



REBLE610-ODU



User Manual

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3 Safety regulations.

The personnel engaged with the installation, the use and the maintenance of the equipment has to be familiar with the theory and practice of first aid.

3.1 Treatment of electrical shocks.

When the victim loses his consciousness:

Put into practice the following first aid principles.

- Position the victim lying down on his back on a rigid surface.
- Open the respiratory airways lifting up the neck and pushing down the front (Fig. 1).
- If necessary, open the mouth to check the respiration.
- In case the victim doesn't breath, start immediately the artificial respiration (figure 2): bend the head, close the nostrils, attach the mouth to the victim one's and do 4 quick mouth-to-mouth respirations

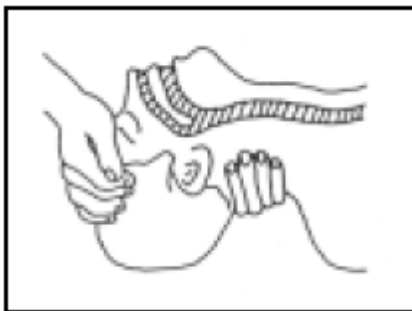


Figure 1: Resuscitation detail – 1.



Figure 2: Resuscitation detail – 2.

- Check the pulsation (Figure 3); in case of absence of pulsation, start immediately the cardiac massage (Figure 4) pressing the breastbone in the middle of the thorax (Figure 5).



Figure 3: Resuscitation detail – 3.

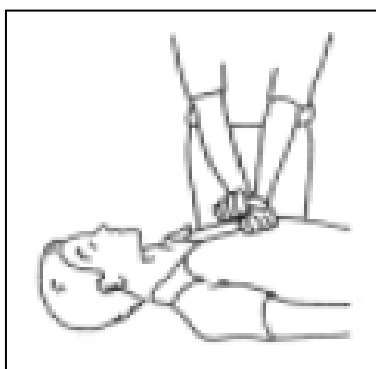


Figure 4: Resuscitation detail – 4.

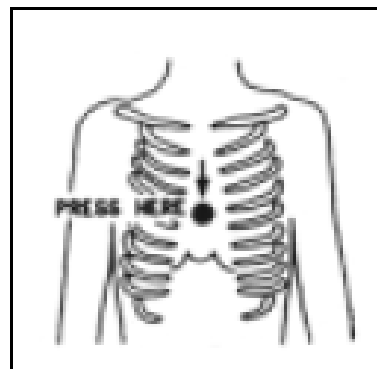


Figure 5: Resuscitation detail – 5.

- When there is only one rescuer, he has to maintain a rhythm of 15 compressions alternated with 2 quick respirations.
- In case there are two rescuers, the rhythm should be one respiration each 5 compressions.
- Do not interrupt the cardiac massage during the artificial breathing
- Call a doctor as soon as possible

When the victim is conscious

- Cover up the victim with a blanket.
- Try to calm down the victim.
- Unbutton the cloche and lay down the victim.
- Call a doctor as soon as possible.

3.2 Treatment of electrical burns.

Large burns and cuts of the skin

- Cover up the interested area with a clean sheet or cloth.
- Do not open the blisters; remove the fabric and the parts of the clothes attached to the skin; apply a suitable ointment.
- Treat the victim according to the type of accident.
- Take the victim to the hospital as soon as possible.
- When the arms and legs are affected keep them raised.

When there is no doctor available within an hour and the victim is conscious and does not retch, give a liquid solution containing salt and sodium bicarbonate: 1 teaspoon of salt and half a teaspoon of sodium bicarbonate for each 250 ml of water.

Have the victim sip half a glass of the solution for four times and for 15 minutes.

Stop when retching.

Do not give any alcoholics

Less serious burns

- Apply cold (not frozen) gauzes using a clean as possible cloth.
- Do not open the blisters; remove the fabric and the parts of the clothes attached to the skin; apply a suitable ointment.
- When necessary, put on clean and dry clothes.
- Treat the victim according to the type of accident.
- Take the victim to the hospital as soon as possible.
- When the arms and legs are affected keep them raised.

4 General Description.

The **REBLE610-ODU** is the outdoor version of the REBLE610, from which it differs for the separation between the RF part (located in a waterproof aluminum case) from the modem, the I/O section and control.

The indoor unit or control unit (REBLE610-IDU) belongs to the same chassis of the REBLE610, which makes for a more efficient maintenance and an easier frequency modification which is always a difficult task; As for its predecessor, there is a hot-swappable redundant power supply, available both in AC and DC.

The modular approach has brought to the development of the data interface module (containing modulator, demodulator and data interface) and the RF module (containing Transmitter, Receiver and channel filter). From an RF point of view the new transmission circuitry is able to guarantee at least 1 watt at the head with every modulation scheme, introducing in addition, wideband precorrection (up to 1GHz depending on frequency band). Data interface is equipped with 5 SMPTE310/ASI/BTS ports on BNC connectors, configurable as input or output; this feature let have in a single chassis the functions of a SMPTE310/ASI matrix and a SMPTE310/ASI distributor, both in input and output. The link let also transfer IP traffic on a GbE port, 5 E1 2.048 Kbps signal and a “transit” connection (just not to use too many coaxial cables for the transit).

To transfer all these signals the channel capacity has been increased to 56MHz and bitrate equal to 310Mbit/s; using an optional XPIC module (and an extra Reble610) it is possible to duplicate the bitrate increasing it to 610Mbit/s, exploiting H and V polarizations and cancelling undesired content using special algorithms. A new management software offers complete control over device parameters and settings, an on-board TFT touch-screen allows for a simple and intuitive user interface to check for anomalies. The same monitoring and control can be carried out thru a particularly easy to use web interface and thru SNMP.

5 Technical Specifications.

Table 1

	2-4.2	4.4-5.0	5.0-5.5	5.8-7.1*	7.1-7.7	7.7-8.5	10.0-10.7*	10.7-11.7	12.7-13.2	14.0-15.5
Power [QPSK] after circulator [dBm] (*dielectric resonator filters)[1 dB less for standard filters]	35						34	33		
Power out [256 QAM after circulator [dBm] (*dielectric resonator filters)	30						29	28		
RF connectors/flanges	N		N or UER70		N		UBR120		UBR140	

Table 2

Configuration	Full-duplex or Half-duplex
Conversion	Direct
RF Output Return Loss	> 23 dB
RF Input Return Loss	> 23 dB
Spurious suppression	> 65 dBc
Frequency stability	< ± 10 ppm
Standard channels	1.75/3.5/7/14/20/28/29, 65/30/40/56 MHz
Modulation scheme	QPSK; 8PSK 16-32 APSK 16-32-64-128-256QAM
Capacity*	Up to 310 Mbit/s

Table 3: Performances examples in a 28 MHz channel.

Modulation	Sensitivity	Payload
QPSK	-88 dBm	36.665 Mbit/s
8PSK	-82 dBm	54.998 Mbit/s
16QAM	-81 dBm	73.331 Mbit/s
32QAM	-78 dBm	91.664 Mbit/s
64QAM	-74 dBm	123.384 Mbit/s
128QAM	-71 dBm	148.409 Mbit/s
256QAM	-68 dBm	173.726 Mbit/s

5.1 Modem details.

All modem parameters are tied to configuration released by Elber s.r.l.; parameters cannot be manually modified.

Table 4

Modulation schemes	QPSK; 8PSK 16-32 APSK 16-32-64-128-256QAM
Protection codes *	1. Low Density Parity Check (LDPC) encoder 2. Reed-Solomon with K from 6 to 255 and t from 0 to 16 and Convolutional Trellis or Block codes (1/2-13/14). Programmable internal interleaver
Max Symbol rate	49.5 MBaud
Bandwidth*	1.75 ÷ 56 MHz
Roll-off shaping filter *	0.15 ÷ 0.30

5.2 I/O signals.

Table 5

Access	5xASI/BTS/SMPTE310 5xE1 1xGbE
SMPTE310/ASI/BTS	BNC 75 Ohm unbalanced
Connector GbE, 1+1, XPIC, Transit	RJ-45
E1 Connectors	RJ48C

5.3 General Specifications

Table 6

Operative Temperature Range	-10°C ÷ 55°C
Management	Front panel (Display TFT touchscreen) SNMP Web browser
Firmware upgrade	USB, WEB, FTP
Power supply	Two, hot swappable. AC 90-260 V~ 50/60 Hz IEC 320 DC 22 ÷ 65 V 2 pins socket
Max power consumption	150 W
Max dissipation	160 W

5.4 Mechanical Specifications.

Table 7: IDU

Rack	Standard 19" 1U
------	-----------------

Width	482.6 mm
Height	43.6 mm
Depth	512.85 mm without Harting connector
Max Weight	8 Kg

Table 8: ODU

Width	132 mm
Height	230 mm
Depth	385.5 mm
Max Weight	< 15 Kg

6 Installation.

- Unpack the equipment and check first of all check if there are any damages due to the transport.
- The box should contain:
 - The RF Head REBLE610-ODU (ODU).
 - Hanger kit (if bought)
 - The control unit REBLE610-IDU (IDU).
 - The interconnection cable between IDU and ODU.
 - One or two AC power supply cables, depending on power source options bought.
 - One or two DC power supply cables, depending on power source options bought.
 - The user manual
- Install the control unit in a rack cabinet standard EIA310. A one-unit space is requested.
- Make sure that there is enough space between other functioning equipment generating high temperatures and that there are no obstructions in the ventilation. (The functioning is guaranteed in a temperature range from -10 °C ÷ +55 °C).
- The equipment must be correctly grounded, to guarantee a secure functioning.
- Be sure of the correct power voltage reading the information on the manual or on the label attached to each equipment, containing the serial number.
- Install the RF Head using the hanger kit for on mast or tower mounting.
- Connect the flange(s) of the equipment to the antenna system for the connection to the branching system and the antenna.
- Connect the cable between IDU and ODU.
- Connect the supply cable(s) to the plug(s) on the back panel of the IDU
- Configure the equipment according to the needs consulting the user manual.

7 User interface.

The user interface consists of a general alarm led and a graphical TFT display with **TOUCH SCREEN** function (for more comfortable use, a stick is available in a compartment located in the front panel, see 9.1).

According to equipment configuration (Half-duplex transmitter [Tx], Half-duplex receiver [Rx], Full-duplex [FD]), just the related menu are shown.

In order to have a read/write privilege and thus modify the configuration of the equipment, it's required the connection of a USB pen with the right token to the USB port in the front panel.

7.1 Main menu.

At equipment switch on, after embedded software boot, display shows the main menu, according to the configuration, as can be seen in Figure 6, Figure 7 and Figure 8.

This menu shows the equipment block diagram, for an easy and intuitive access to modules parameters according to their function; on every active area, one or more circles symbolizing alarm led are shown, eventually red or green depending on the status of the related block.

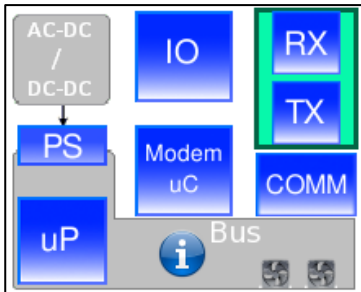


Figure 6: Main menu FD.

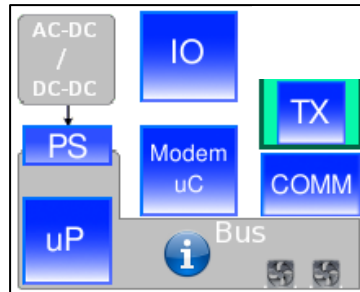


Figure 7: Main menu Tx.

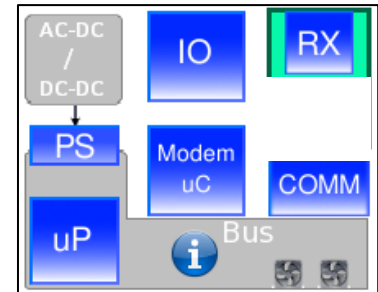


Figure 8: Main menu Rx.

