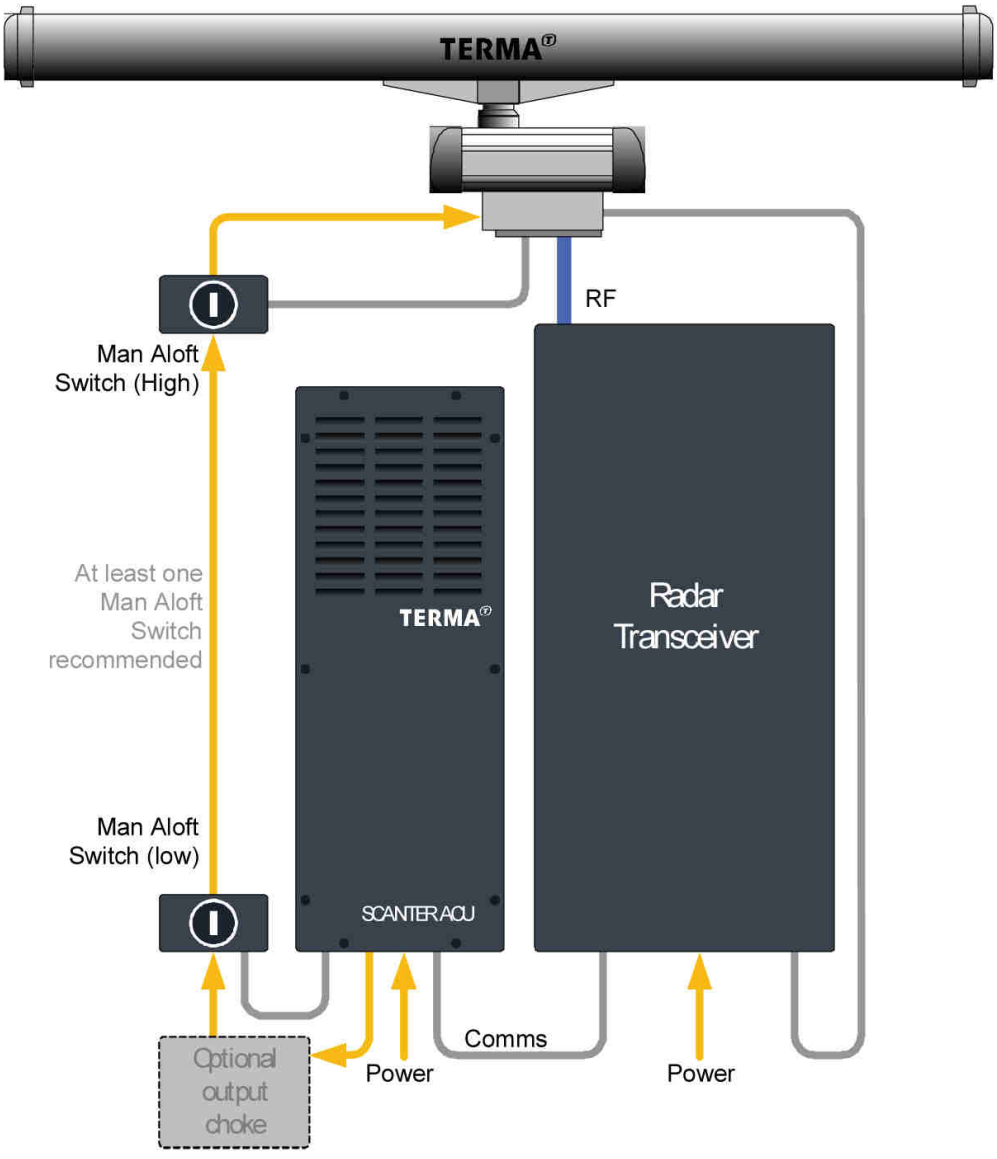

Fig. 7.1 ACU in installation example

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8 Radar Service Tool

The Radar Service Tool (RST) is a software application used for controlling the radar system, such as parameters and BITE information, and for monitoring radar video, plots and tracks.

The RST runs on a laptop or on a PC connected to the radar LAN.

The RST provides the user with a consistent look and feel across the various features implemented. It supports different perspectives, where each perspective corresponds to a particular arrangement and subset of RST windows (views). The user may define, store and recall individual perspectives.

For detailed descriptions of the Radar Service Tool functions, see doc. no. 357641-HO: “SCANTER Radar Service Tool - Operator’s Manual”.

8.1 Installation

8.1.1 System Requirements

The system requirements for the computer running the RST are found in doc. no. 357641-HI: “SCANTER Radar Service Tool”.

8.1.2 Installing and Starting the Radar Service Tool

To install the RST, use the 7-Zip application to extract the zip file from the CD (357641-NF) to the computer. The startup file rst.exe is located in the directory: "RST-357641-NF-<revision>-<Win/Linux>-<32/64bit>\rst".

Start the Radar Service Tool by double-clicking the "rst.exe" file. The user may create a shortcut to this file and place it on the desktop.

8.2 RST Features

8.2.1 Authentication

- Access to the computer is protected by a normal Windows login.

8.2.2 Access Levels

To operate or to change parameters in the radar it is necessary to connect to the radar Parameter Control Protocol using one of the three access levels available:

- Operational access level.
- Service access level.
- Debug access level.

Operational access level allows the user to change the most commonly used parameters and to operate the radar.

The service access level allows to change all parameters, while the debug access level is intended for Terma engineers having intensive and detailed knowledge about the radar system.

8.2.3 User Documentation

The RST “DocLib” view contains a list of documents stored on the transceiver, such as technical manuals.

8.2.4 Parameters and BITE Access

Access to all necessary parameters is available through the RST.

The RST provides status on radar functions and performance as well as detailed status on all modules in the system. All BITE information available about the modules is shown together with any status or error message issued by the module.

8.2.5 Tools

In addition to live radar video, the RST provides the user with operator’s tools, such as A-Scope, EBL, VRM, continuous zoom, histograms, primary-, secondary- and AIS tracks, plots, maps, etc.

These operator’s tools allow the user to perform a detailed analysis of the system performance. Display of track data is possible by clicking on the individual target, in combination with a right-click menu.

8.2.6 Situation Display

The situation display presents live video, A-Scope, EBL, VRM, continuous zoom, histograms, primary-, secondary- and tracks, plots, maps, etc.

These operator tools are available to allow the user to perform more detailed analysis of the system performance. Display of track data is possible by mouse click on the individual target, in combination with a pop-up menu (right mouse click).

The situation display is one of five default perspectives, all described in the following.

8.3 RST Screen Layout

The Radar Service Tool screen layout is shown in Fig. 8.1 (p. 107) with definitions of the different operation areas.

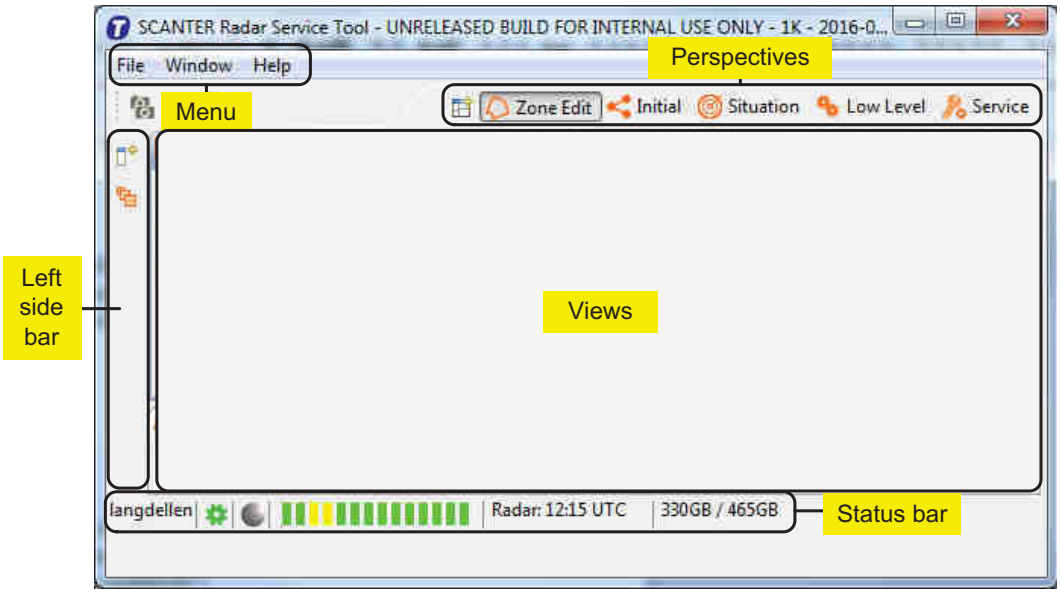

Fig. 8.1 RST - screen layout

In the “Views” area of the screen, it is possible to open interactive views for display and handling of graphical information e.g. radar video, measurement tools, radar control, parameters, BITE information, etc.

Presentation of these views can be selected and deselected individually.

The five default perspectives are described in section 8.5 (p. 110).

The Radar Service Tool menu bar consists of “File”, “Window” and “Help”.

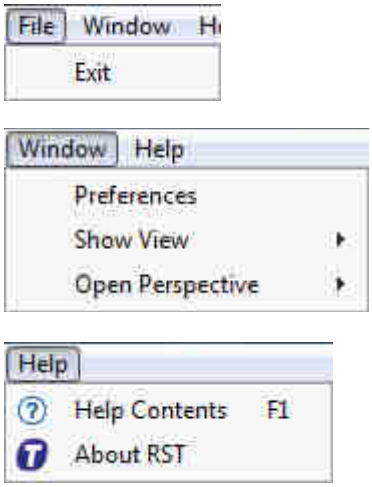

Fig. 8.2 Radar Service Tool - menus and submenus

The ”File” menu is used to exit the RST, while the “Help” menu displays the RST software version and provides information on a number of topics as well as a search function. The help topics can also be displayed by pressing the F1 key anywhere in the RST user interface.

In the “Window” menu, the submenu “Preferences” is used to set default colors, units, snapshots storage directory, radar video setting such as decay, sweep, trails history, video gain, etc.

“Show View” and “Open Perspective” are used to activate a view or a perspective.

The left side bar, shown in Fig. 8.1 (p. 107), is used to open fast views. A fast view remains on the monitor as long as it is in focus. It will disappear from the monitor if the operator clicks any place outside the fast view.

It is possible to reset predefined perspectives to the default layout.To do so, open the perspective, right-click on the perspective button and choose "Reset".

8.3.1 RST Keyboard and Mouse Actions

8.3.2 General

General	
Maximize/Restore view	Double click on view tab
Move view to another docking	Left drag view tab

8.3.3 Adjust Text Size

Adjust text size	
Parameters view	Ctrl - scroll wheel
Profile Editor view	
Profile Names view	
Errors/Warnings view	
Status/Measurements view	

8.3.4 Situation Perspective Control

PPI view	
Re-center	Ctrl - right click
Zoom	Scroll wheel
Zoom in	Ctrl - right drag - up - right
Zoom out	Ctrl - right drag - down - left
Reset zoom and re-center to own unit position	Ctrl - right drag - up - left

A-Scope view	
Zoom	Scroll wheel
Pan/Adjust VRM circle	Left drag

VRM-Scope view	
Zoom	Scroll wheel
Pan/Adjust EBL angle	Left drag

Area Masking view	
Press buttons “Delete Mask” or “Create Mask” to start creating a polygon	
Add polygon vertices	Left click
Finish creating polygon	Right click
Delete last vertex while creating a polygon	Ctrl - left click
Abort current polygon creation	Esc

8.3.5 RST Menu Navigation and Search

Use the four buttons at the top to the right of the view to collapse the navigation tree (all parameters) or to expand the tree. See Fig. 8.3 (p. 109). The view can be minimized into sidebar or maximized.

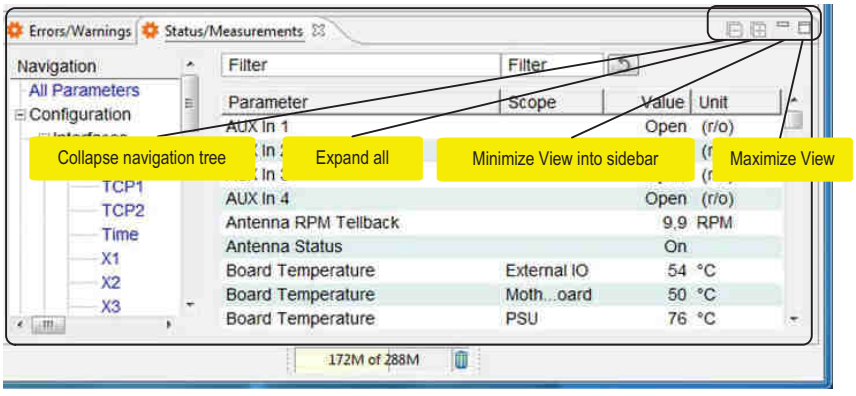

Fig. 8.3 View - control buttons

To search for a parameter, enter the parameter name in the “Parameter filter” or in the “Scope filter” field. See Fig. 8.4 (p. 110). The shown search is for sector 11. To change a parameter value, simply click and enter the new value in the relevant field. “All parameters” in the navigation tree must be selected to enable the search in the entire navigation tree.

In case a parameter cannot be found, pay attention to the parameter access level.

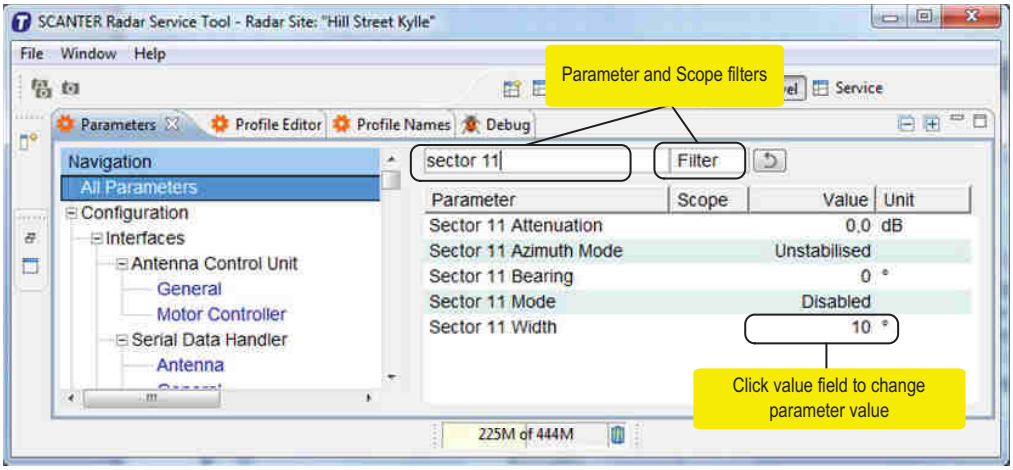

Fig. 8.4 RST - Search filters

8.4 Preferences

In the Preferences menu it is possible individually to change color and fonts. The user can select what unit format to use, specify general settings of the RST, the PPI (radar video, background, trails etc). The following sections describe the usage of the RST Preferences.

Preferences		
Color	General	Help
Perspectives	Plug-ins	RST Own Unit Override
Unit		

Fig. 8.5 RST - Preferences

8.5 Perspectives

When launching the RST program for the first time, there are five default perspectives, each of these containing a certain number of views. The presentation of these views can be selected and deselected individually.

The “Initial” perspective is used when a connection to the transceiver and its services is established. See Fig. 8.6 (p. 110).

Initial	
Connection Manager	Connection Status
Recordings	

Fig. 8.6 “Initial” perspective - default

The “Low Level” perspective provides parameter and profile views for configuring profile content and editing profile names. The Errors/Warnings and Status/Measurements views are used to monitor the health of the transceiver. See Fig. 8.7 (p. 111).

Low Level		
Parameters	Profile Editor	Profile Names
Debug	Errors/Warnings	Status/Measurements
Recent Errors/Warnings		

Fig. 8.7 “Low Level” perspective - default

The “Service” perspective can be used for transceiver backup/restore and software update. Further, it provides access to the documents/user guides stored in the transceiver (DocLib) and RST log data (Console). See Fig. 8.8 (p. 111).

Service		
Backup/Restore	Software Update	DocLib
Console		

Fig. 8.8 “Service” perspective - default

The “Situation” perspective can be used by the operator to start the transceiver and transmission, to select profile and to monitor the transceiver video. Measurement tools are included in this perspective. See Fig. 8.9 (p. 111).

Situation		
PPI	Parameters	Debug
Video Setup	Area Masking	Radar Control
VRM-Scope	Histogram	A-Scope
Markers	Vectors	

Fig. 8.9 “Situation” perspective - default

The “Zone Edit” perspective provides views for creating and editing zones and zone parameters.

Zone Edit		
Zones	Legacy NAAZ Zones	Legacy NTZ Zones
Parameters		

Fig. 8.10 “Zone Edit” perspective - default

Any default perspective can be customized by adding or removing views freely selected by the user.

Alternatively, new personal perspectives can be created, which can be stored in the perspectives area.

Views are placed inside the “Views” area, or “minimized” and placed in the sidebar areas (right and left side) of the RST window.

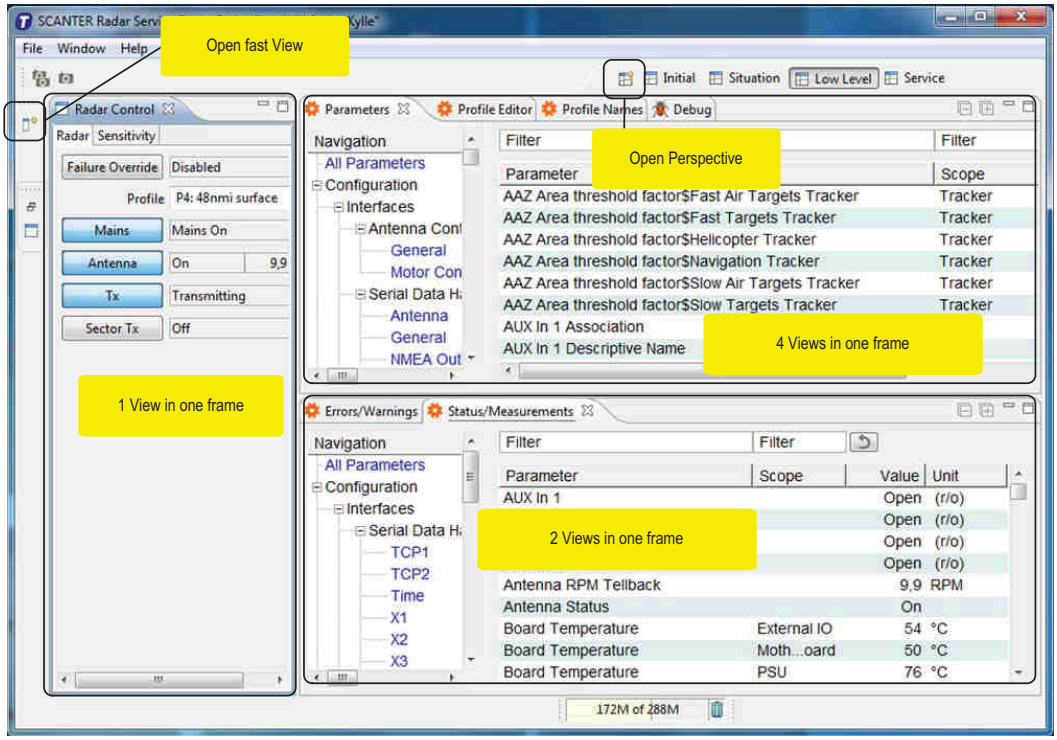

Fig. 8.11 RST - Views

A view can be placed in its own frame, or several views can be placed in the same frame/window. See Fig. 8.11 (p. 112).

To move a view within the view area, select the view tab with the left mouse button while holding down the button. Move the view to another location or inside a frame already containing one or more views.

8.6 Radar Control

When the Mains switch on the transceiver is turned to the off position, the transceiver is in the “Off” state where it cannot function or be reached from remote.

The transceiver can enter any of the four states shown in the below table:

		Radar control view in the Radar Service Tool		
Transceiver states	Mains switch	Mains	Antenna	Transmission
Off	Off	-	-	-
Minimum functioning	On	Off	Off	Off
Mains on	On	On	Off	Off
Fully functioning	On	On	On	On

The “Minimum functioning” state is entered when the transceiver Mains switch is set to “On”. The transceiver starts a booting procedure that may last for 3-5 minutes. The transceiver is checking the presence and condition of all hardware modules. In this state, the LAN ports on the External I/O module are up and running. An RST client can then connect to the transceiver through the LAN network.

"Radar Control" view - Radar tab (Fig. 8.12 (p. 113)) is used for switching on and off the system, switching on/off the antenna motor, the transmitter, and sector transmission.

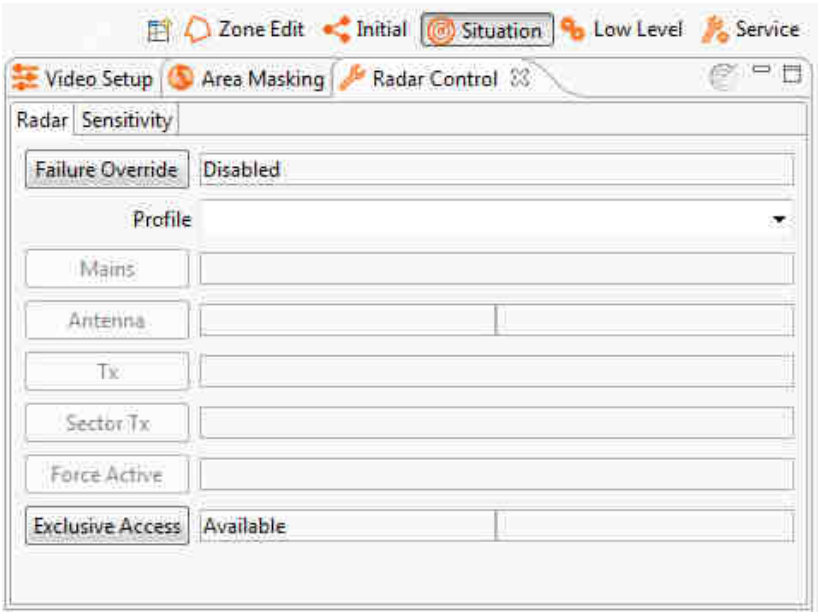

Fig. 8.12 Radar Control view

To change transceiver configuration, the "Profile" drop down menu, see Fig. 8.12 (p. 113), gives the possibility to select one of sixteen predefined profiles.

"Mains" is used for switching the system on and off. The read-only box to the right provides information about the system status.

With "Antenna" it is possible to switch on and off the antenna motor - to the right is shown the actual antenna rotation speed in RPM.

With "Tx" it is possible to switch on and off the transmitter - to the right is shown the status of the transmitter (warming up, stand by, etc.).

"Sector Tx" switches on and off the sector transmission and will affect all sectors enabled.

“Force Active” is for use in redundant systems only, i.e. in SCANTER 6002 this button is dimmed.

“Exclusive Access” is used for requesting ‘master control mode’ of the radar. This mode allows the user to gain exclusive access to the radar, i.e. lock the configuration parameters for sole use. Master control mode is defined in the parameter ‘Master Control Mode’ and can have the values ‘Disabled’, Optional’ or ‘Mandatory’. If the parameter is set to ‘Optional’ or ‘Disabled’, the user must request master control mode before being able to change configuration parameters. If set to ‘Disabled’, exclusive access cannot be requested and the button will be dimmed. Exclusive access can be released by pressing the button.

The "Radar Control" view - Sensitivity tab (Fig. 8.13 (p. 114)) is used for adjusting STC, gain and clutter control.

It is recommended to enable “Auto” adjustment of STC and Gain.

To manually adjust attenuation for STC and gain, disable the “Auto” check box.

“Clutter Control” attenuates rain clutter.

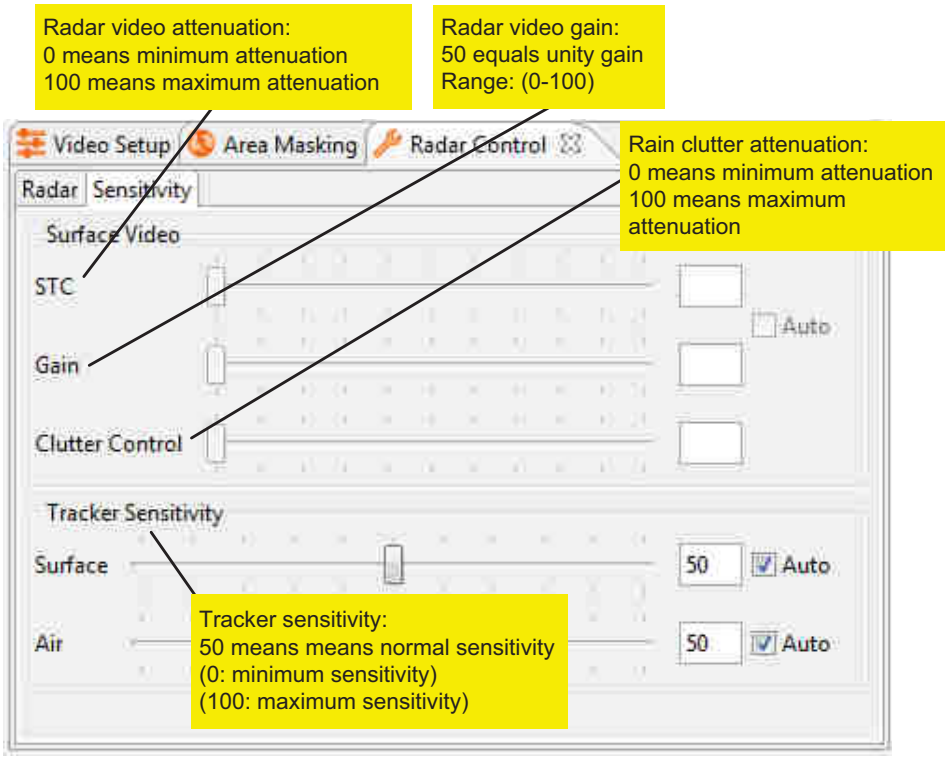

Fig. 8.13 “Radar Control” - sensitivity

8.6.1 Starting Transceiver

Step 1	Turn on power to the transceiver using the power switch on the Power Supply Unit.
Step 2	Establish a connection between the transceiver and the RST by means of the RST “Connection Manager” view.
Step 3	Switch “Mains” on by means of the RST “Radar Control” view, select “Antenna”, “Tx” and an appropriate profile. Enable sector transmission if created and needed.

8.6.2 Stopping Transceiver

Step 1	Switch off “Tx”, “Antenna” and “Mains” by means of the RST “Radar Control” view.
Step 2	Turn off power to the transceiver using the power switch on the Power Supply Unit.

8.6.3 Creating Sectors

In the “Parameters” view - Sectors, it is possible to set up sixteen independent sectors, selected as transmission sectors, prohibit sectors or reduced power transmitting sectors. All available as stabilized or not stabilized sectors.

A stabilized sector is always kept relative north. Unstabilized sectors will follow the moving platform when it is turning, i.e. it is not kept relative to north.

When setting up a sector it is necessary to know or to calculate the bearing of the sector, i.e. the middle. In the same way it is necessary to know or to calculate the width (extent) of the sector (in degrees). See Fig. 8.14 (p. 116).

A prohibit sector is a non-transmission sector.

Selecting reduced power sector, it is possible to transmit with reduced power. Power attenuation is selectable in the interval 0..15.5 dB.

Note: Prohibit sectors have priority over transmission sectors, which should be considered when all types of sectors are mixed on a moving platform.

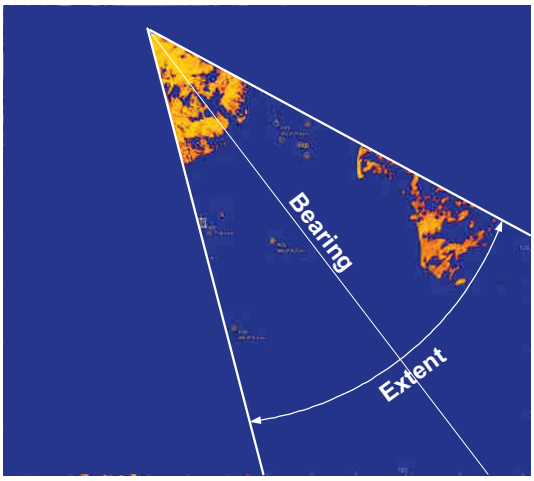

Fig. 8.14 Sector bearing and width

Sector bearing:	0..359 degrees
Sector width:	10.. 350 degrees
Sector mode:	Disabled, prohibit, reduced power sector, transmitting sector
Azimuth mode	Stabilized or unstabilized
Sector attenuation	0..31 dB

8.6.4 Creating ET2 Tracking Zones

Tracking zones facilitate optimized control of tracking in specific areas.

The following types of tracking zones can be set up for a naval system (note the conditions applying to AAZs):

- Automatic Acquisition Zone (AAZ): Automatic Acquisition Zones are areas where tracking will be initiated automatically. AAZs must cover the entire demanded tracking area.

  Note: When the RST is used to control a transceiver, it must be connected using *Parameter Control Protocol v. 2.2 or newer*, and the transceiver must support creating and editing AAZs from this protocol.

- Non-Tracking Zone (NTZ): zone in which the tracker will not perform tracking on plots. No tracks are initiated in the zone and thus no tracks are maintained.

- Non-Automatic Acquisition Zone (NAAZ): zone in which the tracker will not initiate tracks based on the plots within. Confirmed tracks moving into a NAAZ will be maintained.

NTZ and NAAZ can be created and drawn in the PPI view using the "Zone Edit" view.

Zones can be defined for air or surface channel, or for both air and surface channels.

8.6.5 Entering HW Module Information

For some transceiver LRUs it may be necessary to manually enter LRU information after replacement of the LRU. The affected modules are the Ext. I/O, PC Controller Board, PSU, RxTx, RxTx Control, Waveguide Assy and the Blower Assy.

1	Windows: To enter LRU information, open the ”Debug” view using RST and choose “ #LRU Information and Calibration”. Linux: To enter LRU information, open an external browser and enter the transceiver’s IP address (i.e. the IP specified in the “Connection Manager” view - ‘main address’.
2	Select the relevant module and enter all the modules information.
3	To store the module information, click on “Save”.