Active areas:

- Rx
- Tx
- Modem u
- I/O
- uP
- PS
- Bus
- Comm
- 

7.2 Summary menu.

Summary menu reports the most important information for a fast check of the equipment functioning; indeed following measurements and indications are shown:

- Equipment *Power out* (FD and Tx)
- *RSSI Received Signal Strength Indication* (FD and Rx)
- *MSE Mean Square Error* (FD and Rx)
- Modulator locking status *Timing Loop* (FD and Tx)
- Demodulator locking status *Dem Lock* (FD and Rx)

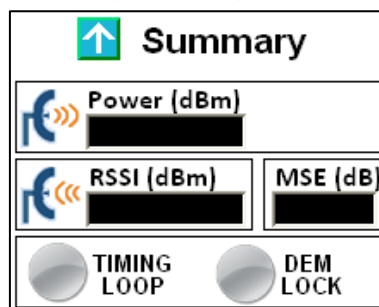


Figure 9: Summary menu FD.

Active areas:

- Directional arrow "UP"  to go back to main menu

7.3 Menu uProcessor (uP).

7.3.1 MicroProcessor submenu.

The submenu let a fast access to the elements to be controlled; icons meaning, concerning different sections, is intuitive.

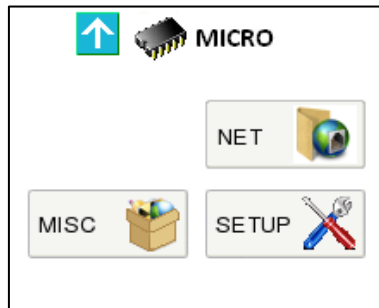


Figure 10: Microprocessor submenu.

7.3.2 Menu Setup - System Time.

This menu let the user set right time and date, used by the system for alarm logging. Information about system time is preserved by the battery of the *Real Time Clock*.

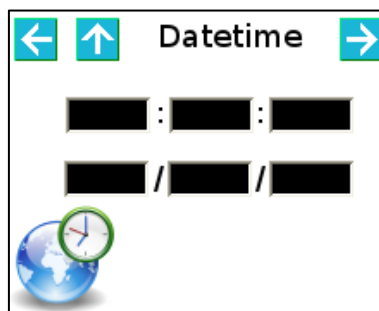


Figure 11: System time setting menu.

Active areas:

- Directional arrow "UP"  to go back to main menu.
- Directional arrows "LEFT"  and "RIGHT"  to browse microprocessor menu.
- Every text box which opens a virtual keypad to enter information.

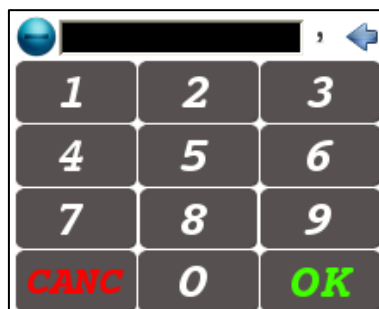


Figure 12: Virtual keypad.

7.3.3 Menu Setup - Touch Screen Calibration.

This menu let the user calibrate the Touch Screen function. It's recommended to use the stick provided with the equipment to touch the red cross, three times as required by the system, after **Calibrate** button pushing.



Figure 13: Touch Screen Calibration menu.

Active areas:

- Directional arrow "UP"  to go back to main menu.
- Directional arrows "LEFT"  and "RIGHT"  to browse microprocessor menu.

7.3.4 Menu Setup - Reset.

This menu let the user reset each microcontroller and FPGA of the equipment.

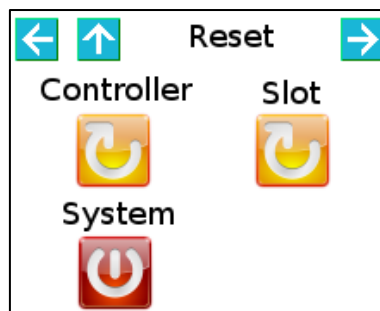


Figure 14: Reset menu.

Active areas:

- Directional arrow "UP"  to go back to main menu.
- Directional arrows "LEFT"  and "RIGHT"  to browse microprocessor menu.
- Reset icons.

SLOT reset will eventually restart modem and data interface; CONTROLLER reset just reboot system supervisor, SYSTEM reset is the complete reset of the equipment.

7.3.5 Menu Net - Network parameters.

This menu let the user modify management port network parameters; in detail, it is possible to set IP address, Subnet Mask and Gateway IP. MAC Address is read-only.

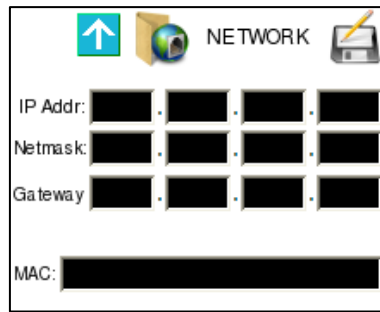


Figure 15: Network parameters menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.
- Every text box, which opens the virtual keypad to insert characters.

7.3.6 Menu Misc - General information 1/2.

This menu shows general purpose information, such as:

- Model
- Serial Number
- Part Number

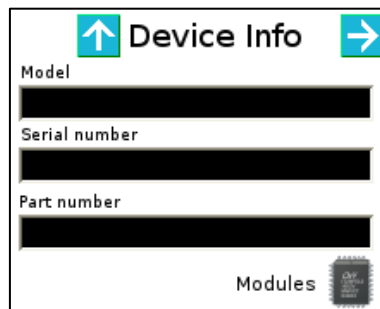


Figure 16: General info menu 1/2.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrow “RIGHT”  to browse microprocessor menu.
- Modules icon.

7.3.7 Menu Misc - General information 2/2.

This menu shows general purpose information, such as:

- Customer name (two rows)
- Installation site (Loc.)
- Site from which it receives and site to which is transmitting (eventually filtered in half-duplex configuration).

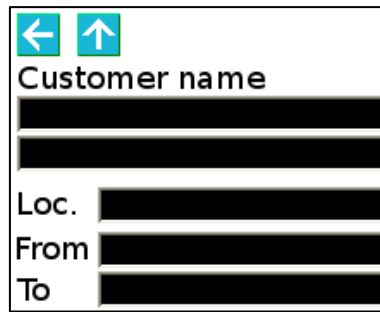


Figure 17: General info menu 2/2.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.3.8 Menu Misc - Modules.

7.3.8.1 Menu Misc - Modules - Controller.

This menu shows controller general purpose information such as:

- Model
- Version
- Revision

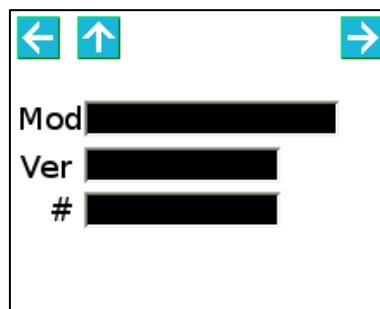


Figure 18: General purpose information controller.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.3.8.2 Menu Misc - Modules - Modem.

This menu shows modem general purpose information such as:

- Model
- Version
- Revision

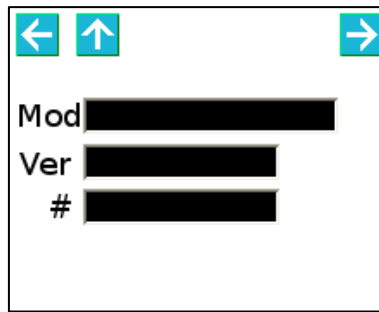


Figure 19: General purpose information modem.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.3.8.3 *Menu Misc - Modules - Interfaces.*

This menu shows I/O interface general purpose information such as:

- Model
- Version
- Revision

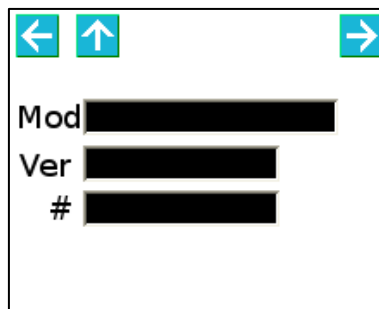


Figure 20: General purpose I/O interface information.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.3.8.4 *Menu Misc - Modules - Rx.*

This menu shows receiver general purpose information such as:

- Model
- Version
- Revision

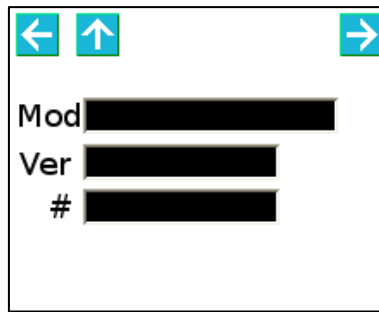


Figure 21: General purpose information Rx.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.3.8.5 Menu Misc - Modules - Tx.

This menu shows transmitter general purpose information such as:

- Model
- Version
- Revision

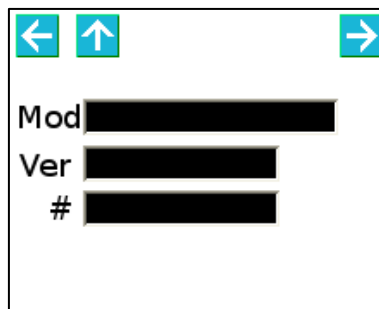


Figure 22: General purpose information Tx.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse microprocessor menu.

7.4 Menu Modem (Modem uC).

The modem menu is composed by a series of pages that let the user monitor and configure main parameters of both modulator and demodulator. Directional arrows allow the browsing in the menu.

The modem configuration is managed uploading configuration files that can be checked through user interface.

7.4.1 Modem submenu.

The submenu let a fast access to the elements to be controlled; icons meaning, concerning different sections, is intuitive.

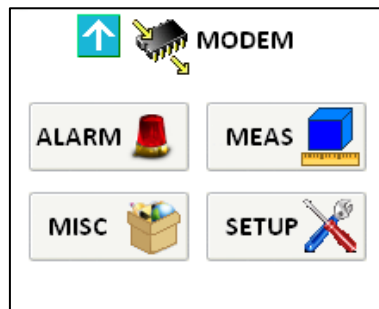


Figure 23: Modem submenu.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Icons    

7.4.2 Modem configuration menu.

The modem configuration menu let the user change the transmitting profile of the modulator. Modifying numeric index in the **Profile** box, related modulation scheme and bitrate are shown. **XPIC** checkbox let the user enable the XPIC function (hw option is needed).

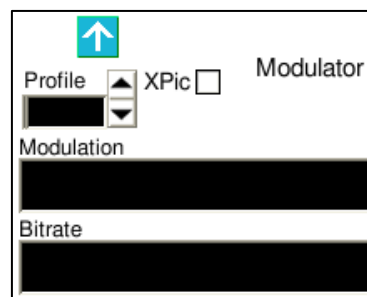


Figure 24: Modem FD configuration menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Checkbox **XPIC** to enable XPIC function.

7.4.3 Modem measurements menu.

The measurement menu is a summary of main functioning parameters of both modulator and demodulator sections.

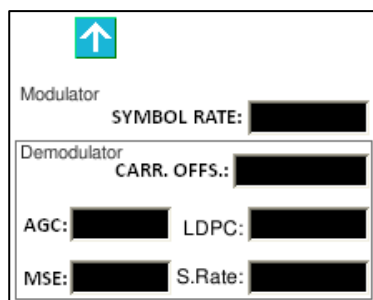


Figure 25: Modem FD measurement menu.

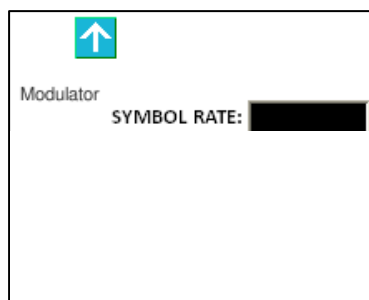


Figure 26: Modem Tx measurement menu.