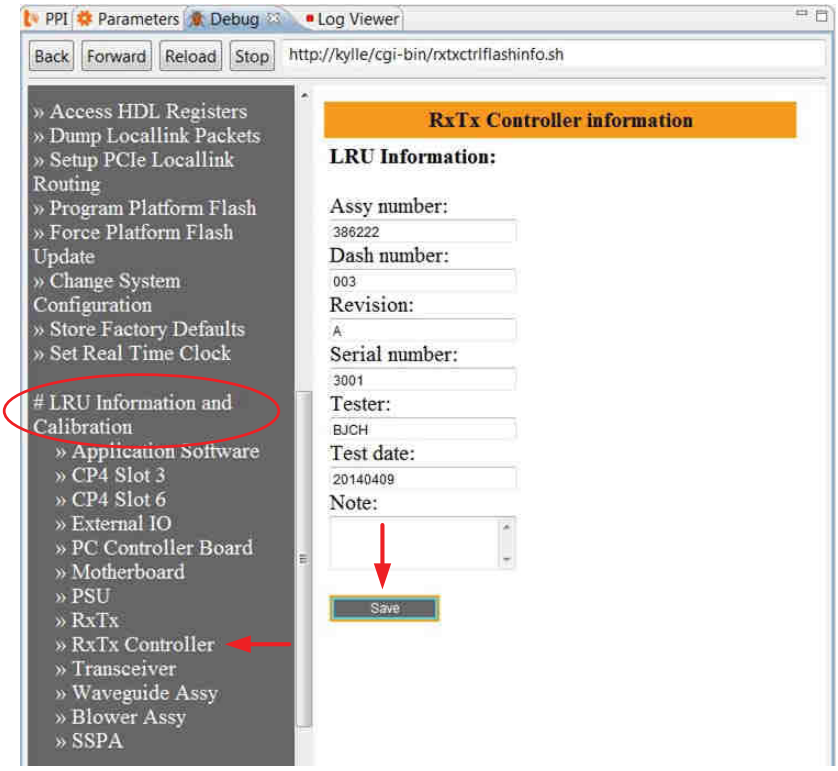

Fig. 8.15 Entering LRU information, RxTx Control

8.6.6 Backup/Restore

The backup and restore functions in the RST provide backup and restore functions for the SCANTER 6002 radar system.

The transceiver contains the application SW, factory default data, transceiver configuration data and site default data. Furthermore, some space is allocated for log files (i.e. performance and measurement data) and temporary files. See Fig. 8.16 (p. 118).

The data set currently being used by the transceiver is stored in the “transceiver configuration” memory area.

The “Site Default” data area is used to store a copy of the “transceiver configuration”. It is recommended to copy the “transceiver configuration” to the “Site Default” area after Setting-To-Work (STW) and later on after major changes of the settings.

Furthermore, it is recommended to back up the “Transceiver configuration”, log files, area masking and maps on the RST computer. When activating the backup from the RST, the FTP server will create and store a temporary backup file, which is then transmitted to the RST.

The “Temporary files” directory has a limited size, hence it is possible to delete some of these files by means of the RST.

The “Factory Default” data area contains basic settings for the transceiver, which are created and used at transceiver production. These data are not intended to be used on site.

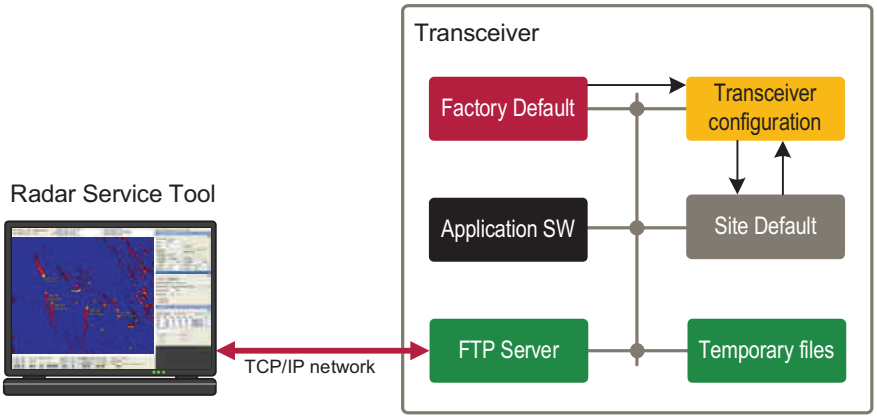

Fig. 8.16 Transceiver - SW and configuration data

8.6.6.1 Creating/Restoring Backup of Configuration Data

Note: Antenna rotation must be stopped before initiating the backup.

To create a backup of the “transceiver configuration” and log files, use the RST “Backup/Restore” view. See Fig. 8.17 (p. 119).

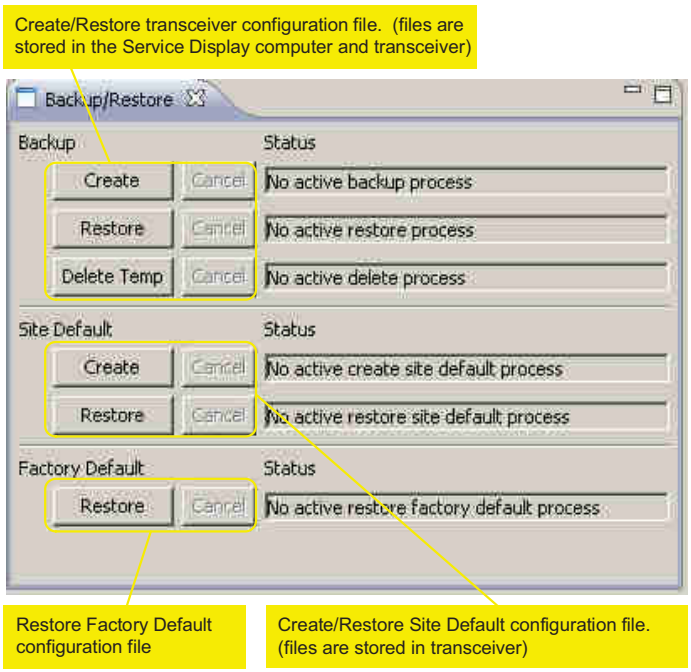

Fig. 8.17 Menu: Window / Show View / Backup/Restore

The RST saves the backup file in a directory selected by the user.

For each zipped backup file, the date is used as the file name (i.e. BackupDate.tar). The backup file contains all parameters for the transceiver and the radar system (i.e. including ACU parameters, etc.), logs, area masking, and maps.

The restore function copies the transceiver backup file from the RST computer to the "Transceiver configuration" area. Once the backup file has been uploaded, the transceiver *will restart* to activate and use the restored backup file.

The restore function is available in two variants: Partial Restore or Full Restore.

A “Full Restore” is used in situations where a complete replacement of the configuration of the transceiver is desired. This includes site specific settings such as IP address, encoder alignment and calibration data. This is the type of restore to be used when exchanging the LRU containing the transceiver hard drive or if a complete re-initialization of the transceiver to a previously backed up state is required.

A “Partial Restore”, on the other hand, replaces only configuration data not tied to the specific transceiver on which it was created. This type of restore operation is useful if the same basic configuration is to be reused across several transceivers. A backup is then created on a master transceiver and partially restored on the remaining transceivers.

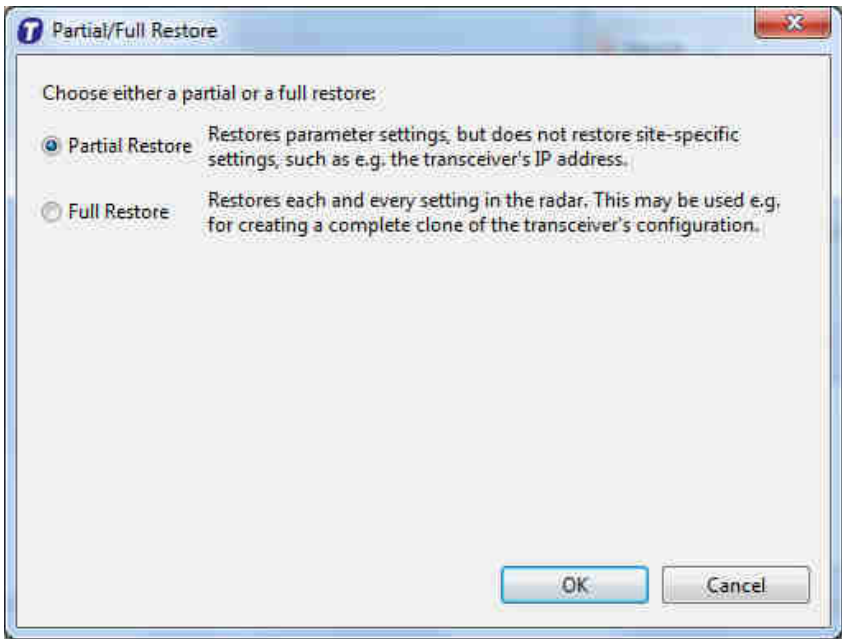

Fig. 8.18 Partial/Full Restore

“Delete Temp” removes temporary files stored in the transceiver (FTP Server).

The “Site Default” create option copies the current contents of the "transceiver configuration" to the "Site Default" area inside the transceiver. "Restore" copies the "Site Default" to the "transceiver configuration" area. The transceiver *will restart* to activate and use the new data.

The “Factory Default” data contains basic parameter values for the transceiver. These are created at transceiver production and should not in general be used after setting to work has been completed.

Restoring the “Factory Default” data will delete the “Transceiver configuration” area. The transceiver will then likely be out of service, unless a backup has been created on the RST that can be restored.

9 Safety Loops

The SCANTER 6002 system has built-in safety precautions to prevent the antenna from rotating and the transceiver from transmitting when personnel need to work close to the antenna. This loop is interrupted by a Man Aloft switch, which is activated when the work on the antenna starts, isolating power from the turning unit/ stabilized platform and prohibits transmission as long as the switch is activated.

In order to protect the immediate surroundings from extended exposure to electromagnetic radiation, the safety system will prevent transmission whenever the antenna is not rotating. This is achieved by not powering up the SSPA unless antenna encoder signals are indicating that the antenna is rotating.

The safety loop depends on the antenna system configuration, i.e. antenna system with fixed turning unit or Lightweight Stabilized Antenna System (LSAS), see sections 9.1.1 and 9.2.1.

9.1 Antenna System with Fixed Turning Unit

9.1.1 Safety Loop

For human safety, a hard wired safety current loop prevents antenna rotation and RF transmission if the safety loop is broken or opened. A number of serial connected switches comprise the entire safety loop.

Furthermore, an ACU fault will also stop antenna rotation and transmission.

The transmission can be controlled externally via the available external hardware EMCON/Tx Inhibit logical interface, which will force the transmitter to react accordingly instantaneously.

Transceiver transmission can be started by issuing a “transmit start” command, either by clicking the Tx button in the Radar Service Tool program or by activating transmission from an other client program. The radar will remember the transmission status when power is switched off, so the system will always return to the same transmission status as it had previously. Transmission will only start if all of the below prerequisites are fulfilled:

	Antenna rotation (RPM) is greater than 0.
	ACU status is normal.
	Motor protection and Man Aloft Switch are not activated.

The antenna start and transmit permissions are controlled by the transceiver.

Fig. 9.1 (p. 122) shows the safety loop of an antenna system with fixed turning unit. The safety loop is supplied with +24 VDC, the Man Aloft switch(es) and motor protection are supplied from the transceiver, and the “ACU Fault” is supplied from the motor controller (through the ACU mains switch).

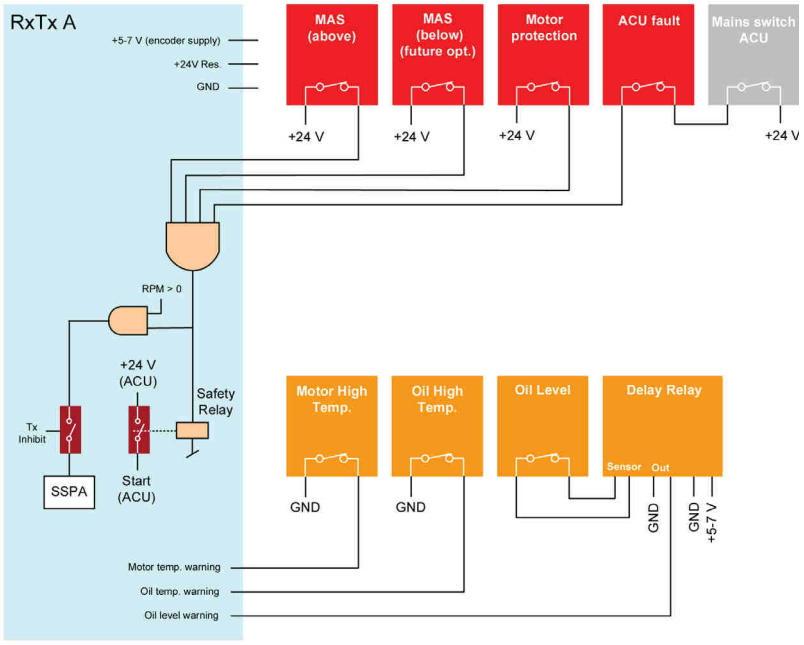

Fig. 9.1 Safety Loop and warnings

The four inputs from the loop (Man Aloft Switch (above), Man Aloft Switch (below), motor protection, and ACU Fault) are AND’ed together. Provided that they all are true (i.e.no errors), the output of the AND-function is true as well and with that the safety relay is energized.

When +24 V is applied “Start” on the ACU, the start function is enabled and with that it is possible to start the antenna rotation with a command via the serial communication.

To activate transmission from the SSPA, the four above-mentioned inputs are AND’ed with the signal “RPM > 0”, which ensures that transmission is only possible when the antenna rotates. When the SSPA is enabled with antenna rotation and there are no errors in the safety loop, the transmission can be controlled externally with the “Tx Inhibit/EMCON” function.

9.1.2 Warnings from Antenna System

In Fig. 9.1 (p. 122) is also shown input signals from the antenna unit which give a warning without any impact on the safety loop - these are:

	Motor High Temperature - motor temperature has reached 120 degrees Celsius.
	Oil High Temperature (if available).
	Oil Level (optional) - a delay is introduced to this signal to avoid short-termed variations on the oil level.

9.1.3 Enabling ACU

The safety relay together with the “Radar Mains ON” relay ensures that the start function of the antenna is enabled in all possible situations. The wiring is shown in Fig. 9.2 (p. 123) where the red wires show how the start input of the motor controller is applied +24 VDC. In a single system two of the terminals are connected as shown close to the start input.

The relays are shown in the position where mains is on and safety loop not interrupted. Whenever the safety loop is interrupted by a failure or activation of the man aloft switch, the contacts of K1 change position and with that remove the +24 VDC to the start input of the motor controller. The same happens when the mains switch is turning off the transceiver and the contacts of K2 change position.

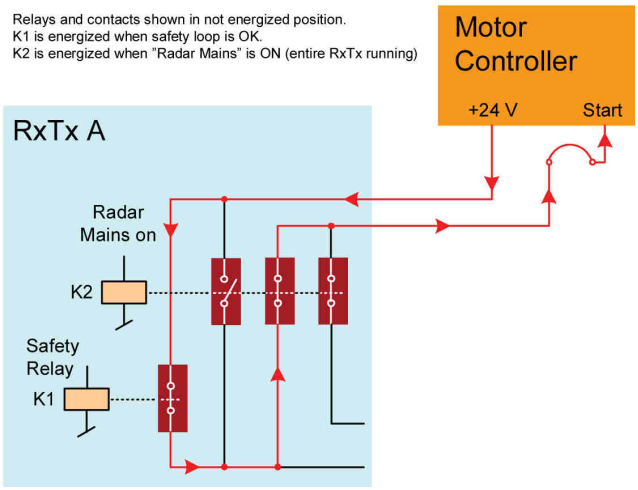

Fig. 9.2 Start enabled - single system

9.2 Lightweight Stabilized Antenna System (LSAS)

9.2.1 Safety Loop

Transceiver control and transmission are described in section 9.1.1 (p. 121).