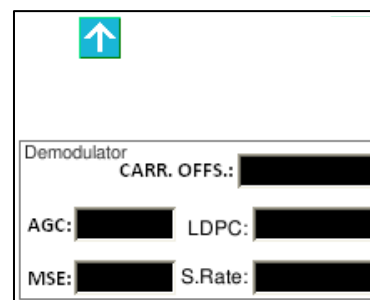


Figure 27: Modem Rx measurement menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.

Modulator section reports just the Symbol Rate measure, which should be the same of the database one. See par. 8.4.1 for more details.

Demodulator section reports 5 measurements:

1. **Carrier Offset** shows the difference in Hz from the frequency of the detected carrier and the reference (0 Hz). Being the system a direct frequency conversion system, this parameter is very important to avoid heavy imbalances of both I and Q baseband paths. An automatic frequency control process (AFC) is always active to compensate possible RF oscillator drifts due to aging, to the temperature or other factors.
2. **LDPC** shows the Bit Error Rate detected by the LDPC decoder.
3. **AGC** indicates the digital automatic gain control level. The measurement is not indicative in case of equipment bad functioning.
4. The **MSE** (*Mean Square Error*) is a measurement of the microwave link C/N. Depending on the modulation, there are different critical levels of MSE. Please contact the manufacture or refer to test reports to check the MSE limit of the desired configuration and profile.
5. **S. Rate** shows the demodulated raw data bitrate.

7.4.3.1 Modem measurements menu - XPIC.

If modem configuration includes the XPIC function, in every measurements page, located at the upper right corner, a directional arrow is shown (Figure 28, Figure 29 and Figure 30); clicking on this arrow, the user gets in menu shown in Figure 31, Figure 32 and Figure 33.

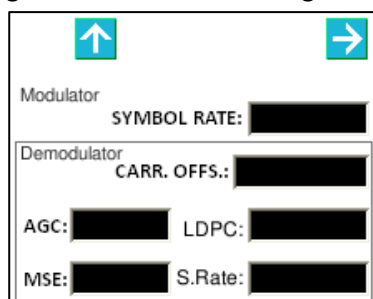


Figure 28: Modem FD measurements menu (2).

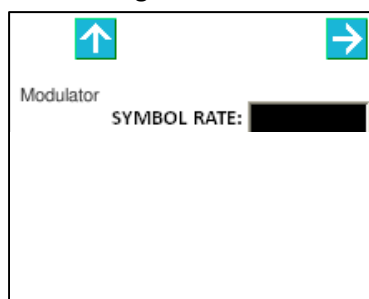


Figure 29: Modem Tx measurements menu (2).

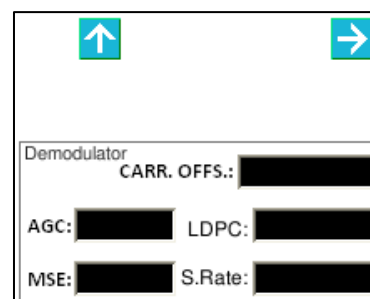


Figure 30: Modem Rx measurements menu (2).

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrow “RIGHT”  to browse between modem measurements page.

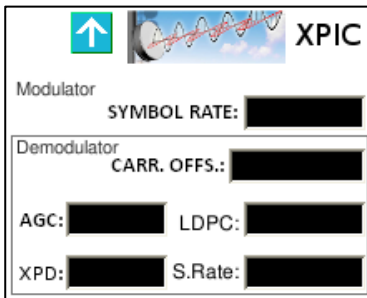


Figure 31: Modem XPIC measurements menu FD.

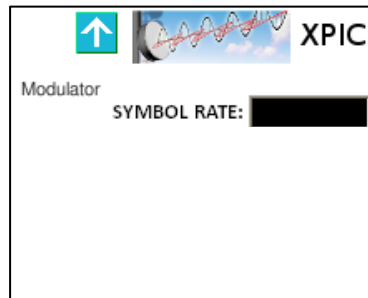


Figure 32: Modem XPIC measurements menu Tx.

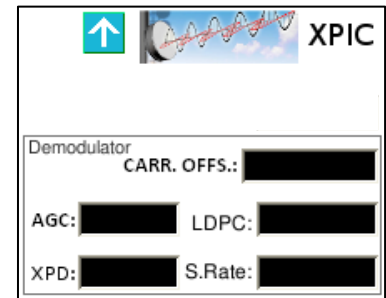


Figure 33: Modem XPIC measurements menu Rx.

Modulator section reports just the Symbol Rate measure, which should be the same of the database one. See par. 8.4.1 for more details.

Demodulator section reports 5 measurements:

1. **Carrier Offset** shows the difference in Hz from the frequency of the detected carrier and the reference (0 Hz). Being the system a direct frequency conversion system, this parameter is very important to avoid heavy imbalances of both I and Q baseband paths. An automatic frequency control process (AFC) is always active to compensate possible RF oscillator drifts due to aging, to the temperature or other factors.
2. **LDPC** shows the Bit Error Rate detected by the LDPC decoder.
3. **AGC** indicates the digital automatic gain control level. The measurement is not indicative in case of equipment bad functioning.
4. **XPD** (*Cross Polarization Discrimination*) is the value of the polarization decoupling detected by XPIC modem.
5. **S. Rate** shows the demodulated raw data bitrate.

7.4.4 Modem alarms menu.

The alarms menu summarizes main alarms of both modulator and demodulator sections.

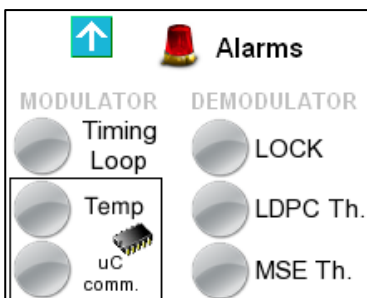


Figure 34: Modem alarms menu FD.

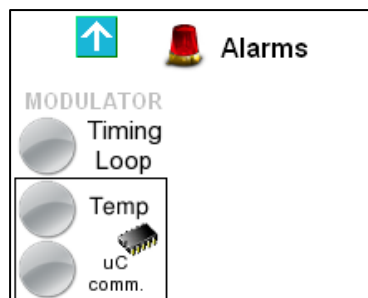


Figure 35: Modem alarms menu Tx.

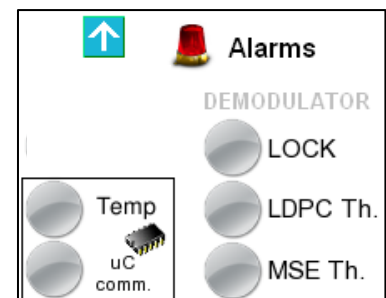


Figure 36: Modem alarms menu Rx.

Active areas:

- Directional arrow “UP”  to go back to main menu.

The modulator section presents just one alarm, the *Timing Loop*. If the modulator is not locked to data clock, this led is red. In this case the link cannot work properly.

The demodulator section presents 3 alarm conditions:

1. *Lock* alarm detects the demodulator locking status.
2. *LDPC Th.* alarm indicates that the *LDPC Stress* value is above the threshold set by the user. This threshold has a default value of 1×10^{-3} .
3. *MSE Th.* alarm indicates that the MSE value is below the alarm threshold for the modulation scheme adopted.

Furthermore there's the temperature alarm that is shared between the two sections and it indicates the left fan bad function.



Attention:

Alarm icon related to *uC Comm* indicates that modem board controller is not properly communicating with system supervisor. In this case, the equipment should be shipped back to factory for repair.

7.4.5 Modem general menu.

Modem general menu reports details of demodulator profile and configuration (the demodulator automatically lock on the profile). Just modulation scheme, occupied bandwidth and net bitrate are shown, but for further information the related section of the web interface can be seen.

Moreover it is possible to enable the internal Clean Carrier generator (**One tone** checkbox), the two tones generator (**Two Tone**) and the predistorsion (**Predistorsion**); by default, **Normal** and **Predistorsion** checkbox are enabled.

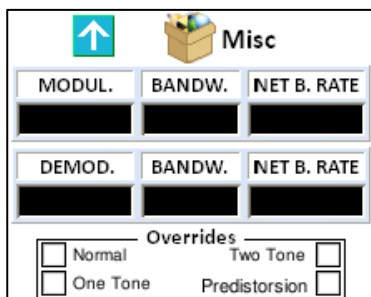


Figure 37: Modem general menu FD.

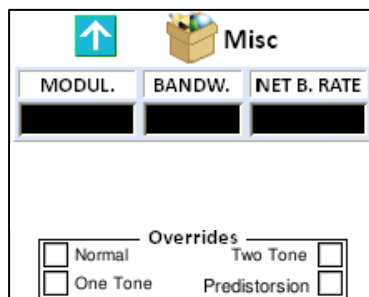


Figure 38: Modem general menu Tx.

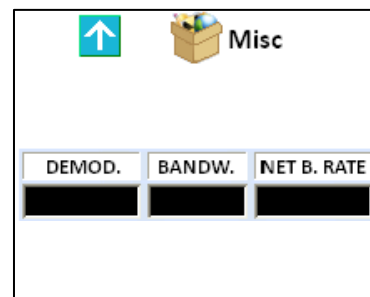


Figure 39: Modem general menu Rx.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- *Checkbox Normal* for normal functioning.
- *Checkbox Single tone* to enable Clean Carrier generator (link frequency + 10 MHz); this setting isn't stored, so it is to be enabled again in case of system restart.
- *Checkbox Two tone* to enable the two tone test signal; this setting isn't stored, so it is to be enabled again in case of system restart.
- *Checkbox Predistorsion* to enable the non-linear precorrection of the amplifier; depending on the frequency of operation, the system load the calibration curve stored in factory.

7.5 Menu I/O (IO).

The I/O menu let the user check the equipment baseband inputs and outputs status. Directional arrows allow the browsing in the menu.

7.5.1 I/O submenu.

The submenu let a fast access to the three types of input/output signals available, that is Ethernet, SMPTE310/ASI and E1 management; icons meaning, concerning different sections, is intuitive.

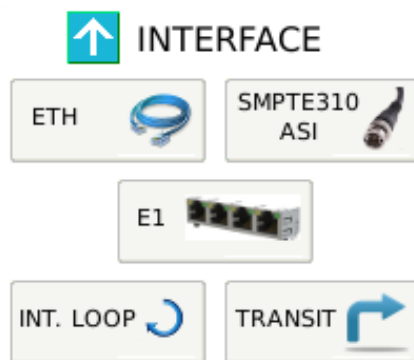


Figure 40: I/O Sub-menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.

- Icons 

7.5.2 Ethernet menu.

Ethernet menu let the user enable or disable the Gigabit Ethernet port.

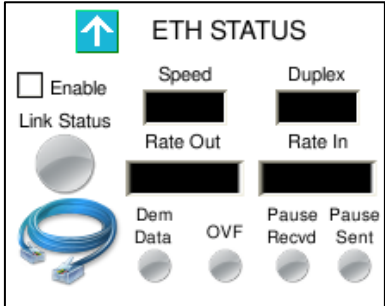


Figure 41: Menu Ethernet.

Active areas:

- Directional arrow “UP”  to go back to main menu.

Display shows following indications and measurements:

Tag	Type	Description
Link Status	Led	Link active status indication (the port is functioning and it’s connected to another functioning port).
Speed	Text	Connection speed (10/100/1000).
Duplex	Text	Half-duplex or full-duplex connection indication.
Rate out	Text	Output data speed.
Rate in	Text	Input data speed.
Dem Data	Led	Indication of data received from demodulator.
OVF	Led	Overflow signaling.
Pause Recvd	Led	Pause frames received from another device (output data bit rate is higher than destination port speed).
Pause Sent	Led	Pause frames sent to another device (input data bit rate is higher than the available capacity).

7.5.3 SMPTE310 ASI menu.

The ASI/SMPTE310 menu let the user check the status of every BNC connector of the back panel.