Fig. 9.3 (p. 124) shows the safety loop in the LSAS. The safety loop is supplied with +24 VDC, the Man Aloft switch is supplied from the transceiver, and the “CEU Fault” is supplied by RxTx.

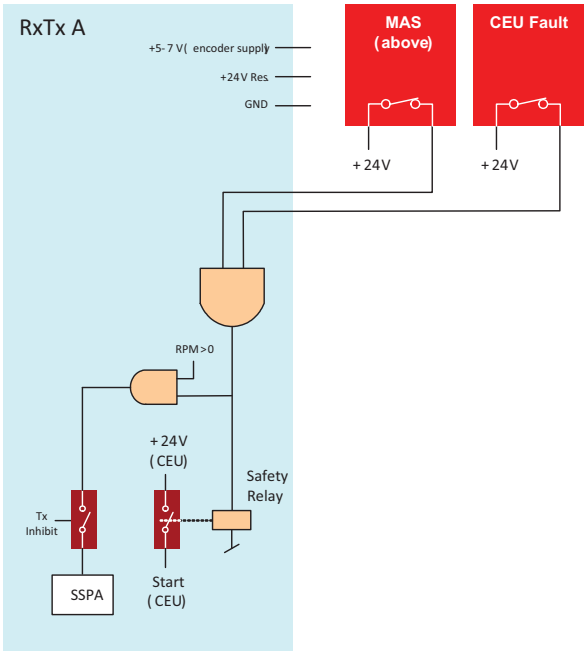

Fig. 9.3 Safety loop, LSAS

The two inputs from the loop - Man Aloft Switch (above) and CEU Fault - are AND'ed together. Provided that they all are true (i.e. no errors), the output of the AND-function is true as well and with that the safety relay is energized.

When +24 V is applied "Start" to the CEU, the start function is enabled and with that it is possible to start the antenna rotation with a command via the serial communication.

To activate transmission from the SSPA, the two above-mentioned inputs are AND'ed with the signal "RPM > 0", which ensures that transmission is only possible when the antenna rotates. When the SSPA is enabled with antenna rotation and there are no errors in the safety loop, the transmission can be controlled externally with the "Tx Inhibit/EMCON" function.

10 Maintenance

This chapter provides information on preventive and corrective maintenance of the SCANTER 6002 transceiver.

10.1 Preventive Maintenance

10.1.1 General Preventive Maintenance

Keep equipment dry and free from dirt.

Keep connection points for lightning protection free from paint/corrosion. Keep them well greased (Poly Butyl Cuprysil, grade 492).

Keep protective ground wires in good condition, and check the connection if any of them has been removed.

Clean all surfaces with a soft cloth. Remove dirt using small amounts of water with a mild soap. Never use trichlorethylene or alcoholic agents.

10.1.2 Scheduled Preventive Maintenance

		6 months	12 months	7 years	8 years
Entire installation	Perform visual inspection of the entire installation - repair observed damages	X			
ACU	Refer to doc. 978100-HT				
Antenna system	Refer to relevant antenna manual, see section 1.7 (p. 29)				
Waveguide	Check for leakage, deformations, corrosion etc. including grounding points		X		
	Check static dehydrator (change in color)	X			
Transceiver	Clean/replace air filters	X			
	Replace Blower Assy				X
	Replace Blower Assy, CP4				X
	Replace battery on PC Controller Board			X	

The above intervals assume that the equipment is mounted in rough conditions. On the basis of experience, the intervals may be extended on individual sites if conditions are mild. In dust-filled environments, air filters may require more frequent cleaning/replacement.

10.2 Consumables, Spare Parts and Tools

10.2.1 Consumables

Consumables	Part number
Air filter, transceiver	524884-001
Air filter, ACU	262394-001
Static dehydrator	249703-001
Cable strap, Ø44 x 4 mm, black	201197-010
Cable strap, Ø20 x 2.5, natural	201197-049
Consumables, SCANTER 5/6k (on-site kit containing:) Filter Element (air filter, 524884-001) Fuse, 15A, Fast, Cartridge (307609-018) Fuse, Time-lag, 6.3X32mm 6.3A (610376-019)	696294-001

Fig. 10.1 Consumables kit, on-site

10.2.2 Spare Parts

Module	Part number
Waveguide Assembly	386240-00x
SSPA, Long Range	386250-002
RxTx	386232-00x
RxTx Control	386222-00x
Crate Assy incl. Motherboard	386265-00x
PC Controller Board	386285-00x
Battery, lithium, for PC Controller Board	519886-001
Common Platform 4 (CP4) Board	386260-00x
External I/O Board	386270-00x
Power Supply	386290-00x

Module	Part number
Blower Assy	386298-00x
Blower Assy, CP4	386268-00x
Heater Assy	386277-00x
Waveguide, SSPA	524894-00x
Interconnection Board	386275-00x
Fuse, mains, 15 A, Fast, Cartridge	307609-018
Fuse, ACH, 6.3 A, Time-lag, 6.3x32 mm	610376-019

10.2.3 Tools

Tools	Part number
Standard tools	N. A.
Terma Tool Kit	696293-001
Vacuum cleaner	N. A.
Brush	N. A.

10.2.3.1 Standard Tools

A collection of standard tools which is expected to be in a technician's tool box such as screwdrivers (for Philips, Pozi drive, and slotted screws), side cutters, spanners, Allen keys, tweezers etc.

10.2.3.2 Terma Tool Kit

The Terma Tool Kit includes tools necessary to perform maintenance on the SCANTER 6002.

Below the contents of the tool kit and where the tools are used.

Fig. 10.2 Terma Tool Kit

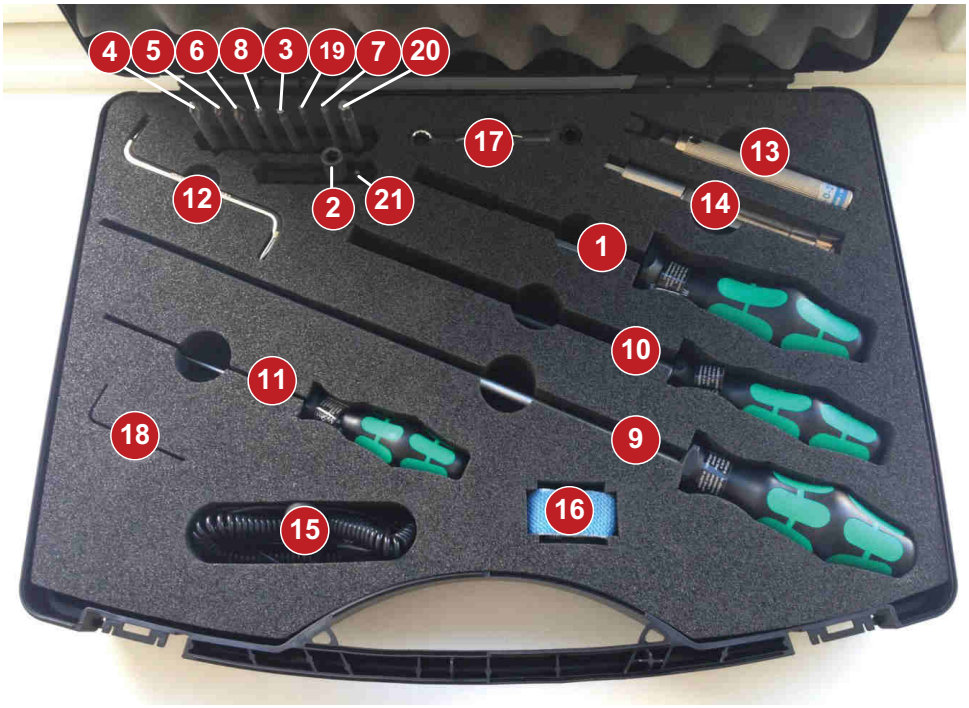

Fig. 10.3 Contents, Terma Tool Kit

1	Bit screwdriver	Handle for bits
2	Bit, Socket 5.5 mm	Interconnection board
3	Bit, Allen 3 mm	Cable support (Frame Assy)
4	Bit, PH2	Filter, CP4, PC Board
5	Bit, PZ1	Cover plate
6	Bit, PZ2	Blower
7	Bit, Torx T10 x 89	Interconnection board
8	Bit, Torx T20	External I/O, Frame Assy
9	Screwdriver, PH2 x 300 mm	PSU, RxTx, RxTx Control
10	Flexible screwdriver, 6 mm	WG Assy SSPA
11	Screwdriver, 3.5 x 100 mm	Sub-D connectors
12	Screwdriver, angled	D-Sub Connectors
13	Moment spanner, 1 Nm	SMA connectors
14	Extension, Moment spanner	SMA connectors
15	ESD cable	ESD protection
16	ESD bracelet	ESD protection
17	Ratchet for bits	Blower (crate) if present
18	Allen key, 2 mm	Blower
19	Bit, Torx T8 x 89	CP4
20	Bit, Allen, 5 mm x 89	(Antenna gearbox)
21	Bit, Torx T10 x 25	External I/O

10.2.4 Cable Marking

In general, when a module is removed from the transceiver it is always a good idea to note the positions where the cables are connected - specially if there is no marking on the cables.

All cables within the transceiver are marked. This means that it should be possible to find the position for each connector.

Marking of cables in the transceiver is shown below.

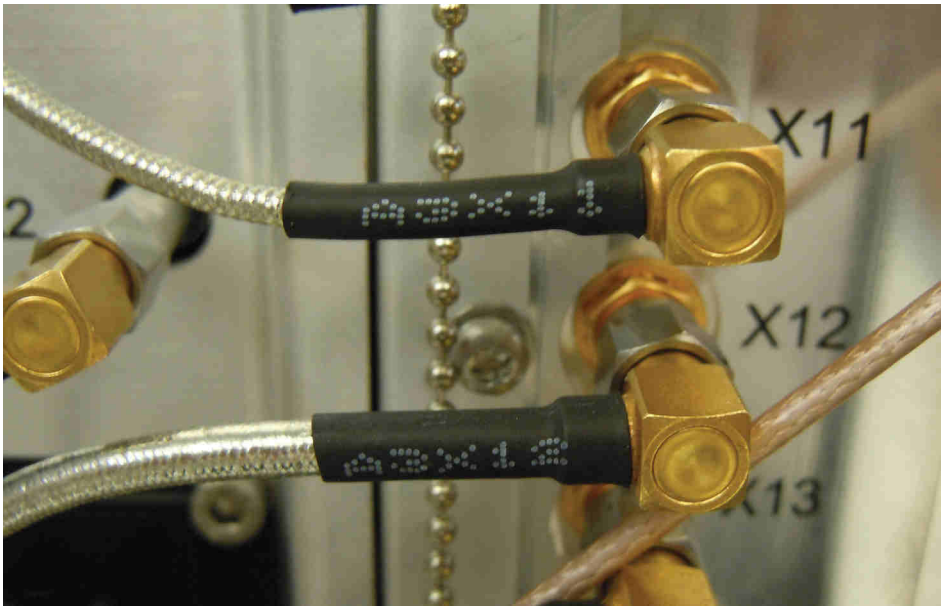

Fig. 10.4 Marking SMA (A3X11 and A3X12)

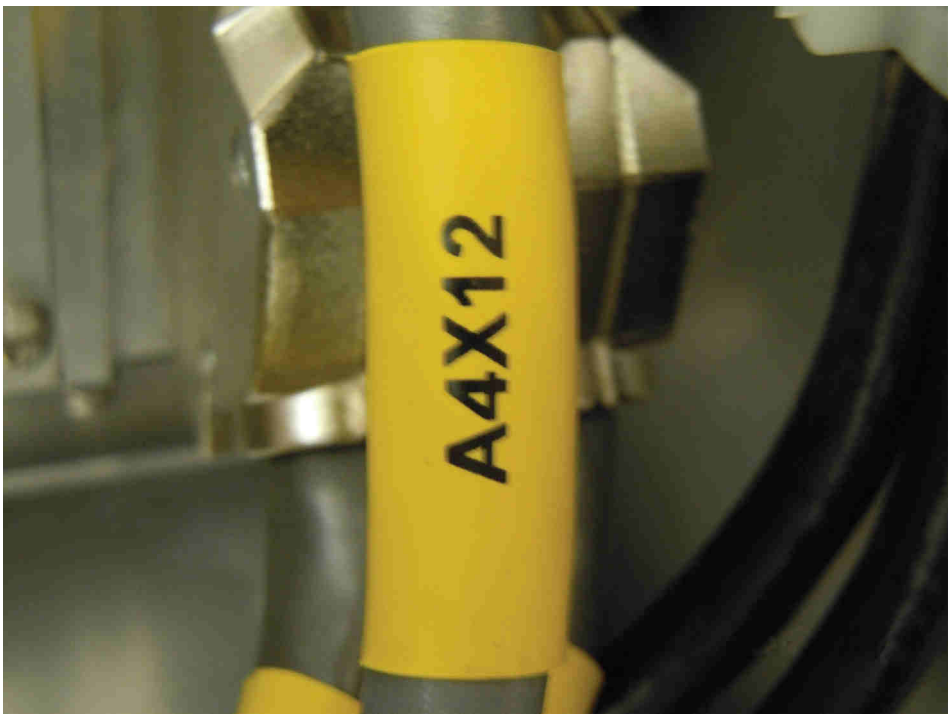

Fig. 10.5 Marking, other cables

The marking shows the module number, in this case A3 for the SMA connectors and A4 for the cable below. The subsequent X-number tells to which connector the cable shall be connected (X11 and X12 in first picture and X12 in the second picture.

Information about the module numbers is located on the inside of the front door (see Fig. 10.6 (p. 131)).