3

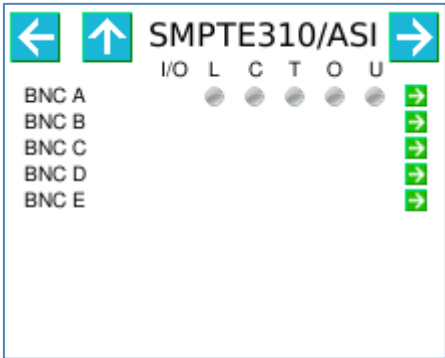


Figure 42: General SMPTE310/ASI menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.

- Directional arrows “LEFT”  and “RIGHT”  to browse between each connector page (A, B, C, D, E).

Moreover, the display shows following information:

Tag	Type	Description
I/O	Text	Input (I) or Output (O) indication.
L	Led	Input signal lock indication (valid only for inputs).
C	Led	Carrier detected indication, that is the ASI/SMPTE310 signal presence (valid only for inputs).
T	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
O	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
U	Led	Underrun indication, that is buffer level is under “Almost Empty” threshold.

7.5.3.1 Single connector ASI/SMPTE310 menu.

This menu let the user check the configuration and status of every connector.

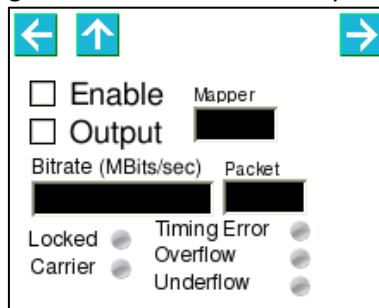


Figure 43: BNC connector configuration and status menu.

Active areas:

- Directional arrow “UP”  to go back to I/O menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse between each connector page (A, B, C, D, E, F, G, H, J, K).

Moreover, the display shows following information:

Tag	Type	Description
Mapper	Text	Associated transport channel number indication (inputs should not use the same number, while outputs do).
Bitrate	Text	Bitrate indication.
Packet	Text	ASI packet format indication (188/204).
Locked	Led	Signal lock indication.
Carrier	Led	Carrier detected indication, that is the ASI signal presence (valid only for inputs).
Timing Error	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
Overflow	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
Underflow	Led	Underrun indication, that is buffer level is under “Almost Empty” threshold.

7.5.4 E1 menu.

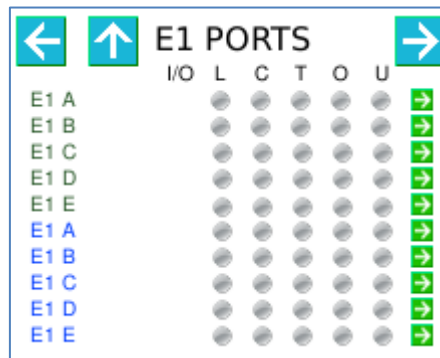


Figure 44: General E1 Ports

Tag	Type	Description
I/O	Text	Input (I) or Output (O) indication.
L	Led	Input signal lock indication (valid only for inputs).
C	Led	Carrier detected indication, that is the E1 signal presence (valid only for inputs).
T	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
O	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
U	Led	Underrun indication, that is buffer level is under “Almost Empty” threshold.

7.5.4.1 Single connector E1 menu.

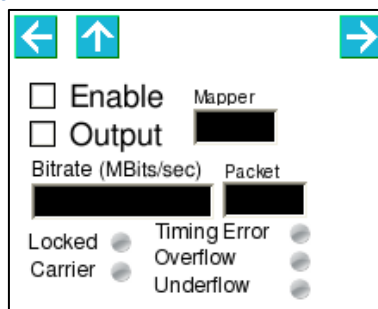


Figure 45: RJ48C connector configuration and status menu.

Active areas:

- Directional arrow “UP”  to go back to I/O menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse between each connector page (A, B, C, D, E, F, G, H, J, K).

Moreover, the display shows following information:

Tag	Type	Description
Mapper	Text	Associated transport channel number indication (inputs should not use the same number, while outputs do).
Bitrate	Text	Bitrate indication.
Packet	Text	Unused.
Locked	Led	Signal lock indication.
Carrier	Led	Carrier detected indication, that is the E1 signal presence (valid only for inputs).
Timing Error	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
Overflow	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
Underflow	Led	Underrun indication, that is buffer level is under “Almost Empty” threshold.

7.5.5 TRANSIT menu.

The TRANSIT menu let the user check the status of every incoming channel of the transit connection.

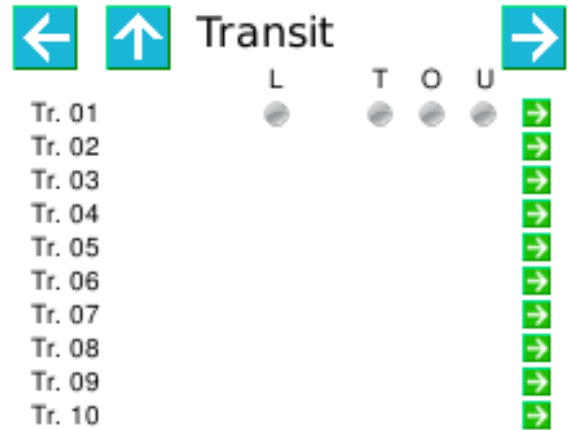


Figure 46: General TRANSIT menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse between each transit page (Tr.1-Tr.10).

Moreover, the display shows following information:

Tag	Type	Description
L	Led	Input signal lock indication (valid only for inputs).
C	Led	Carrier detected indication, that is the signal presence (valid only for inputs).
T	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
O	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
U	Led	Underflow indication, that is buffer level is under “Almost Empty” threshold.

7.5.5.1 Single channel TRANSIT menu.

This menu let the user check the configuration and status of every incoming channel.

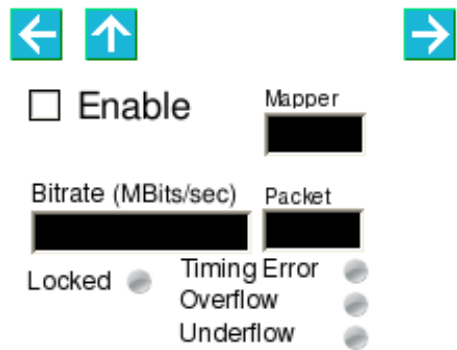


Figure 47: TRANSIT configuration and status menu.

Active areas:

- Directional arrow “UP”  to go back to I/O menu.
- Directional arrows “LEFT”  and “RIGHT”  to browse between each transit page (Tr.1-Tr.10).

Moreover, the display shows following information:

Tag	Type	Description
Mapper	Text	Associated transport channel number indication (inputs should not use the

		same number, while outputs do).
Bitrate	Text	Bitrate indication.
Packet	Text	ASI packet format indication (188/204).
Locked	Led	Signal lock indication.
Carrier	Led	Carrier detected indication, that is the ASI signal presence (valid only for inputs).
Timing Error	Led	Timing indication, that is interface data are locked to modulator or to demodulator.
Overflow	Led	Overflow indication, that is buffer level is above “Almost Full” threshold.
Underflow	Led	Underrun indication, that is buffer level is under “Almost Empty” threshold.

7.6 Menu Transmitter (TX).

The Transmitter menu consists of a single page that allows monitoring and setting of the most important parameters of the transmitter module; the menu is accessible only for FD or Tx devices.

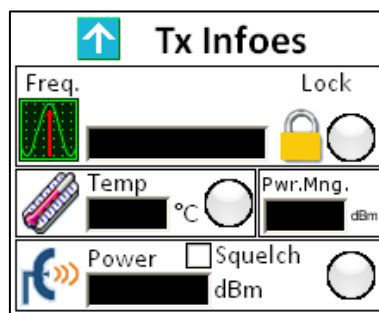


Figure 48: Transmitter menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.
- Checkbox for the squelch of the transmitter.

The page also shows three icons that correspond to the alarm led:

1. An alarm for the oscillator status (in case of oscillator unlock, the transmitter is silenced through hardware pin).
2. An alarm indicating low power at the transmitter output.
3. An alarm indicating that the temperature of the module is higher than 60°C.

Moreover, the page reports temperature and power output measurements.

7.7 Menu Receiver (RX).

The Receiver menu consists of a single page that allows monitoring and setting of the most important parameters of the receiver module; the menu is accessible only for FD or Rx devices.

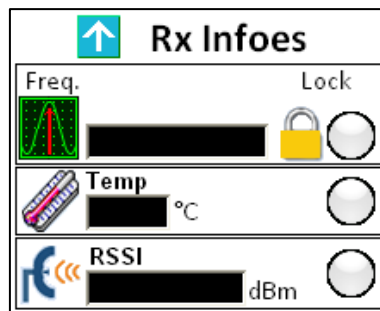


Figure 49: Receiver menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.

The page also shows three icons that correspond to the alarm led:

1. An alarm for the oscillator status
2. An alarm indicating the low field level received for the used modulation.
3. An alarm indicating that the temperature of the module is higher than 55°C.

The page reports as well the measurements of the registered temperature and received field level (RSSI).

7.8 Menu Communicator.

7.8.1 Communicator submenu.

This menu helps the user monitor and configure the boards managing the communication between IDU and ODU, which are the COMM_UNIT, and the STEP-UP and STEP-DOWN supplies.

Clicking on  icon, Figure 50 menu appears.

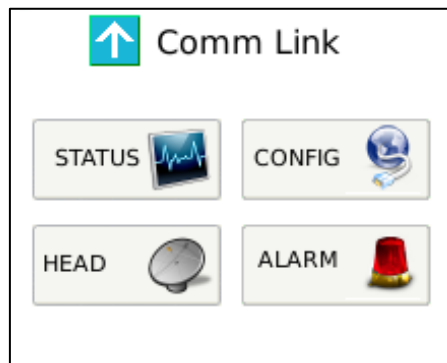
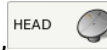


Figure 50: Menu Comm link.

Active areas:

- Self-explaining icons , ,  and  to access to related submenu.
- Arrow  to go back to previous menu.

7.8.2 Menu Status Communicator.

User may accede to this menu by clicking on , and following submenu opens:

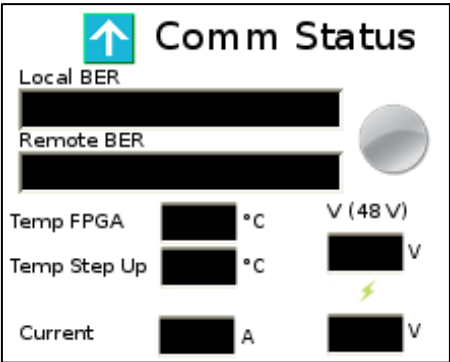


Figure 51: Menu status communicator.

Active areas:

- Arrow  to go back to previous menu.

Tag	Description
Local BER	BER indication of IDU communication board.
Remote BER	BER indication of ODU communication board.
Temp FPGA	Temperature indication of IDU communication board.
Temp Step Up	Temperature indication of voltage step-up board for ODU interconnection.
V (48V)	Step-up output voltage indication.
Current	Step-up current consumption indication.
V	Step-up input voltage indication.

7.8.3 Menu Configuration Communicator.

User may accede to this menu by clicking on  and it let configure temperature alarm and warning thresholds, as well as switching off or on the RF Head.

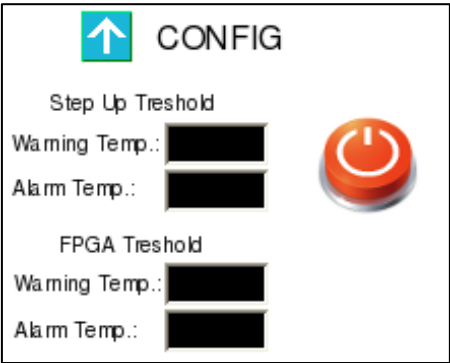


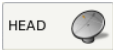
Figure 52: Menu configuration communicator.