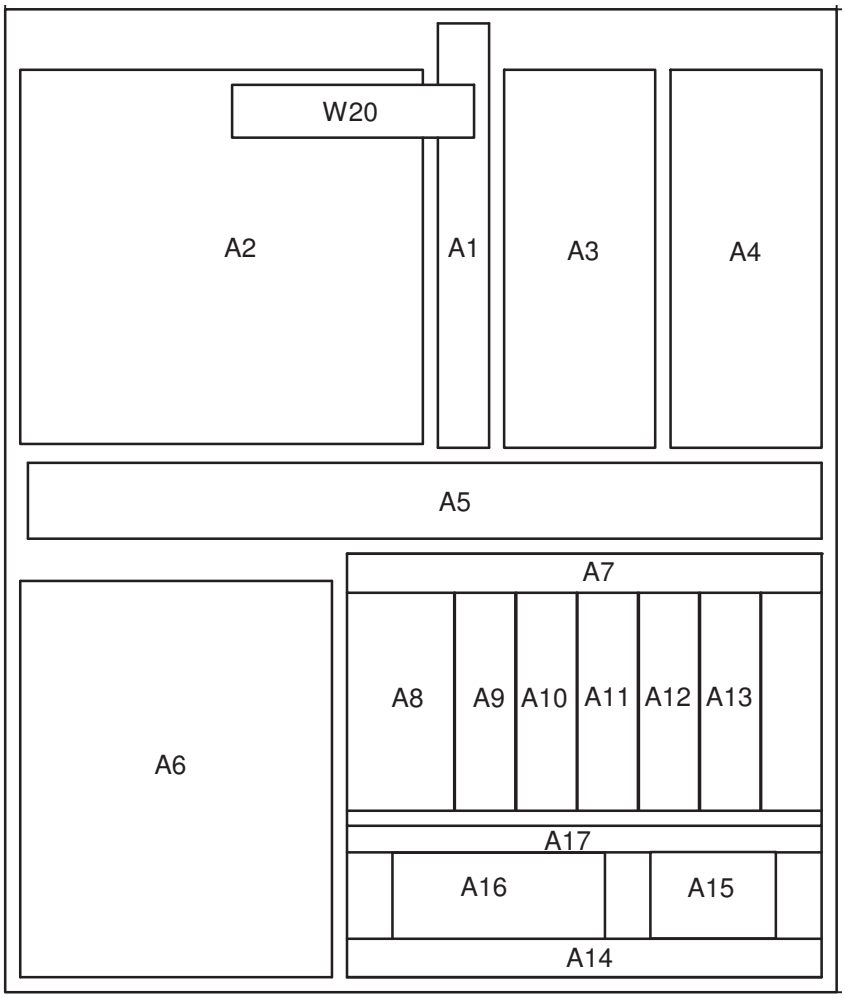

Fig. 10.6 Module numbers

10.3 Maintenance Tasks

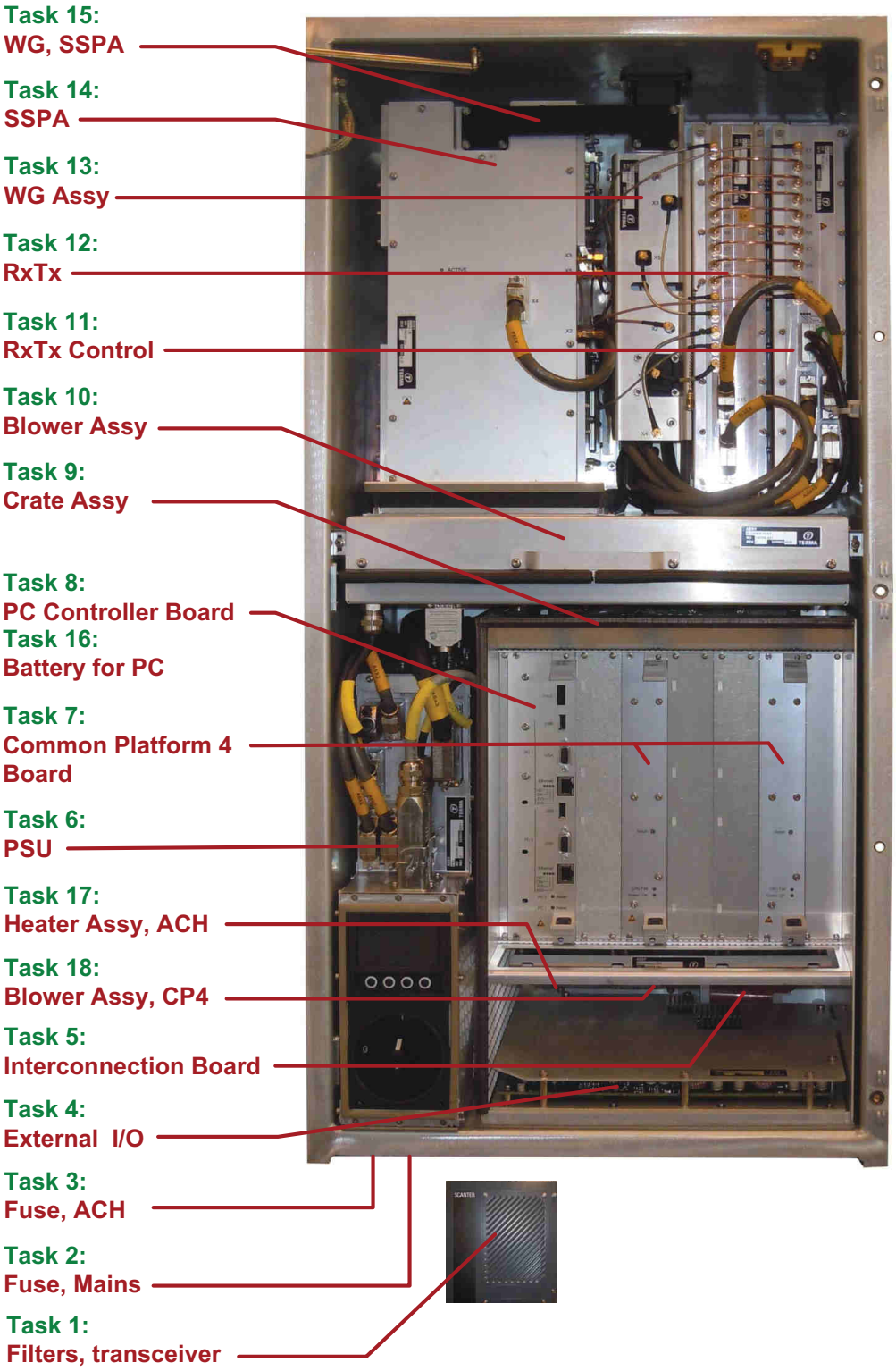

Fig. 10.7 Task overview, Preventive and corrective maintenance

10.3.1 ESD Protection

Always use ESD (Electrostatic Sensitive Device) precautionary procedures when handling ESD-marked transceiver modules as these contain components sensitive to damage by electrostatic discharge. Wear a wrist strap connected to the designated earth grounding point when handling unshielded electronics.

The location of the grounding point is shown in 10.8.

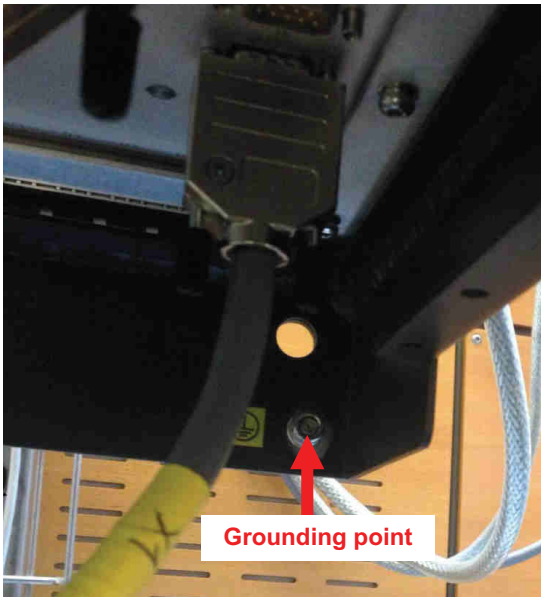

Fig. 10.8 Transceiver grounding point

10.3.2 Task 1: Replace Filters, Transceiver

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Screwdriver PH2 (tools 1/4 or 9) Vacuum cleaner / Brush
Spare parts / consumables:	2 pcs. Terma no. 524884-001 (Filter)

This task can be performed without shutting down the transceiver as all the work is done from outside.

The task is the same for both filters (air inlet and air outlet) - therefore only one of the filters is shown below.

1 Using tools 1/4 or tool 9 and/or fingers, unscrew the two screws holding the filter cover - see location of the screws on Fig. 10.9 (p. 134).

2 Remove the cover.

3 The filter appears as shown in Fig. 10.10 (p. 134). Check if it is clean. If positive, remount the cover and check the other filter.

4 If the filter is dusty, use a vacuum cleaner to remove the dust. Use the vacuum cleaner on the filter from the same side as the dust entered the filter.

5 Check for dust behind the filter (Fig. 10.11 (p. 134). If any, clean with the vacuum cleaner and a brush.

6 Mount the cover.

Fig. 10.9 Filter cover

Fig. 10.10 Filter

Fig. 10.11 Behind filter

10.3.3 Task 2: Replace Fuse, Mains

Refer to Fig. 10.7 (p. 132)

Tool requirements:	None
Spare parts / consumables:	Terma no. 307609-018 (Fuse 15 A, Fast, Cartridge)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Turn the cap of the fuse holder counter-clockwise and take out the fuse. See location of the fuse holder in Fig. 10.12 (p. 135).

4 Replace the blown fuse in the fuse holder with a new.

5 Insert fuse in the fuse holder, press the cap against the fuse holder and turn clockwise until it is tightened.

6 Turn on power to the transceiver using the power switch on the Power Supply Unit.

7 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

Fig. 10.12 Fuse, Mains

10.3.4 Task 3: Replace Fuse, ACH

Refer to Fig. 10.7 (p. 132)

Tool requirements:	None
Spare parts / consumables:	Terma no. 610376-019 (Fuse Time-lag, 6.3 A)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Turn the cap of the fuse holder counterclockwise and take out the fuse. See location of the fuse holder in Fig. 10.13 (p. 136)

4 Replace the blown fuse in the fuse holder with a new.

5 Insert fuse in the fuse holder, press the cap against the fuse holder and turn clockwise until it is tightened.

6 Turn on power to the transceiver using the power switch on the Power Supply Unit.

7 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

Fig. 10.13 Fuse, ACH

10.3.5 Task 4: Replace External I/O (A14)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Torx screwdriver T10 and T20 (tools 1/7/21 and 1/8) Socket wrench (tools 1/2)
Spare parts / consumables:	Terma no. 386270-00x (External I/O, A14)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove the Blower Assy CP4 as described in “Task 18: Replace Blower Assy, CP4” on page 162 (steps 3-4).

4 Remove all cables and connections from the External I/O at the bottom of the cabinet.

Mark all connector positions to ensure that they are correctly connected after replacement.

5 Remove the two screws holding the connector for the interconnection board to the motherboard - use Torx T10 (tools 1/7/21). Shown in Fig. 10.14 (p. 137).

Pull out the connector.

6 From the bottom of the cabinet, remove 12 Torx T20 screws holding the External I/O board (tools 1/8). The position of the screws is shown in Fig. 10.15 (p. 137).

Fig. 10.14 Connector

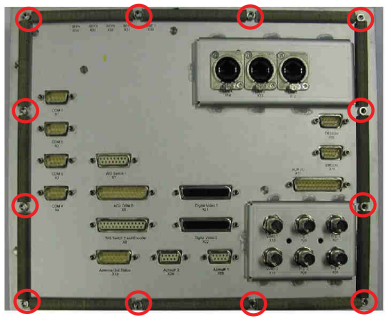

Fig. 10.15 12 screws

7 Lift the board, take it out and take it to an ESD-approved workstation.

8 Remove two screws and two nuts holding the connector and the support angle, respectively. See Fig. 10.16 (p. 138) - red circles indicate two screws on connector (tools 1/7), yellow circles indicate the two nuts holding the support angle (tools 1/2).

Move the interconnection board to the new External I/O and fasten the angle and the connector (tools 1/7 and 1/2).

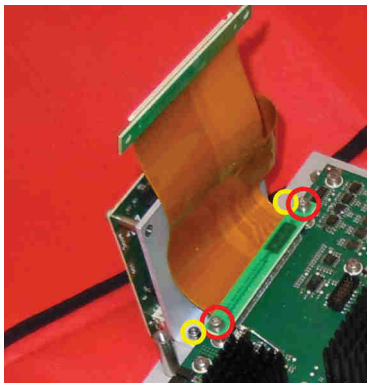

Fig. 10.16 Removal of board

9 Put the old External I/O in an antistatic bag.

10 Place the new External I/O board with the existing interconnection board and mount/tighten 12 screws at the bottom (tools 1/8).

11 Mount the connector of the interconnection board connector on the motherboard and fasten it with 2 Torx T10 screws (tools 1/7).

12 Re-establish all connections to the bottom of the External I/O board.

13 Mount the Blower Assy CP4 as described in “Task 18: Replace Blower Assy, CP4” on page 162 (steps 5-6).

14 Turn on power to the transceiver using the power switch on the Power Supply Unit.

15 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

16 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

10.3.6 Task 5: Replace Interconnection Board (A15)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Torx screwdriver T10 and T20 (tools 1/7 and 1/8) Socket wrench (tools 1/2)
Spare parts / consumables:	Terma no. 386275-00x (Interconnection, A15)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove the Blower Assy CP4 as described in “Task 18: Replace Blower Assy, CP4” on page 162 (steps 3-4).

4 Remove all cables and connections from the External I/O at the bottom of the cabinet.
Mark all connector positions to ensure that they are correctly connected after replacement.

5 Remove the two screws holding the connector for the interconnection board to the motherboard - use Torx T10 (tools 1/7).
Shown in Fig. 10.17 (p. 139).
Pull out the connector.

6 From the bottom of the cabinet, remove 12 Torx T20 screws holding the External I/O board (tools 1/8). The position of the screws is shown in Fig. 10.18 (p. 139).

Fig. 10.17 Connector

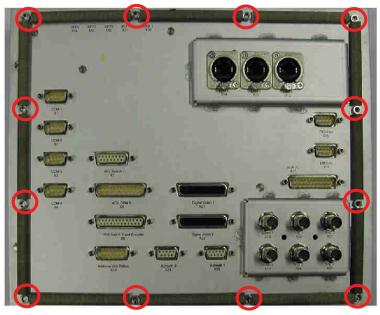

Fig. 10.18 12 screws

7 Lift the board, take it out and take it to an ESD-approved workstation.

8 Remove two screws and two nuts holding the connector and the support angle, respectively. See Fig. 10.19 (p. 140) - red circles indicate two screws on connector (tools 1/7), yellow circles indicate the two nuts holding the support angle (tools 1/2).

Mount the new interconnection board on the External I/O and fasten the angle and the connector (tools 1/7 and 1/2).

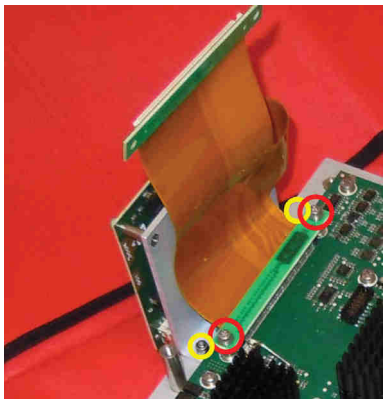

Fig. 10.19 Removal of board

9 Put the old module in an antistatic bag.

10 Place the External I/O board with the new interconnection board and mount/tighten 12 screws at the bottom (tools 1/8).

11 Mount the connector of the interconnection board connector on the motherboard and fasten it with 2 Torx T10 screws (tools 1/7).

12 Re-establish all connections to the bottom of the External I/O board.

13 Mount the Blower Assy CP4 as described in “Task 18: Replace Blower Assy, CP4” on page 162 (steps 5-6).

14 Turn on power to the transceiver using the power switch on the Power Supply Unit.

15 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

10.3.7 Task 6: Replace PSU (A6)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Screwdriver PH2 x 300 (tool 9) Screwdriver 3.5 x 100 (tool 11)
Spare parts / consumables:	Terma no. 386290-00x (Power Supply Unit, A6)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove all connections from the power supply unit (tool 11) - those indicated in Fig. 10.20 (p. 141) and the connector (if optional heater is present there might be two connectors) at the bottom as well. Check marking on cables.

Fig. 10.20 Connectors

4 Using tool 9, remove the screw fixing the PSU at the bottom (front). Indicated with a red arrow in Fig. 10.21 (p. 141).

5 Using tool 9, unscrew four captive screws - two are placed at the top of the unit, two are placed at the bottom with access through two holes at the bottom of the front plate. See Fig. 10.21 (p. 141).

6 Remove the Power Supply Unit - lift it before pulling out as the connectors and fuse holders should be free of the cut-out in the cabinet.