Active areas:

- Arrow  to go back to previous menu.
- Each text box, opening the virtual keyboard for characters digitizing (Figure 12).
- Button  or  for switching off or on the ODU.

Tag	Description
Step up Threshold Warning Temp.	Temperature warning threshold configuration for voltage step-up conversion board (12 to 48V).
Step up Threshold Alarm Temp.	Temperature alarm threshold configuration for voltage step-up conversion board (12 to 48V).
FPGA Threshold Warning Temp.	Temperature warning threshold configuration for communication board.
FPGA Threshold Alarm Temp.	Temperature alarm threshold configuration for communication board.

7.8.4 Menu Head.

User may accede to this menu by clicking on the icon  to monitor the communication from the ODU side.

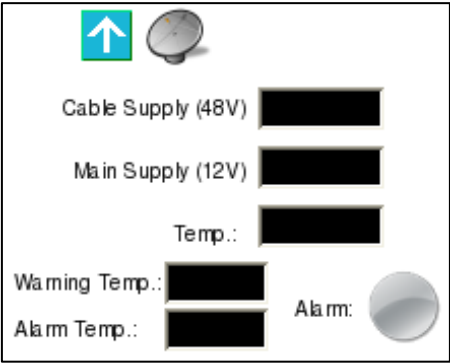


Figura 1: Menu Head.

Active areas:

- Arrow  to go back to previous menu.
- The lower test boxes, opening the virtual keyboard for characters digitizing (Figure 12**Errore. L'origine riferimento non è stata trovata.**).

Tag	Description
Cable Supply (48 V)	Cable output voltage reading.
Main Supply (12V)	Step-down converter output voltage reading.
Temp.	Communicator board temperature detected in °C.
Warning Temp.	RF Head warning temperature threshold configuration.
Alarm Temp.	RF Head alarm temperature threshold configuration.
Alarm	General alarm indication.

7.8.5 Menu Alarm Communicator.

User may accede to this menu by clicking on icon  to check communication boards' alarms.

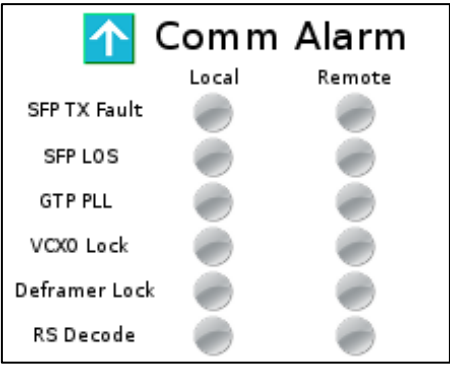


Figura 2: Communicator alarm.

Active areas:

- Arrow  to go back to previous menu.

Tabella 1

Tag	Description
SFP TX Fault	Optical transmitter faulty
SFP LOS	Optical receiver Loss of Signal indication
GTP PLL	Communication PLL with problems
VCXO Lock	VCXO locking status

Deframer Lock	Communication deframer locking status
RS Decode	Reed-Solomon decoder status

7.9 Menu Power Supply (PS).

The Power Supply menu allows verifying whether both power supply modules are fed, what type of feeding they are receiving and whether the secondary voltages are correct (+5V and +6V).

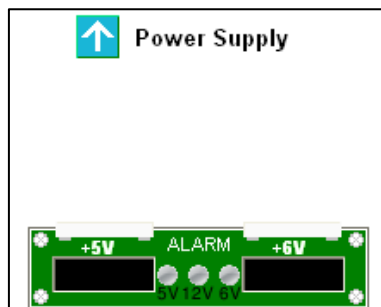


Figure 53: Power Supply menu.

Active areas:

- Directional arrow “UP”  to go back to main menu.

There is as well a general alarm indicator in case one of the voltage values is not being respected.

The upper zone of the menu is dynamically filled by the icon of the corresponding power supply module, which can be in alternating or continuous current. It is hence possible to see the different combinations reported in the following figures.

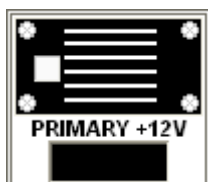


Figure 54: Icon power supply with continuous current, primary position.



Figure 55: Icon power supply with continuous current, secondary position.

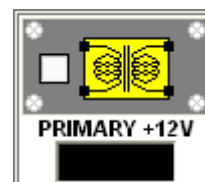


Figure 56: Icon power supply with alternating current, primary position.

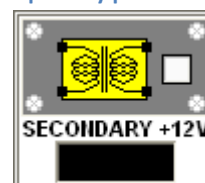


Figure 57: Icon power supply with alt alternating current, secondary position.

8 WEB interface.

The REBLE610 is equipped with a WEB interface for an easier and intuitive monitoring and equipment configuration.

The Web server connection can be achieved through RJ-45 connector in the front panel; with a very common *Web browser* (like Internet Explorer, Mozilla Firefox, Google Chrome, Opera, Safari...) it is possible to check equipment status and verify performances even remotely simply writing in the address bar the IP address of the equipment. In order to check the IP address, please refer par.8.3.3.

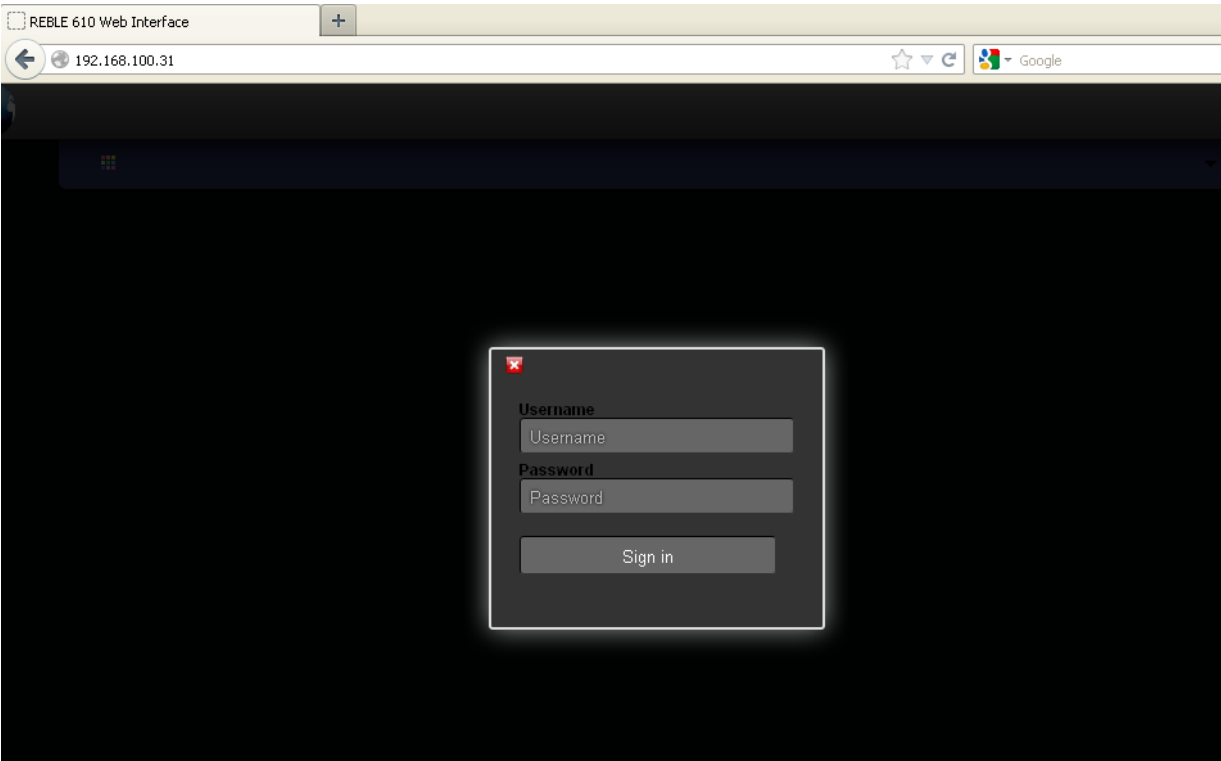


Figure 58: Web interface login page.

Figure 58 show the login page of the Web interface, which let the user access after successful insertion of username and password.

8.1 Status.

Once the login process has been validated, the general stats page opens; it let the user immediately check alarmed parts; the page is divided into 4 or 5 modules (depending on full duplex or half duplex configuration), hereunder described.

8.1.1 Status-Controller.

A screenshot of the 'Controller' status page in the REBLE 610 Web Interface. The page has a grey header with the word 'Controller' and a small icon. The main content is divided into two columns. The left column is titled 'Information' and contains a table of controller details. The right column is titled 'Status' and contains two sub-sections: 'Power Supply' and 'Fans'. The 'Power Supply' section shows a table of voltage readings. The 'Fans' section is currently empty.

Information	
Board Model	Reble Controller
Version	1.0.0
Revision	2257:2258
Customer	Telecom Italia Media Broadcasting
Location	Maiella
Device	Bidirectional
From	Francavilla
To	Francavilla
Serial Number	REB610/10/00002/2012
Part Number	REB610/FD1010-C/HP
Link Model	REBLE610/10

Status	
Power Supply	
Primary AC/DC	12.1 V
Secondary DC/DC	0.0 V
Voltage 2 (5V)	5.1 V
Voltage 3 (6V)	6.3 V

Figure 59: Web Status form – controller.

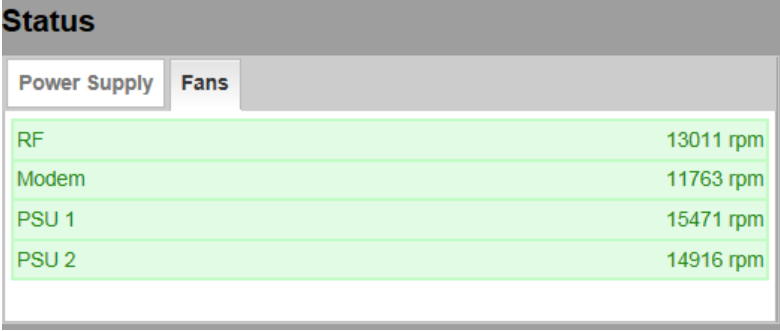
Table 9: Controller Information.

Board Model	Controller board model
Version	Firmware version
Revision	Firmware version revision

Customer	Customer name
Location	Installation site
Device	Equipment configuration (Full-duplex, Tx, Rx, Repeater)
From	Transmitting site
To	Receiving site
Serial Number	Ex.: REB610/10/00002/2012
Part Number	Ex.: REB610/FD1010-C/HP
Link Model	Ex.: REBLE610/10

Table 10: Power supply status.

Primary AC/DC	12V output of main supply measurements; indication if AC/DC or DC/DC. Line is green if value is between limits, red otherwise.
Secondary DC/DC	12V output of backup supply measurements; indication if AC/DC or DC/DC. Line is green if value is between limits, red otherwise.
Voltage 2 (5 V)	5 V level. Line is green if value is between limits, red otherwise.
Voltage 3 (6 V)	6 V level. Line is green if value is between limits, red otherwise.



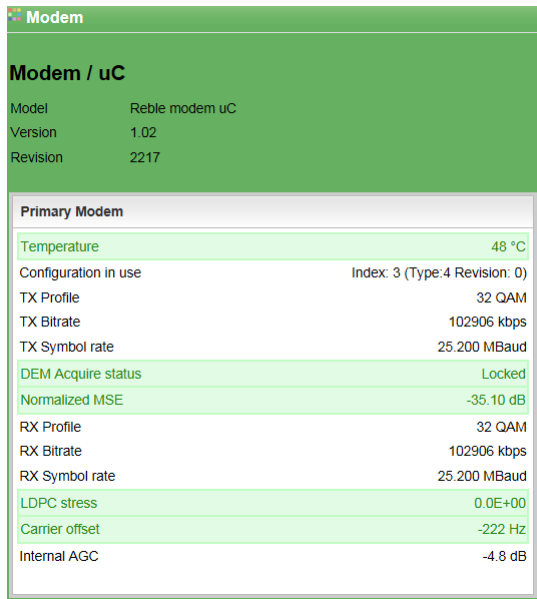
Status	
Power Supply	Fans
RF	13011 rpm
Modem	11763 rpm
PSU 1	15471 rpm
PSU 2	14916 rpm

Figure 60: Web Status form – controller fans.

Table 11: Fans status.

RF	Front panel right fan speed.
Modem	Front panel left fan speed.
PSU 1	Main power supply fan speed.
PSU 2	Backup power supply fan speed.

8.1.2 Status-Modem.



Modem

Modem / uC

Model Reble modem uC
Version 1.02
Revision 2217

Primary Modem

Temperature 48 °C

Configuration in use Index: 3 (Type:4 Revision: 0)

TX Profile 32 QAM
TX Bitrate 102906 kbps
TX Symbol rate 25.200 MBaud

DEM Acquire status Locked

Normalized MSE -35.10 dB

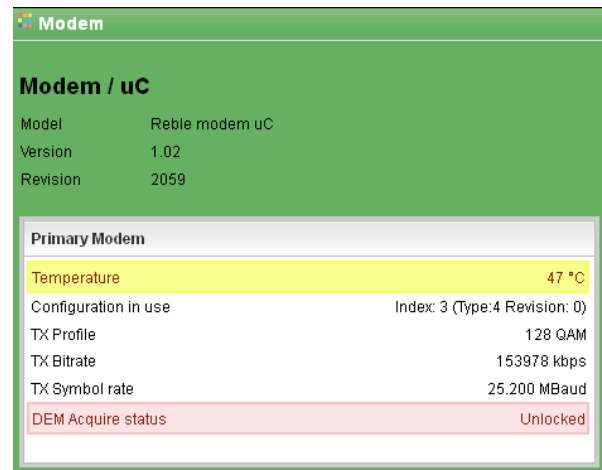
RX Profile 32 QAM
RX Bitrate 102906 kbps
RX Symbol rate 25.200 MBaud

LDPC stress 0.0E+00

Carrier offset -222 Hz

Internal AGC -4.8 dB

Figure 61: Web Status form – modem locked.



Modem

Modem / uC

Model Reble modem uC
Version 1.02
Revision 2059

Primary Modem

Temperature 47 °C

Configuration in use Index: 3 (Type:4 Revision: 0)

TX Profile 128 QAM
TX Bitrate 153978 kbps
TX Symbol rate 25.200 MBaud

DEM Acquire status Unlocked

Figure 62: Web Status form – modem unlocked.

Table 12: Fans status.

Model	Modem board model.
Version	Modem board microcontroller firmware version.
Revision	Modem board microcontroller firmware revision.
Temperature	Temperature measurement on modem board. Line is green if value is between limits, red otherwise.
Configuration in use	Details of the configuration in use for the modem.
TX Profile	Profile (modulation scheme) in use in the modulator.
Tx Bitrate	Modulator Bitrate.
Tx Symbol Rate	Modulator Symbol Rate.
Dem Acquire status	Demodulator Locking status. Line is green if value is between limits, red otherwise.
Normalized MSE	Mean Square Error measurement, normalized according to the used modulation. Line is green if value is between limits, red otherwise.
RX Profile	Profile (modulation scheme) in use in the demodulator (automatically detected).
Rx Bitrate	Demodulator bitrate.
Rx Symbol Rate	Demodulator Symbol Rate.
LDPC stress	Error Rate indication, detected by LDPC (<i>Low Density Parity Check</i>) decoder. Line is green if value is between limits, red otherwise.
Carrier Offset	Carrier Offset compared to central frequency. Line is green if value is between limits, red otherwise.
Internal AGC	Internal AGC level. Line is green if value is between limits, red otherwise.

8.2 Status-Interface.

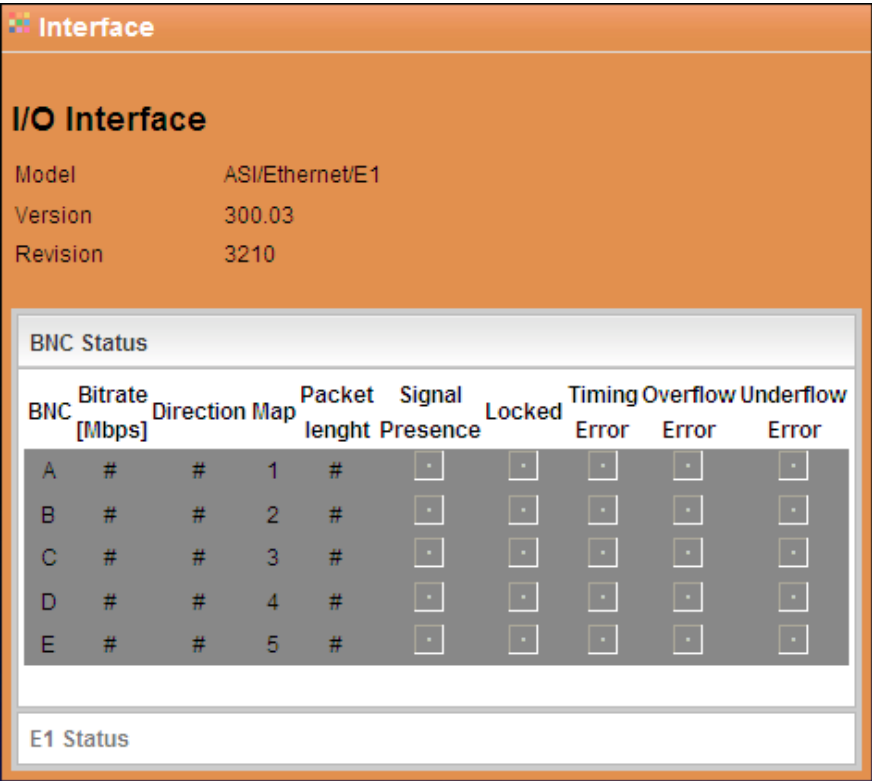


Figure 63: Web Status form – Interface BNC Status.

Table 13: SMPTE310/ASI/BTS connectors status.

Model	Data interface board Model.
Version	FPGA firmware version.
Revision	FPGA firmware revision.
Bitrate [Mbps]	ASI data stream bitrate.
Direction	Connector (Input [IN] or output [OUT]).
Map	Transport channel of the TS associated to related connector.
Packet Length	ASI format detected (188 or 204).
Signal Presence	Signal presence detected indication.
Locked	Signal lock indication.
Timing error	Data stream locking error indication.
Overflow error	Data buffer overflow indication.
Underflow error	Data buffer underflow indication.

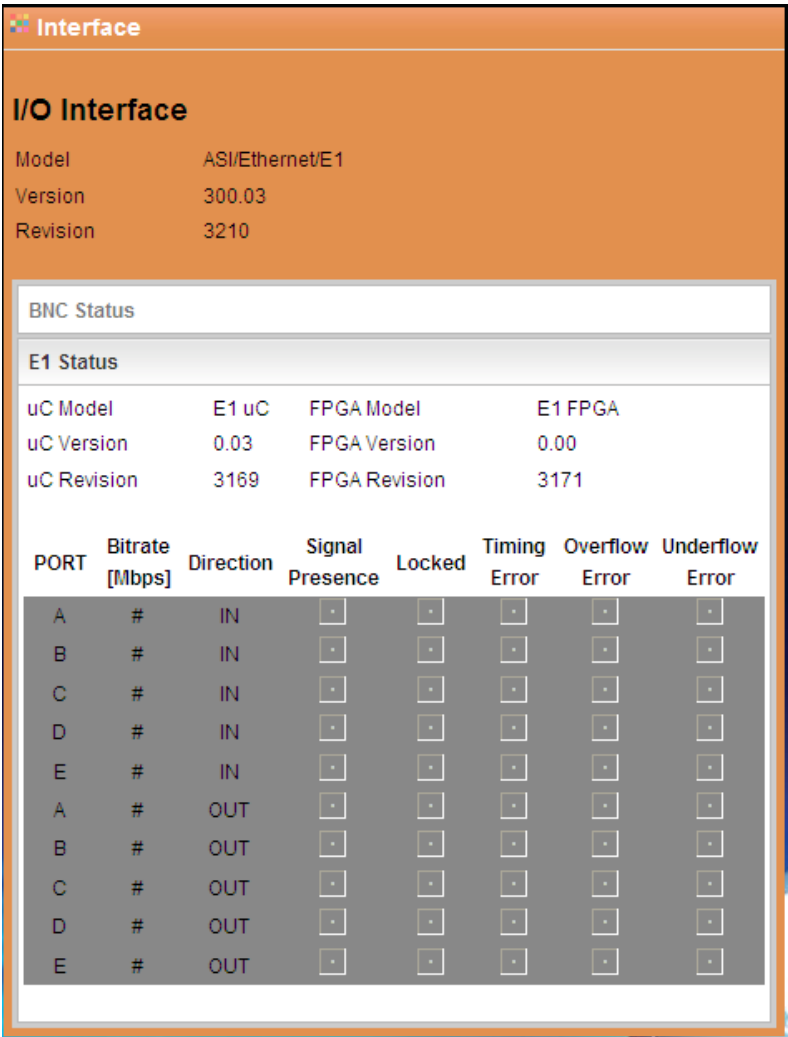


Figure 64: Web Status form – Interface RJ48C Status.

Table 14: I/O Interface status.

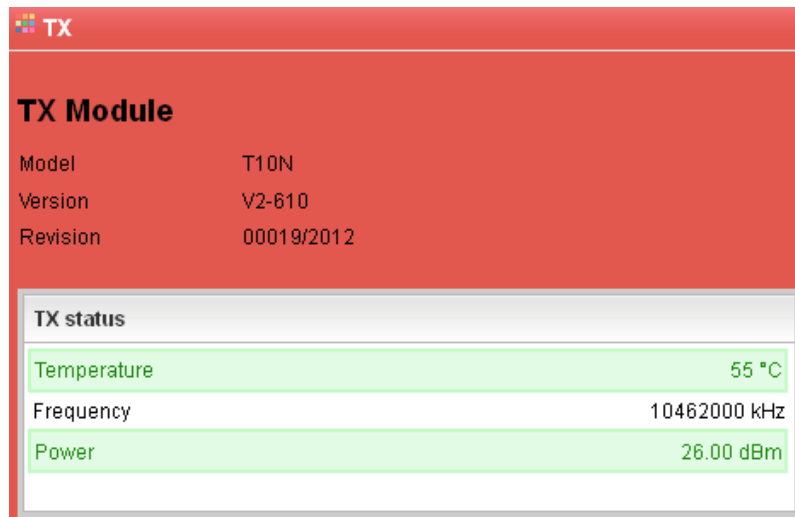
Model	Data interface board Model.
Version	FPGA firmware version.
Revision	FPGA firmware revision.

Table shown in above shows each BNC connector (A to K) status; Table 13 describes the indications.

Table 15: I/O details.

Bitrate [Mbps]	ASI data stream bitrate.
Direction	Connector (Input [IN] or output [OUT]).
Signal Presence	Signal presence detected indication.
Locked	Signal lock indication.
Timing error	Data stream locking error indication.
Overflow error	Data buffer overflow indication.
Underflow error	Data buffer underflow indication.