7 Place the new PSU.

8 Fasten all five screws.

9 Mount all connectors removed earlier.

10 Turn on power to the transceiver using the power switch on the Power Supply Unit.

11 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

12 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

Fig. 10.21 Screws

10.3.8 Task 7: Replace Common Platform 4 (CP4) Board (A9-A13)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Screwdriver PH2 (tools 1/4 or 9)
Spare parts / consumables:	Terma no. 386260-00x (Common Platform 4, A9-A13)

1 Using the Radar Service Tool, create a transceiver backup file. Use the Backup/Restore view.

Stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Using tools 1/4 or tool 9, loosen the screws in the upper and lower handle, marked with 1 in Fig. 10.22 (p. 142) - these two screws are fixing the module to the frame.

Release the two handles (upper handle and lower handle) by pushing the black button into the handle - marked as “2” in Fig. 10.22 (p. 142). While doing this simultaneously on the two handles, move the upper handle upwards and the lower handle downwards (“3”). This will pull the module out of the connector.

Now the module can be removed.

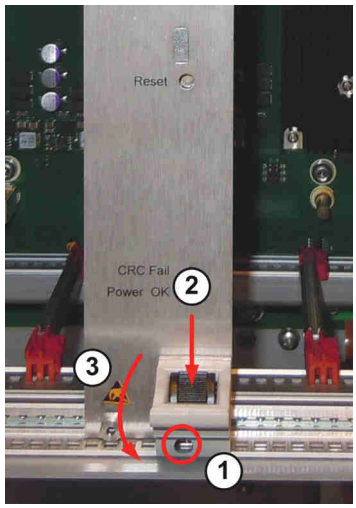

Fig. 10.22 Handle

4 Place the Common Platform 4 board in an antistatic bag.

5 Mount the new module in the slot - be sure to hit the upper and lower guide for proper mounting.

6 Keep the handles in the unlocked position until these reach the crate - press the two handles towards each other to move the module fully into the crate (until the connection is made on the motherboard).

7 Tighten the two screws fixing the module to the frame using tool 1/4 or tool 9.

8 Turn on power to the transceiver using the power switch on the Power Supply Unit.

The transceiver starts and automatically detects that the module needs SW. Uploading of SW to the module starts automatically and lasts several minutes. The upload of the module SW is completed when the transceiver front panel turns green.

To check the SW status of the module, open a browser window and enter the transceiver address followed by port number 8081:

http://__.__.__.__:8081/

User “admin” and password “admin”.

The firmware status is found in “Operation/BITE/Status/FPGA Firmware Status” and the status is expected to show “OK”.

NOTE:

If the firmware status of the module is not “OK”, then execute a manual module update (flash):

Open ”Debug” view using RST and choose the ”Force Platform Flash Update” menu.

Select “Update to Production Firmware” and click “OK”

Flashing of the system starts. When completed, a message appears in the same window. Restart the transceiver.

Check the SW status of the module in “Operation/BITE/Status/FPGA Firmware Status”.

9 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

10.3.9 Task 8: Replace PC Controller Board (A8)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Screwdriver PH2 (tools 1/4 or 9)
Spare parts / consumables:	Terma no. 386285-00x (PC Controller Board, A8)

1 Using the Radar Service Tool, create a transceiver backup file. Use the Backup/Restore view.

Stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Using tools 1/4 or tool 9. loosen the screws in the upper and lower handle, marked with 1 in Fig. 10.23 (p. 144) - these two screws are fixing the module to the frame.

Release the two handles (upper handle and lower handle) by pushing the black button into the handle - marked as “2” in Fig. 10.23 (p. 144). While doing this simultaneously on the two handles, move the upper handle upwards and the lower handle downwards (“3”). This will pull the module out of the connector.

Now the module can be removed.

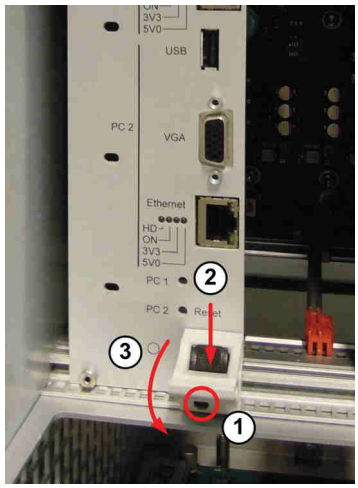

Fig. 10.23 Handle

4 Place the PC Controller Board in an antistatic bag.

5 Mount the new module in the slot - be sure to hit the upper and lower guide for proper mounting.

6 Keep the handles in the unlocked position until they reach the crate - press the two handles towards each other to move the module fully into the crate (until the connection is made on the motherboard).

7 Tighten the two screws fixing the module to the frame using tools 1/4 or tool 9.

8 Turn on power to the transceiver using the power switch on the Power Supply Unit. Wait for the booting of the PC to end.

9 Using the default IP address for the transceiver (this is determined by the controller board), switch “Mains On” by means of the Radar Service Tool.

10 Using Radar Service Tool, restore full back-up. Settings and IP addresses are now changed to usual values.

11 If needed, select antenna rotation, Tx and profile etc.

12 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

10.3.10 Task 9: Replace Crate Assy (A7)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Torx T10 and T20 screwdriver (tools 1/8 and 1/7) Screwdriver PZ2 (tools 1/6) Screwdriver PZ2 (tools 1/5) Screwdriver PH2 (tools 1/4 or tool 9) Screwdriver Allen 3 mm (tools 1/3) Screwdriver, angled (tool 12) Screwdriver, 3.5 x 100 mm (tool 11)
Spare parts / consumables:	Terma no. 386265-00x (Crate Assy, A7)

The Crate Assy is carrying Motherboard, External I/O, Interconnection board and three cables connecting to the PSU. The motherboard is part of the Crate Assy while the External I/O and the Interconnection board are both separate LRUs. Therefore, the External I/O, the Interconnection board (mounted on the External I/O) and the three cables have to be dismounted from the Crate Assy.

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove the External I/O according to the description in “Task 4: Replace External I/O (A14)” on page 137, but let the Interconnection board remain on the External I/O as both have to be mounted in the new Crate Assy.

4 Remove the Blower Assy according to the description in Task 10.

5 Remove PC Controller Board and Common Platform Boards as necessary to get access to the screws behind these modules according to respective tasks, 8 and 7. Antistatic bags!!

6 Using screwdriver (tools 1/5), loosen 10 captive screws/washers fixing the Crate Assy to the back plate.
The location of these is shown with red circles in Fig. 10.24 (p. 146). The two upper screws (dotted red circles) are accessible above the Crate Assy (marked with red circles in Fig. 10.25 (p. 147)).

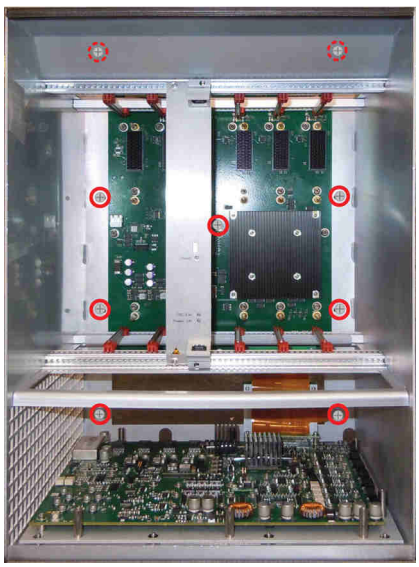

Fig. 10.24 Screws

7 Unplug X2, X3 and X4 on the PSU. These three cables are connecting to the Crate Assy. If the screws are tightened too hard, use tool 11.

8 Using Allen 3 mm screwdriver (tools 1/3), remove 5 screws and washers holding two cable supports - shown with yellow circles in Fig. 10.25 (p. 147). Remove the two cable supports.

The Crate Assy can now be moved a little outwards (only kept in place now by two cables).

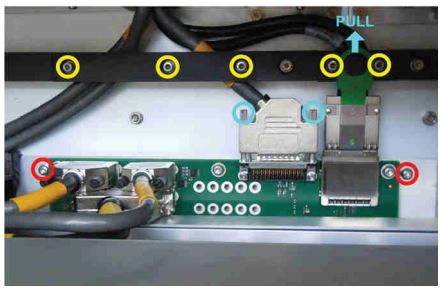

Fig. 10.25 Support and cables

9 Referring to Fig. 10.25 (p. 147), pull the green ring upwards on the rightmost connector to release it from the Motherboard (light blue arrow).

On the leftmost connector loosen the two screws (shown with light blue circles) to release it from the Motherboard. If too tight to loosen them with the fingers, use the angled screwdriver (tool 12).

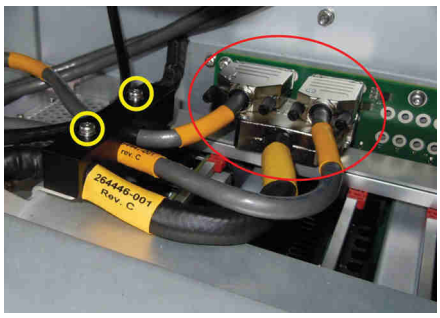

Fig. 10.26 Support, connectors

10 Take out the Crate Assy. Remove the cable support using Torx T20 screwdriver (tools 1/8) to remove two screws as indicated with yellow circles in Fig. 10.26 (p. 147). Disconnect the three connectors within the red ellipse in Fig. 10.26 (p. 147) and remove the three cables.

Re-establish the cable support without cables going through it.

11 Connect the three cables on the new Crate Assy and fix them with the cable support (Fig. 10.26 (p. 147)). Place the new Crate Assy in RxTx.

12 Mount the connectors removed in step 9 and mount the cable supports removed in step 8 (Fig. 10.25 (p. 147)).

13 Connect X2, X3 and X4 on the PSU.

14 Fix the Crate Assy with the ten screws (step 6).

15 Replace the PC Controller Board and the CP4 Boards.

16 Mount the Blower Assy and connect to PSU.

17 Mount the External I/O and Interconnection board and re-establish all connections at the bottom of the cabinet.

18 Turn on power to the transceiver using the power switch on the Power Supply Unit.

19 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

10.3.11 Task 10: Replace Blower Assy (A5)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Screwdriver, PH2 (tools 1/4 or 9) Screwdriver, 3.5 x 100 (tool 11) Allen Key, 2 mm (tool 18)
Spare parts / consumables:	Terma no. 386298-00x (Blower Assy, A5)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 On the power supply unit, remove the connection to the blower assy (A5X2) - the location of the connector is shown in Fig. 10.27 (p. 148). Use tool 11 if the screw is tightened too hard.

4 On left and right side of the Blower Assy, two pointed screws are fastening the Blower Assy in place. See Fig. 10.28 (p. 148).

Remove the two screws using tool 18 out the Blower Assy together with its cable.

Fig. 10.27 Connector

5 Slide in the new unit - a horizontal slot in left and right side will guide the assy. Make sure that the cable follows the unit in.

6 Secure its position by mounting angles and screws in each side.


Fig. 10.28 Screws

7 Mount the connector on the power supply unit.

8 Turn on power to the transceiver using the power switch on the Power Supply Unit.

9 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

10 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

10.3.12 Task 11: Replace RxTx Control (A4)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Moment spanner, 1 Nm (tool 13) Extension, moment spanner (tool 14) Screwdriver PH2 x 300 (tool 9) Screwdriver 3.5 x 100 (tool 11)
Spare parts / consumables:	Terma no. 386222-00x (RxTx Control, A4)

1 Using the Radar Service Tool, create a transceiver backup file. Use the Backup/Restore view.

Stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 On RxTx Control, loosen all SMA connectors (X1 - X10) using tools 13/14, four D-Sub connectors (X12, X13, X14, X15) using tool 11 and one PCIe connector (X11) as indicated on the RxTx Control module with red circles and ellipses - see Fig. 10.29 (p. 149).

The PCIe connector is unplugged by pulling outwards in the green plastic ring on the side of the connector.

Avoid bending the semi-rigid cables!!

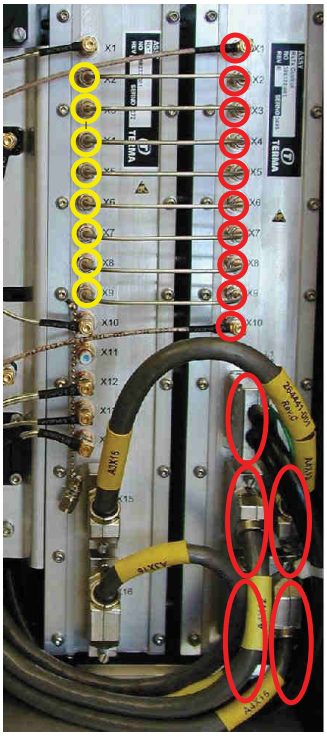

Fig. 10.29 Connectors

4 On the RxTx to the left of the RxTx Control, loosen SMA connectors X2 - X9 to remove or turn the semi-rigid cables so the RxTx Control can be pulled out without any obstructions - use tools 13/14. Indicated with yellow circles in Fig. 10.29 (p. 149).

5 Loosen the 4 captive screws holding the RxTx Control to the back of the cabinet (tool 9).
2 screws are located at the top and 2 screws are located at the bottom as indicated in Fig. 10.30 (p. 150).

6 Take out the RxTx Control module and put it in an antistatic bag.

7 Mount the new RxTx Control module and fasten it with the 4 captive screws loosened in step 5 using tool 9.

8 Mount and tighten all SMA connectors (X1 - X10) using tools 13/14.
Mount four D-Sub connectors (X12, X13, X14, X15) using tool 11 and mount one PCIe connector (X11) by simply pushing it into the connector.

9 On the RxTx, tighten SMA connectors X2 - X9 using tools 13/14.

10 Turn on power to the transceiver using the power switch on the Power Supply Unit.

The transceiver starts and automatically detects that the module needs SW. Uploading of SW to the module starts automatically and lasts several minutes. The upload of the module SW is completed when the transceiver front panel turns green.

To check the SW status of the module, open a browser window and enter the transceiver address followed by port number 8081:

http://__.__.__.__:8081/

User “admin” and password “admin”.

The firmware status is found in “Operation/ BITE/Status/FPGA Firmware Status” and the status is expected to show “OK”

NOTE: If the firmware status of the module is not “OK”, then execute a manual module update (flash):

Open ”Debug” view using RST and choose the ”Force Platform Flash Update” menu.

Select “Update to Production Firmware” and click “OK”

Flashing of the system starts. When completed, a message appears in the same window. Restart the transceiver.

Check the SW status of the module in “Operation/BITE/Status/FPGA Firmware Status”.

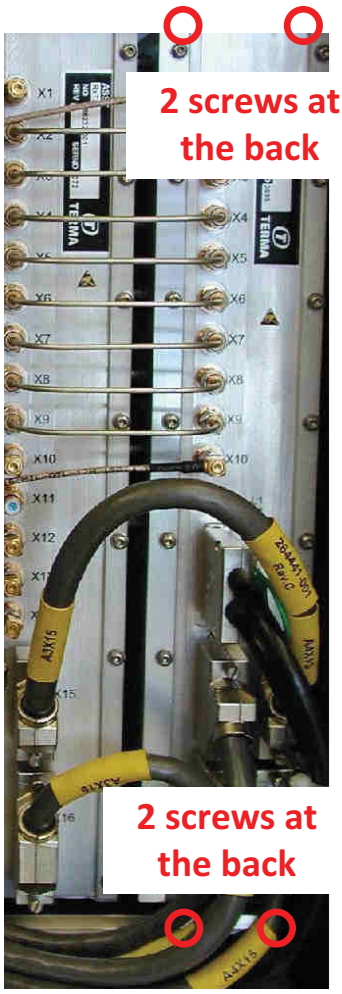

Fig. 10.30 Screws

11 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

12 Make a PSAT calibration of the SSPA. (For details on the procedure, see 12.3 (p. 167).

13 To enter HW module information (Assy number, serial number, etc.), follow the steps listed in 8.6.5 (p. 117).

10.3.13 Task 12: Replace RxTx (A3)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Moment spanner, 1 Nm (tool 13) Extension, moment spanner (tool 14) Screwdriver PH2 x 300 (tool 9) Screwdriver 3.5 x 100 (tool 11)
Spare parts / consumables:	Terma no. 386232-00x (RxTx, A3)

1 Using the Radar Service Tool, create a transceiver backup file. Use the Backup/Restore view.

Stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Loosen X6 on the Waveguide Assy and X14 on RxTx using tools 13/14 and remove the small cable.
Mount the termination on X14 (this is attached to the RxTx with a chain).

To avoid damage of the RxTx, it is important to mount the termination as the X14 input has a very high impedance. See Fig. 10.32 (p. 151).

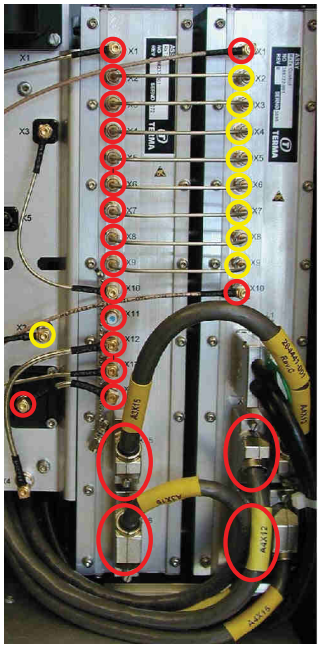

Fig. 10.31 Connectors

4 On RxTx, loosen all SMA connectors (X1 - X14) using tools 13/14 and two D-Sub connectors (X15 - X16) using tool 11 as indicated on the RxTx module with red circles and ellipses - see Fig. 10.31 (p. 151).

Avoid bending the semi-rigid cables!!

5 On the RxTx Control, loosen and remove SMA connectors X1 and X10 and D-Sub connectors X12 and X14 as these might obstruct free passage for the RxTx when pulled out.

Fig. 10.32 Termination

6 On the RxTx Control loosen SMA connectors X2 - X9 to remove or turn the semi-rigid cables allowing the RxTx to be pulled out (yellow circles in Fig. 10.31 (p. 151)).

7 On the Waveguide Assy loosen X2 (only loosen slightly), so the cable can be turned away from RxTx.

8 Loosen the 4 captive screws holding the RxTx to the back of the cabinet.

2 screws at the top and 2 screws at the bottom as indicated in Fig. 10.33 (p. 152). Use tool 9.

9 Take out the RxTx module.

10 Mount the new RxTx module and fasten it with the 4 captive screws loosened in step 8 - use tool 9.

11 On the RxTx Control, mount and tighten SMA connectors X1, X10 and D-Sub connectors X12 and X14. Use tools 13/14 and tool 11, respectively.

12 On the Waveguide Assy tighten X2 using tools 13/14.

13 Dismount the termination from X14 on the RxTx module and mount the small cable from Waveguide Assy X6 to RxTx X14. Use tools 13/14 to tighten.

14 On RxTx, mount and tighten all remaining SMA connectors (X1 - X13) and two D-Sub connectors (X15 - X16).

Use tools 13/14 and 11, respectively.

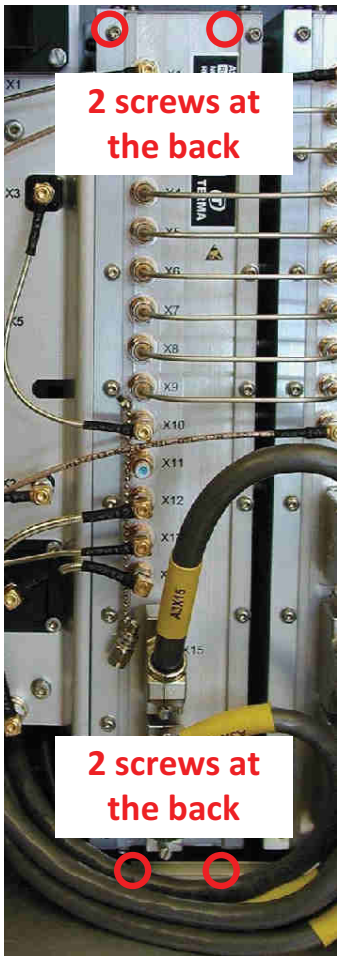

Fig. 10.33 Screws

15 On the RxTx Control, tighten SMA connectors X2 - X9 using tool 13/14.

16 Turn on power to the transceiver using the power switch on the Power Supply Unit.

The transceiver starts and automatically detects that the module needs SW. Uploading of SW to the module starts automatically and lasts several minutes. The upload of the module SW is completed when the transceiver front panel turns green.

To check the SW status of the module, open a browser window and enter the transceiver address followed by port number 8081:

http://__.__.__.__:8081/

User “admin” and password “admin”.

The firmware status is found in “Operation/BITE/Status/FPGA Firmware Status” and the status is expected to show “OK”

NOTE:

If the firmware status of the module is not “OK”, then execute a manual module update (flash):

Open ”Debug” view using RST and choose the ”Force Platform Flash Update” menu.

Select “Update to Production Firmware” and click “OK”

Flashing of the system starts. When completed, a message appears in the same window. Restart the transceiver.

Check the SW status of the module in “Operation/BITE/Status/FPGA Firmware Status”.

17 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

18 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

19 Make a PSAT calibration. For details, see 12.3 (p. 167).

10.3.14 Task 13: Replace Waveguide Assy (A1)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Screwdriver, PH2 (tool 9) Screwdriver PZ2 (tools 1/6) Moment spanner, 1 Nm (tool 13) Extension, moment spanner (tool 14) Flexible screwdriver, 6 mm (tool 10)
Spare parts / consumables:	Terma no. 386240-00x (Waveguide Assy, A1) 1 pc. Cable strap, Terma no. 201197-010

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove Waveguide SSPA according to Task 15. Use tool 10.

It might not be necessary to remove more units, but to have more space, the Blower Assy and the SSPA can be removed. In this case, execute step 4 and 5 or continue with step 6.

(4) Remove Blower Assy according to Task 10.

(5) Remove SSPA according to Task 14.

6 Using tool 13/14, loosen and remove all SMA connectors from the waveguide assy (X3, X2, X6 and X4) together with X14 on RxTx (and remove the small cable).
All these connections to be removed are shown with red circles on Fig. 10.34 (p. 154).

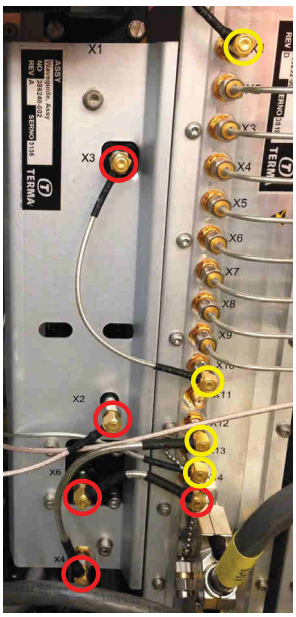

Fig. 10.34 Connectors

7 Mount the termination on X14 on RxTx. The termination is attached to RxTx with a chain. See Fig. 10.35 (p. 155).

Fig. 10.35 Termination

To avoid damage of the RxTx, it is important to mount the termination as the X14 input has a very high impedance. See Fig. 10.35 (p. 155).

8 Loosen SMA connectors on RxTx marked with a yellow circle (X1, X10, X12, and X13) - see Fig. 10.34 (p. 154) and turn the cables upwards or downwards so the waveguide assy has free passage when it is taken out. For doing this the connectors should be loosened just a little bit. Use tools 13/14.

9 In the cable tray at the bottom of the Waveguide Assy, cut the cable strap holding the cables to the assy. See Fig. 10.36 (p. 155).

10 Remove the waveguide connector coming from the installation to get acces to the top flange of the Waveguide Assy. Using tools 1/6, loosen and remove the four screws holding the top flange. See Fig. 10.37 (p. 155).

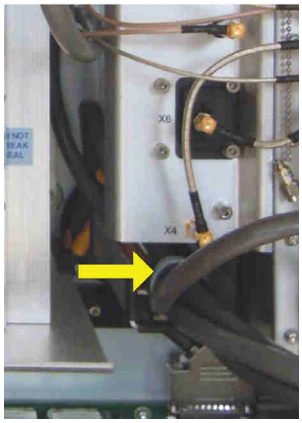
Fig. 10.36 Cable strap

11 Loosen the four screws fixing the Waveguide Assy to the back - see Fig. 10.38 (p. 156). The two lower screws are accessible through the cable tray at the bottom - the two upper screws are accessible through the two slots on the front plate indicated in Fig. 10.39 (p. 156). All four screws are captive. Use tool 9.

12 Pull old unit downwards and out and place the new - ensure that the top flange is guided properly through the circular cut-out in the top of the cabinet.

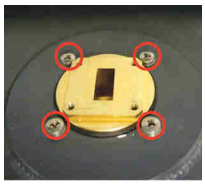
Fig. 10.37 Top flange

13 Mount and tighten the four screws holding the top flange to the cabinet (tools 1/6) and mount the waveguide connector. Check that the O-ring is placed correctly.

14 Tighten the four screws holding the unit to the back (tool 9).

15 Mount a new cable strap to fix the cables to the cable tray at the bottom of the assy.

16 Mount and tighten the connectors X3, X2 and X4 (tools 13/14).
Remove the termination on RxTx X14 and mount the small cable between X6 (Waveguide Assy) and X14 (RxTx) and tighten (tools 13/14).
Tighten connectors X1, X10, X12 and X13 on the RxTx (tools 13/14).

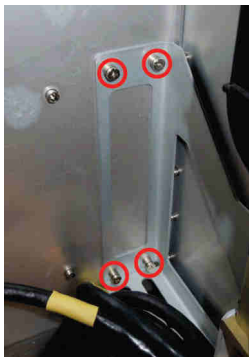

Fig. 10.38 4 screws

17 Mount SSPA and Blower Assy according to Task 14 and 10, respectively, if these have been removed.

18 Mount Waveguide SSPA according to Task 15.

19 Turn on power on the mains switch on the PSU.

20 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

21 To enter HW module information (Assy number, serial number etc.), follow the steps listed in 8.6.5 (p. 117).

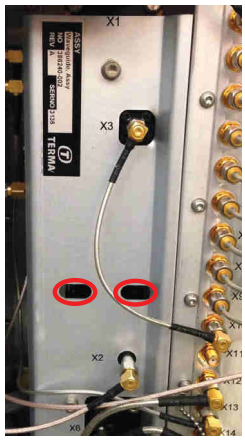

Fig. 10.39 Two slots

10.3.15 Task 14: Replace SSPA (A2)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Screwdriver, PH2 (tool 9) Moment spanner, 1 Nm (tool 13) Screwdriver, 3.5 x 100 (tool 11)
Spare parts / consumables:	Terma no. 386250-002 (SSPA, Long Range, A2)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove Waveguide SSPA according to Task 15.

4 Remove Blower Assy according to Task 10.

5 Unscrew and unplug D-Sub connector X4 using tool 11.
Unscrew and unplug the three SMA connectors X2, X3 and X5 using tool 13.
See Fig. 10.40 (p. 157).

X2 connects to RxTx, X1
X3 connects to RxTx, X13
X5 connects to RxTx Control, X10

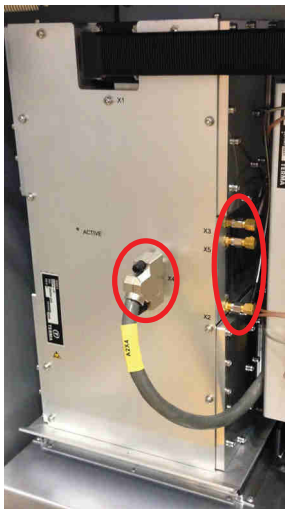

Fig. 10.40 Connectors

6 On the PSU, unplug the Harting connector supplying the SSPA. See Fig. 10.41 (p. 157).

7 The SSPA module is fixed to the cabinet with eight screws, four to the left and four to the right. The left side screws of the SSPA is shown in Fig. 10.42 (p. 158) and the right side is equal to the left side. The screws in red circles must be loosened totally, while the screw in yellow circle should be left untouched.

Using tool 9, loosen the screws according to the above mentioned and let the SSPA hang in the “yellow” screw.

Lift the SSPA module and take it out.

Fig. 10.41 SSPA supply

8 Mount the new unit - fasten it to the back with all eight screws.

9 Mount the Harting connector in the PSU.

10 Mount the D-Sub connector (X4) and three SMA connectors (X2, X3 and X5).

11 Mount the Blower Assy according to Task 10.

12 Mount the Waveguide SSPA according to Task 15.

13 Turn on power on the mains switch on the PSU.

14 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile)

15 Make a PSAT calibration. For details, see 12.3 (p. 167).

Fig. 10.42 6 screws

10.3.16 Task 15: Replace Waveguide, SSPA

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Flexible screwdriver, 6 mm (tool 10)
Spare parts / consumables:	Terma no. 524894-00x (Waveguide, SSPA)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Remove eight screws holding the waveguide assembly and remove it. Use tool 10.
See Fig. 10.43 (p. 159)

4 Mount the new waveguide assembly, mount and tighten the eight screws using tool 10.

5 Turn on power to the transceiver using the power switch on the Power Supply Unit.

6 Switch “Mains On” by means of the Radar Service Tool (if needed, select antenna rotation, Tx and profile).

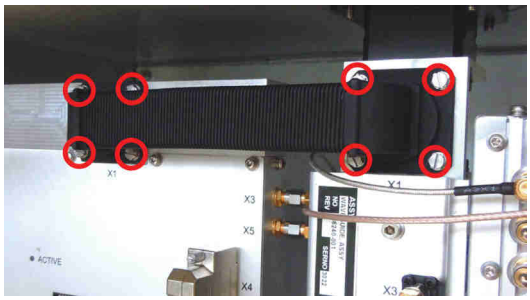

Fig. 10.43 WG SSPA, screws

10.3.17 Task 16: Replace Battery, PC Controller Board (A8)

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Screwdriver PH2 (tool 9)
Spare parts / consumables:	Terma no. 519886-001 (battery, lithium) Terma no. 201197-049 (cable strap, Ø20 x 2.5)

The battery needs to be replaced after 7 years. A BITE warning will indicated need to replace battery

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Take out the PC Controller Board according to Task no. 8 and place it on an ESD-approved workstation.

4 Locate the green, cylindrical battery fastened to the PCB with a cable strap.
See Fig. 10.45 (p. 160).

5 Cut the strap fixing the battery to the PCB, disconnect the red/black wire from the connector and remove the battery.

6 Place the new battery in same position as the old battery and fix it with a cable strap - cut the strap where necessary.

7 Connect the red/black wire to the connector.

8 Mount the PC Controller Board in the crate according to Task 8.

9 Turn on power to the transceiver using the power switch on the Power Supply Unit.

10 Switch “Mains On” by means of the Radar Service Tool.

Fig. 10.44 PC Board

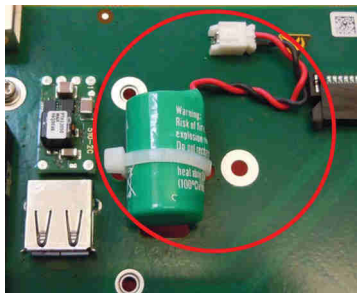

Fig. 10.45 Battery

11 Set up date and time in the operational system.

12 If needed, select antenna rotation, Tx and profile.

10.3.18 Task 17: Replace Heater Assy, ACH

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	ESD protection (tools 15/16) Screwdriver PH2 (tool 9)
Spare parts / consumables:	Terma no. 386277-00x (Heater Assy, ACH) Terma no. 201197-010, Cable strap, 3 pcs.