8.2.1 Status-Transmitter.



TX

TX Module

Model T10N
Version V2-610
Revision 00019/2012

TX status	
Temperature	55 °C
Frequency	10462000 kHz
Power	26.00 dBm

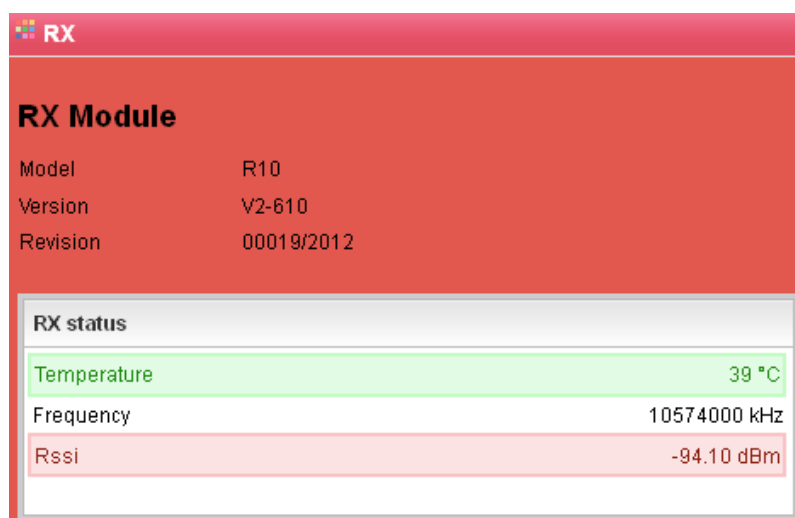
Figure 65: Web Status form – Tx.

This form is not available in half duplex configuration, receiver version.

Table 16: Status Transmitter.

Model	Transmitter board model.
Version	Transmitter board HW version.
Revision	Serial number transmitter board.
Temperature	Transmitter board temperature measurement. Line is green if value is between limits, red otherwise.
Frequency	Transmitting circuit operating frequency.
Power	Transmitter output power. Line is green if value is between limits, red otherwise.

8.2.2 Status-Receiver.



RX

RX Module

Model R10
Version V2-610
Revision 00019/2012

RX status	
Temperature	39 °C
Frequency	10574000 kHz
Rssi	-94.10 dBm

Figure 66: Web Status form – Rx.

This form is not available in half duplex configuration, transmitter version.

Table 17: Status Receiver.

Model	Receiver board model.
-------	-----------------------

Version	Receiver board HW version.
Revision	Serial number receiver board.
Temperature	Receiver board temperature measurement. Line is green if value is between limits, red otherwise.
Frequency	Receiving circuit operating frequency.
RSSI	Signal level detected by receiver. Line is green if value is between limits, red otherwise.

8.3 Tab Controller.

Tab web concerning Controller is composed by six frames:

1. Coil fans.
2. Customer.
3. Network.
4. Trap Manager.
5. Tools.
6. Password Management.

8.3.1 Controller – Coil fans.

Coil fans

Fans

Tx Module

Manual: ☒

Speed (rpm):

Temperature Target:

Rx Module and Modem

Manual: ☒

Speed (rpm):

Rx Temperature Target:

Modem Temperature Target:

Apply

Figure 67: Web controller form – fans.

This frame let drive and monitor the functionality of front panel fans.

Checkbox **Manual** set in manual mode the configuration of the fans speed, measurable in Speed box in rpm. In this case, it is necessary to manually set the speed.

In case checkbox **Manual** is disabled, on the contrary, it is required to establish temperature targets for modules equipped with sensor, and the system controller will program fan controller so as to keep modules at temperature set by the user.

Right fan is managed according to transmitter board temperature (if installed, so not available in half duplex receiver configuration); left fan according to temperatures detected on modem and receiver boards. Modifications are validated pushing **Apply** button.

Table 18: Fan management.

Manual	Checkbox fan manual management.
Speed(rpm)	Only available in manual modality, shows the right fan speed in rpm.

Temperature target	Target temperature for transmitter board (available in automatic modality).
Rx Temperature target	Target temperature for receiver board (available in automatic modality and only for models with receiver).
Modem Temperature target	Target temperature for modem board (available in automatic modality).

8.3.2 Controller – Customer.

Figure 68: Web Controller form – Customer info.

Table 19: Equipment information for customers.

Customer name	Customer name.
Location	Installation site.
Link type	Equipment typology
Receive from	Site which the equipment is receiving from.
Transmit to	Site which the equipment is transmitting to.

8.3.3 Controller – Network.

Network Management

Ip address: 192.168.9.42

Netmask: 255.255.240.0

Gateway: 192.168.0.254

MAC address: 00:17:EB:80:79:0E

Domain name server: 192.168.0.1

NTP server: ntp1.inrim.it

Timezone (correction for NTP sync)

Select your country and timezone

Time zone: Europe/Rome

Country: Italy

Apply

Figure 69: Web Controller form – Network Parameters.

This frame let check and modify network parameters of the user interface.

Ip Address, Netmask and Gateway Address can be modified by the user writing in the dedicated text box while Mac Address is read-only. Moreover, it's possible to configure a DNS, a NTP server IP address, the Time Zone and the Country where the equipment is installed.

8.3.4 Controller – Trap Manager.

This frame let the user access to SNMP traps management; for every possible alarm is possible to enable or disable the traps sending. Besides, it is possible to set their destination address.

Traps Management

Modem Traps

Trap	Enable/Disable
Temperature	☒
MSE	☒
Timing Loop	☒
LDPC decoder stress	☒
DEM Lock	☒
uC error	☒

Interface Traps

BNC/ASI Traps

RX Traps

TX Traps

Controller Traps

Apply

Figure 70: Web Controller form – Modem SNMP traps configuration.

Traps Management

Modem Traps

Interface Traps

Trap	Enable/Disable
ETH Lock	☒
ETH Overflow	☒
ETH Pause Receive	☒
ETH Pause Sent	☒
FPGA Error	☒

BNC/ASI Traps

RX Traps

TX Traps

Controller Traps

Apply

Figure 71: Web Controller form – Data interface SNMP traps Configuration.

Modem Traps

Interface Traps

BNC/ASI Traps

BNC name	Signal Presence	Locked	Timing Error	Overflow Error	Underflow Error
A	☒	☒	☒	☒	☒
B	☒	☒	☒	☒	☒
C	☒	☒	☒	☒	☒
D	☒	☒	☒	☒	☒
E	☒	☒	☒	☒	☒
F	☒	☒	☒	☒	☒
G	☒	☒	☒	☒	☒
H	☒	☒	☒	☒	☒
K	☒	☒	☒	☒	☒
J	☒	☒	☒	☒	☒

RX Traps

TX Traps

Controller Traps

Apply

Figure 72: Web Controller form – Baseband signals SNMP traps configuration.

Traps Management

Modem Traps

Interface Traps

BNC/ASI Traps

RX Traps

Trap	Enable/Disable
Temperature	☒
PLL1	☒
PLL2	☐
Low RSSI	☒

TX Traps

Controller Traps

Apply

Figure 73: Web Controller form – Receiver SNMP traps Configuration.

Traps Management

Modem Traps

Interface Traps

BNC/ASI Traps

RX Traps

TX Traps

Trap	Enable/Disable
Temperature	☒
PLL1	☒
PLL2	☒
Low Power	☒

Controller Traps

Apply

Figure 74: Web Controller form – Transmitter SNMP traps configuration.

Traps Management

Modem Traps

Interface Traps

BNC/ASI Traps

RX Traps

TX Traps

Controller Traps

Trap	Enable/Disable
Modern Fan	☒
RF Fan	☒
PSU1 Fan	☒
PSU2 Fan	☒
RF Fan	☒
PSU1 12V	☒
PSU2 12V	☒
5 Volt	☒
6 Volt	☒

Apply

Figure 75: Web Controller form – Controller SNMP traps configuration.

Traps Receiver

Trap receiver

127.0.0.1

Apply

Figure 76: Web Controller form – Trap Destination configuration.

8.3.5 Controller – Tools.

Tools

Tools

Date & Time

System Time:

9.7.2011 10:27:49

Local Time:

18.10.2012 11:47:09

New Time:

18.10.2012 11:47:09

Apply

Reset Command

Slot

Controller

System

TFT Calibration

USB Token

Customer Name

Create Token

Figure 77: Web Controller form – general info and tools.

Table 20: General instruments.

System Time	
Local Time	
New Time	Text box to modify local time.

The “Reset Command” subsection let the user send a reset pulse to related subsections separately, i.e. the modem microcontroller, the system controller, the whole system or to TFT calibration.

“USB Token” subsection let the user generate a single-use password to be installed on a USB drive, which let the user modify equipment parameters through display (after connection of the drive to USB port on the front panel).

8.3.6 Controller – Password management.

Password Management

Manage system Password

User Password

Apply

Super User Password

Apply

Administrator Password

Apply

Display Password

Apply

SNMP Read Community

Apply

SNMP Write Community

Apply

Figure 78: Web Controller form –password management.

This form let modify the passwords for web interface, TFT and the SNMP communities.

Passwords should be composed of at least six characters and cannot overcome fifteen characters.
The password level that can be modified is subject to the rights of the user. The user “User” cannot change passwords. User “Super-User” can change its own and the “User” ones. The “Administrator” can change any password.

8.4 Tab Slot.

Web tab of the Controller board is composed by 4 sections:

- Modem
- Interface
- Tx
- Rx

8.4.1 Slot – Modem.

Web section of Modem board is composed by 5 frames, reporting information about both modulator and demodulator part.

1. Status
2. MSE Graphic
3. Temperature Management
4. Profile Management
5. Operational Mode Management

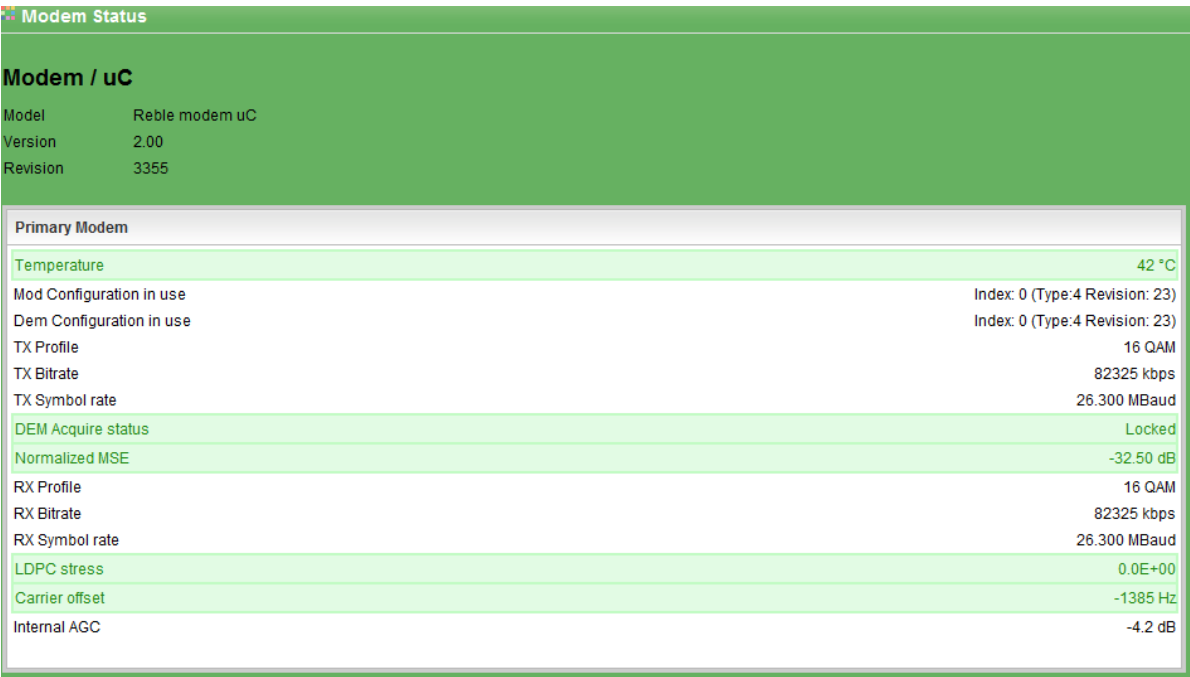


Figure 79: Web slot modem form – status.

Status frame reports the information already shown in the homepage of the web interface. (See par. 8.1.2).