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Take out the PC Controller Board according to Task no. 8 and store it in an antistatic bag. Remember ESD protection (bracelet).

4 Cut the cable straps holding the heater cable to the Crate Assy (left side of the Crate Assy).

5 Disconnect the heater cable from X9 on the PSU. See Fig. 10.46 (p. 161).

Fig. 10.46 Disconnect

6 Remove Blower Assy, CP4 according to “Task 18: Replace Blower Assy, CP4” on page 162.

7 Remove External I/O according to Task no. 4 - do not remove Interconnection board from the unit.

8 Using tool 9, remove four screws holding the Heater Assy - indicated in Fig. 10.47 (p. 161) and take it out while drawing the cable through the Crate Assy.

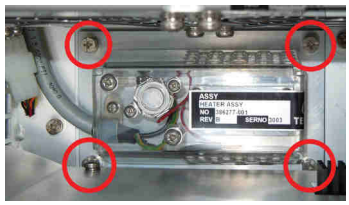

Fig. 10.47 Heater, screws

9 Mount the new heater with the four screws, fasten the cable to the Crate Assy with cable straps and re-establish the connection to the PSU (X9).

10 Mount the External I/O including the Interconnection board according to Task no. 4.

11 Mount the PC Controller Board in the crate according to Task 8. ESD protection!

12 Turn on power to the transceiver using the power switch on the PSU.

13 Switch “Mains On” by means of the Radar Service Tool.

14 If needed, select antenna rotation, Tx and profile.

10.3.19 Task 18: Replace Blower Assy, CP4

Refer to Fig. 10.3 (p. 128) and Fig. 10.7 (p. 132)

Tool requirements:	Ratchet and bit Torx T10 (tools 17/7/19)
Spare parts / consumables:	Terma no. 386268-00x (Blower Assy, CP4, A17)

1 Using the Radar Service Tool, stop antenna rotation (if active) and switch “Mains Off”.

2 Turn off power to the transceiver using the power switch on the Power Supply Unit.

3 Disconnect the connection to the blower assy. The connector is to the left of the blower assy. See Fig. 10.48 (p. 162).

4 Using tool 17, rachet and tool 7/21, Torx T10, remove the four screws holding the blower assy (the four screws which are holding the assy to four spacers). See the location of the four screws on Fig. 10.49 (p. 162).

5 Mount the new Blower Assy with the four screws.

6 Re-establish the connection to the blower.

7 Turn on power to the transceiver using the power switch on the Power Supply Unit.

8 Switch “Mains On” by means of the Radar Service Tool.

9 If needed, select antenna rotation, Tx and profile.

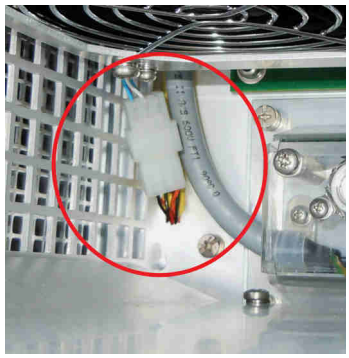

Fig. 10.48 Connector

Fig. 10.49 Screws, 4 pcs.

11 Installation Racks

Installation racks are available for LSAS and/or systems with IFF antenna. The racks function as housing of LSAP controller (CEU), IFF interrogator and transponder, Service Display PC, power unit, server and other equipment.

Installation racks are available in various sizes (height units) and may be configured to the individual customer.

Please contact Terma for details.

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12 Transceiver Adjustments

12.1 Antenna Correction and Range Adjustment

Correction of the antenna must be carried out at installation or after replacement of the encoder.

Range adjustment must be carried out at installation or if the waveguide has been moved or replaced.

1	In the “Video Setup” view, set the RST measurement units to correspond to the available target data.
2	Set the “Antenna Correction” parameter to zero. (Configuration/Interfaces/Antenna)
3	Set “Range Adjust” parameter to zero. (Configuration/Interfaces/Antenna)
4	Locate a uniform, non-moving, small and stable target at a long range with a known range/bearing or GPS. Use the EBL/VRM tool to show the target on the VRM scope and measure the exact bearing. See Fig. 12.1 (p. 165) GPS positions can be converted to range and bearing from e.g. http://www.gpsvisualizer.com/calculators
5	Calculate and set the “Antenna Correction” parameter (bearing correction). Antenna correction = 360° – Measured bearing + Actual bearing
6	Watch the PPI and inspect correct bearing to target, fine adjust if required.
7	Measure the exact distance to the target. Calculate and set the “Range Adjust” parameter. Range adjust = Antenna range – Actual range
8	Watch the PPI and inspect correct range to target, fine adjust as required.

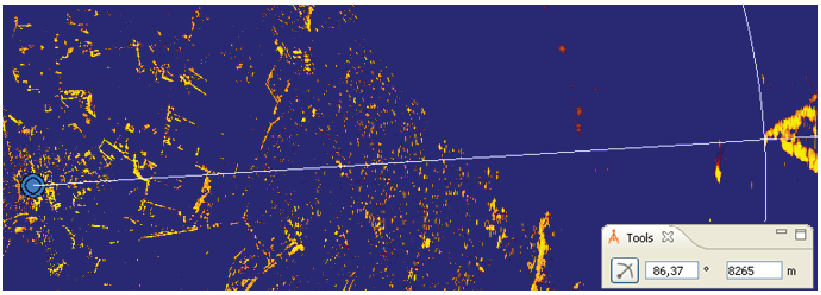

Fig. 12.1 Range and antenna correction

12.2 Antenna Squint Calibration

Antenna squint calibration must be performed if the antenna system is replaced. The purpose of the calibration is to adjust the transmission offset angle as a function of signal frequency.

1	In the “Parameters” view, set the parameter “Burst TMFD Sequence Length” to 6. (Configuration/RxTx/Timing Calculation/Input)
2	Set the “Squint Calibration” parameter to “On”. (Service and Installation/Squint Calibration)
3	Set the ”Frequency Selection” parameter to “f0” (The first of 6 frequencies). (Service and Installation/Squint Calibration)
4	Locate a uniform, non-moving, small and stable target at a long range and use the EBL/VRM tool to show the target on the “VRM-scope” view. Zoom the scope in to cover 3-4 deg. in azimuth.
5	Place the EBL exactly on the centre of the target and then press the “Hold” icon (H) to be found inside the view, topmost right corner.
6	Set the “Squint Calibration Options” parameter to “Store data set”. (Service and Installation/Squint Calibration)
7	Set the ”Frequency Selection” parameter to the next frequency (f1 - f5). (Service and Installation/Squint Calibration)
8	Adjust the “Antenna Correction” parameter until the target max. amplitude is directly on the previously max. amplitude from step 5. Higher correction value moves target to the right in the EBL scope. See Fig. 12.2 (p. 167). (Configuration/Interfaces/Antenna/)
9	Set the “Squint Calibration Options” parameter to “Store data set”. (Service and Installation/Squint Calibration)
10	Repeat from step 7 until data sets from all 6 frequencies (f0 – f5) have been stored.
11	Set “Squint Calibration Options” parameter to “Calculate Coefficients” (if available). (Service and Installation/Squint Calibration)
12	Set “Squint Calibration” to “Off”. (Service and Installation/Squint Calibration)
13	Watch the PPI and inspect all frequencies correctly aligned.

14	Reset the “Burst TMFD Sequence Length” to previous value (default 4).
16	Set “Squint Calibration” to “Off”.

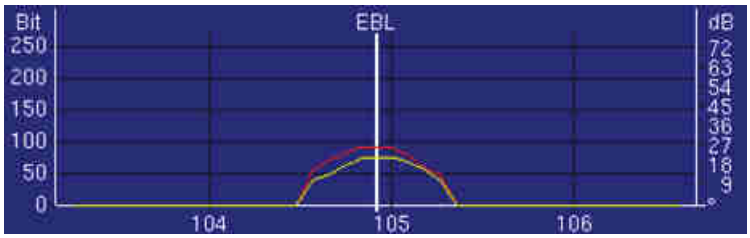

Fig. 12.2 Aligned antenna correction seen in the EBL scope of the first and second frequency, during squint calibration

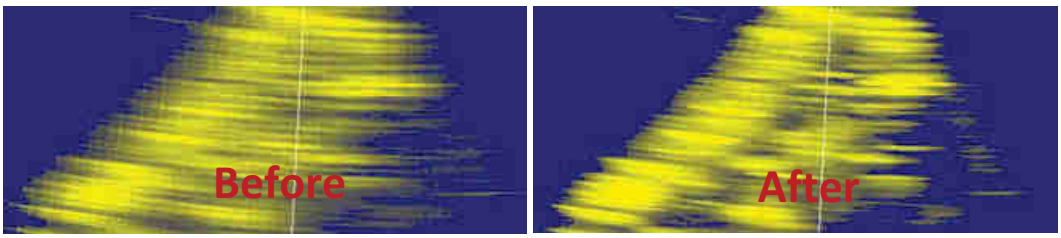

Fig. 12.3 Example of two frequencies before and after squint calibration

12.3 PSAT Calibration

The purpose of this calibration is to avoid amplifier saturation while achieving highest output power possible.

This procedure must be carried out after replacing the SSPA, the RxTx control or the RxTx. A “PSAT not calibrated” message is displayed in the RST “Errors/Warnings” view.

Once the PSAT calibration is started, all Carrier Frequency Scale Factors are set to 0%. The transceiver will then adjust all 6 carriers automatically one by one. This might take a few minutes. When calibration is completed, the error message “PSAT not calibrated” disappears from the RST “Errors/Warnings” view.

The scale factors are normally used for all 16 transceiver profiles. However, the transceiver SW is flexible and allows for different settings in the profiles.

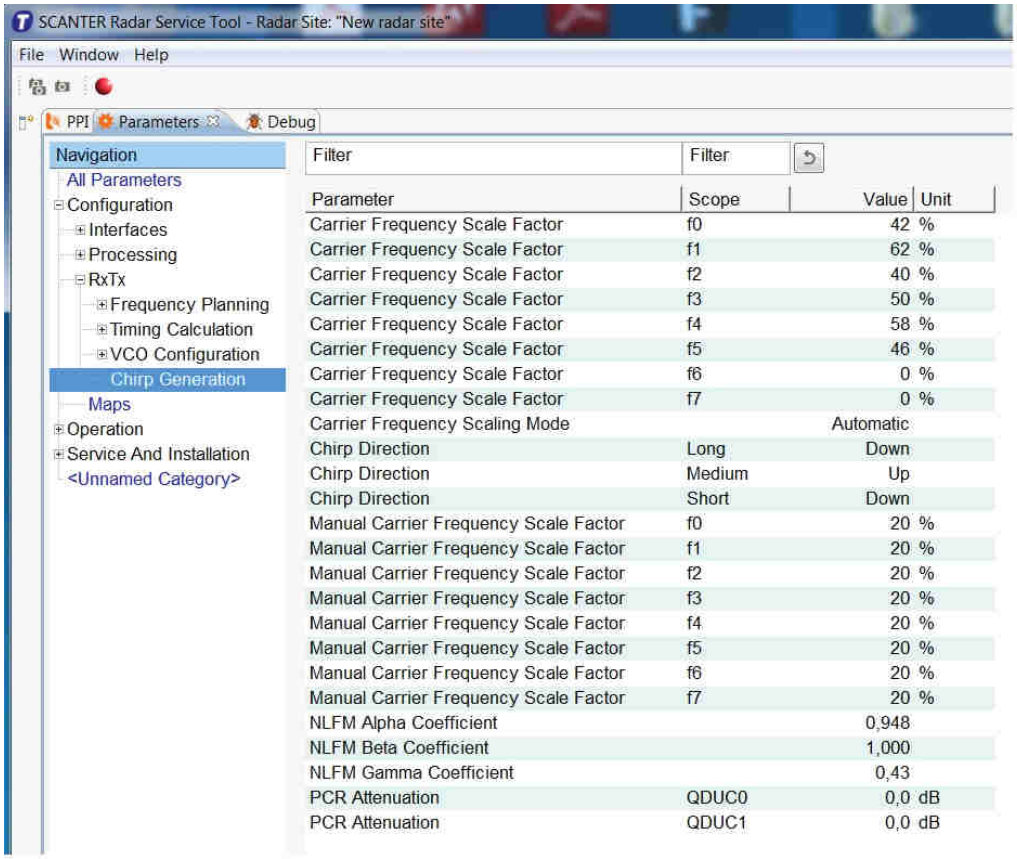

Fig. 12.4 Chirp generation

When the calibration is completed, check the “Forward Power” BITE measurement. This must be within -1 dB/+2 dB (~ -20%/+60%) of the nominal specified power. In some cases, the output power is too high and might cause an SSPA current error message. In such cases, the manual scale factors can be used or the PCR attenuation level to reduce power level and current for the SSPA.

The “Carrier Frequency Scaling Mode” parameter determines whether auto or manual scale factors are used by the SSPA.

1	In the “Low Level” perspective, open the “Profile Editor” view. Find the “Carrier Frequency Scale Factor” parameters and make sure that none of the scale factors are checked as “profiled”. (Configuration/RxTx/Chirp Generation)
2	In the “Low Level” perspective, open the “Parameters” view. Find the “Carrier Frequency Scaling Mode” parameter and set the value to “Automatic”. (Configuration/RxTx/Chirp Generation)

3	In the “Parameters” view, start the PSAT calibration by setting “PSAT Calibration” parameter to “on”. Antenna and transmission must be activated. (Service And Installation/PSAT Calibration) The calibration process will take a few minutes. The progress of the calibration can be viewed in “Chirp Generation” in the “Parameters” view. (Configuration/RxTx/Chirp Generation)
4	In the “Low Level” perspective, open the “Errors/Warnings” view and verify that the message “PSAT not Calibrated” has disappeared. Also verify that there is no SSPA current error message.
5	In the “Low Level” perspective, open the “Status/Measurements” view and read the forward power value. It must be within -1 dB/+2 dB (~ -20%/+60%) of the specified power. (Operation/BITE/Forward And Reverse Power)
6	To get rid of any SSPA current errors, use the “PCR Attenuation” parameter to attenuate the power for all carrier frequencies. Increase the attenuation in steps of 2 dB until the current error message disappears. In the “Low Level” perspective, open the “Parameters” view. Use the “PCR Attenuation” parameter. (QDUC0) is for VTS/CS or SRS systems (High Band frequency). (Configuration/RxTx/Chirp Generation)

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13 BITE Errors and Warnings

For a comprehensive list of all BITE errors and warnings that may be detected in the system, refer to doc. no. 386304-DI: “SCANTER 6000 Series Transceiver Control Protocol Data Def”.

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14 Annex A - Acknowledgement

The SCANTER 5000/6000 Series transceiver software package contains open source software components. License information can be found in doc. no. 386302-RA: “SCANTER 5000/6000 Series Transceiver Core Software Open Source Components License Information”, while the source code for these components is available in doc. no. 386302-SC: “SCANTER 5000/6000 Series Transceiver Core Software GPL Source Code”.

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Terma A/S
Hovmarken 4
DK-8520 Lystrup, Denmark
Telephone +45 87 43 70 00
Telefax +45 87 43 60 01
www.terma.com
support@terma.com