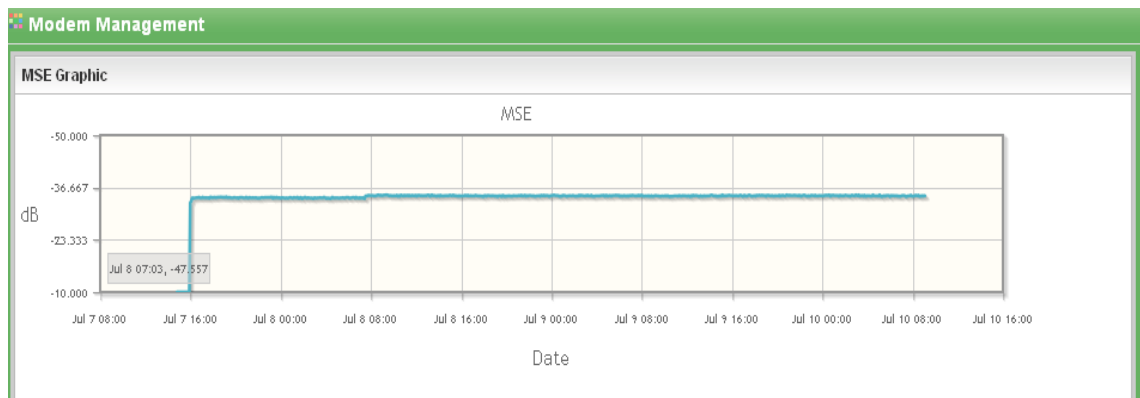


Figure 80: Web slot modem form – MSE Graphic.

MSE Graphic frame reports the MSE trend of last 10 days, with 5 seconds sampling time.

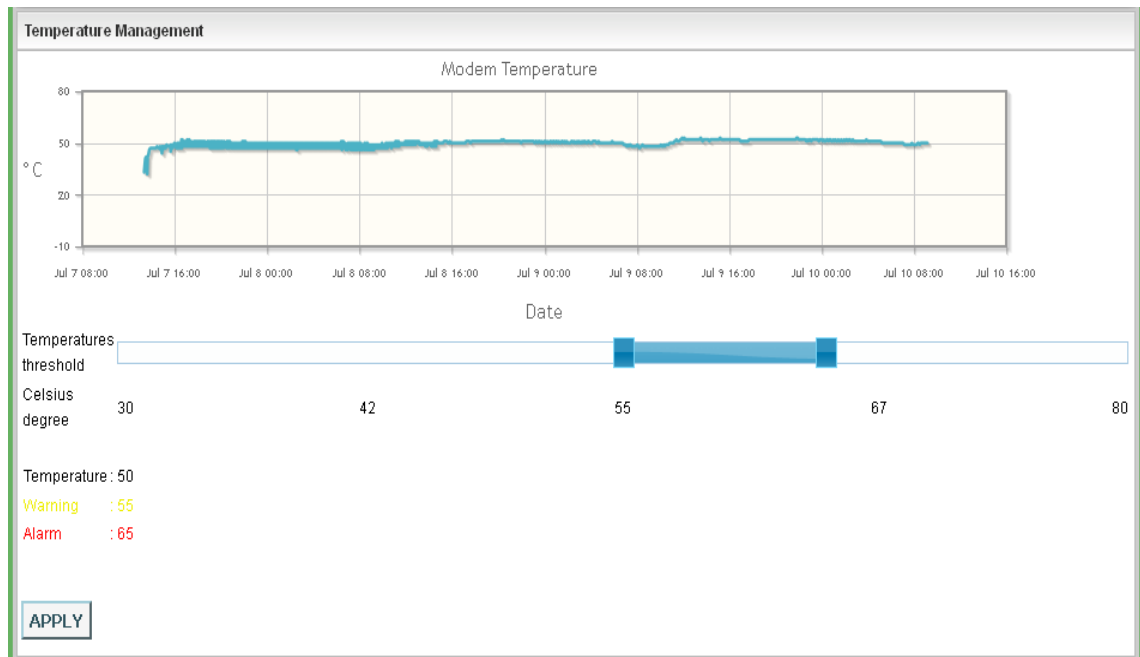


Figure 81: Web slot modem form – Temperature management.

Temperature management frame reports modem board temperature trend of last 10 days, with 5 seconds sampling time.

Furthermore, it is possible to set and check alarm and warning thresholds (through the interactive bar and the **Apply** button), and the actual temperature.

Profile management			
Configuration:	4	Revision:	0
Mother rate:	3/4	Block size:	8K
Symbol rate:	25.200 MBaud	Nominal Modulation Bandwidth:	28.000 MHz
Profile	128 QAM - 153978 kbps		
Apply			

Figure 82: Web slot modem form – Profile management.

Profile management

Configuration: 4 Revision: 0
 Mother rate: 3/4 Block size: 8K
 Symbol rate: 25.200 MBaud Nominal Modulation Bandwidth: 28.000 MHz

Profile: 128 QAM - 153978 kbps (selected)
 QPSK - 41162 kbps
 8PSK - 61744 kbps
 16 QAM - 82325 kbps
 32 QAM - 102906 kbps
 64 QAM - 130021 kbps
 128 QAM - 153978 kbps

Operational Mod: 128 QAM - 153978 kbps

Apply

Figure 83: Web slot modem form – Profile management expanded.

Profile Management frame let the user change modulator profile, selecting it through dropdown-list; all profiles belonging to the same configuration share the parameters hereunder shown:

- LDPC Mother Rate
- Symbol Rate
- FEC blocks dimension
- Occupied bandwidth

Operational Mode Management

Operational Mode: Normal (selected)
 Predistortion: ☒
 XPic: ☐

Apply

Figure 84: Web slot modem form – Operational Mode Management.

Operational Mode Management

Operational Mode: Normal (selected)
 Predistortion
 XPic

Apply

Normal (selected)
 Normal
 One tone
 Two tone
 Sweep tone
 White noise
 Mute
 PRBS
 Stub

Figure 85: Web slot modem form – Operational Mode Management expanded.

Operational Mode Management frame let the user modify some modem parameters:

- Operational Mode:
 - o Normal
 - o Clean carrier generator (for dish aligning)
 - o Two tones generator
 - o Sweep
 - o White noise

- Mute
 - PRBS
 - Stub
- Pre-distortion enabling (recall factory defaults for each frequency)
- XPIC function enabling (only with related hardware option)

8.4.2 Slot – Interface.

Web section of I/O Interface is composed by 4 frames:

- 1. Status
- 2. Input / Output port Management
- 3. Ethernet port Management
- 4. Transit Management

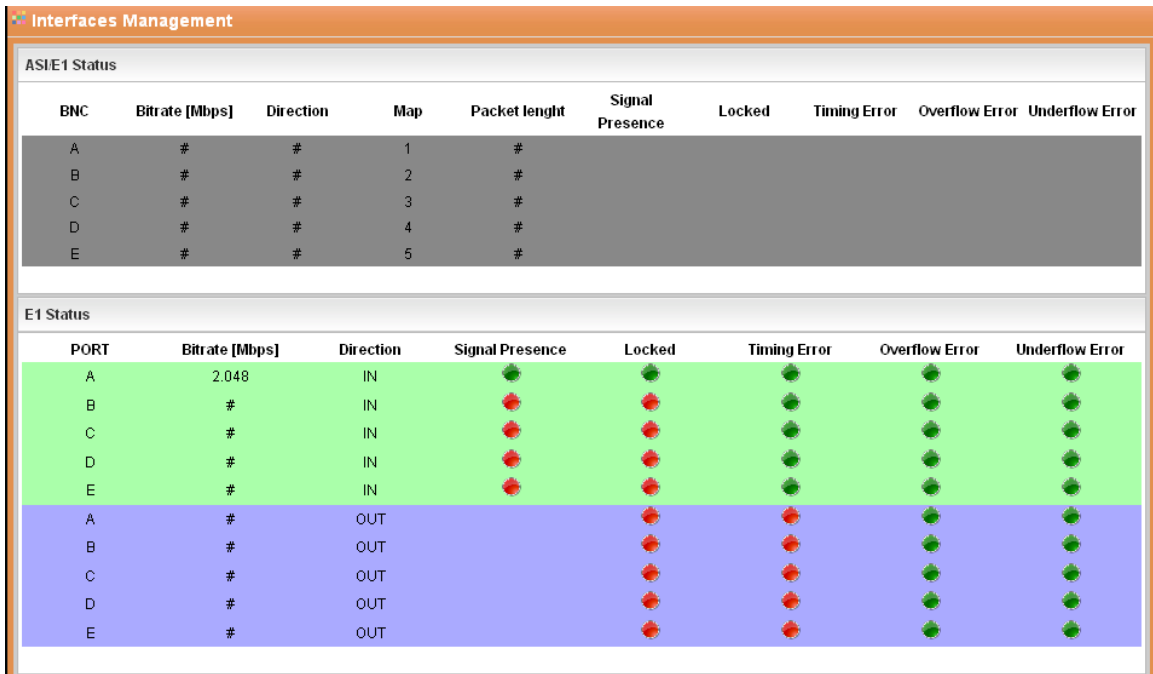


Figure 86: Web slot interface form – Status.

Status frame reports information already shown in the homepage (see par.8.2).

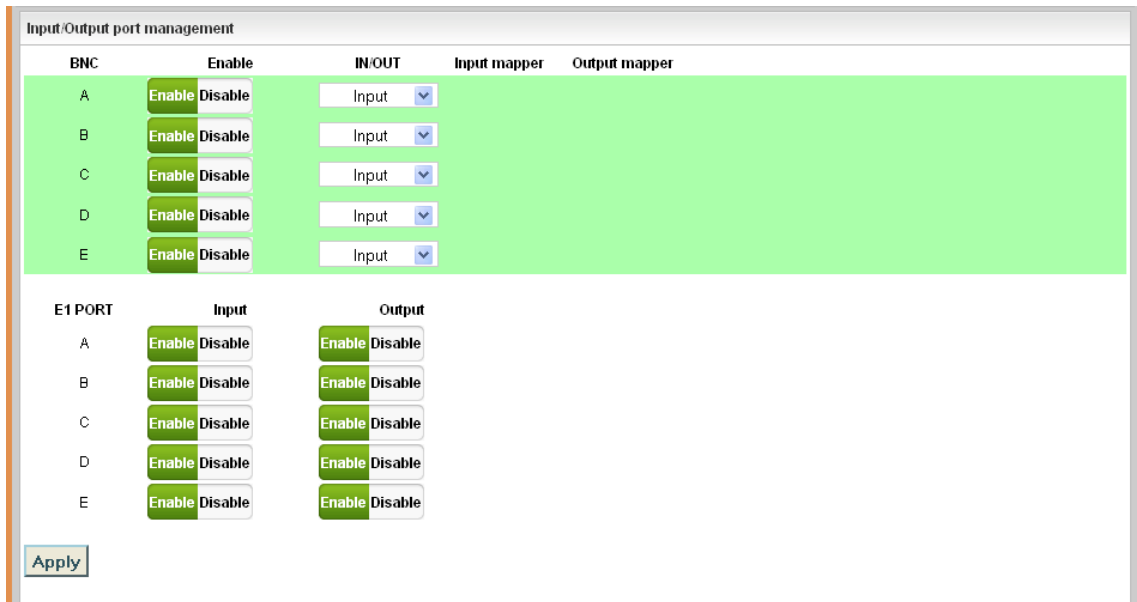


Figure 87: Web slot interface form – Input/Output ports management.

Input/output port management frame let the user configure signals on each BNC and RJ48C connector of the back panel; connectors are identified with ten letters (A, B, C, D, E) as per serigraphy (see par. 9.2) and for each one it is possible to:

- 1. Enable or disable the port.
- 2. Configure the port as input or output (just BNCs)

- 3. Associate a transport channel number (from 1 to 10; one number can be tied to only one input at a time). (just BNCs)
- 4. Associate a channel to be extracted (from 1 to 10; outputs can be multiple). (just BNCs)

Ethernet port management

Enable Port

Enable

Disable

Apply

Figure 88: Web slot interface form – Ethernet port management.

Ethernet port management let the user configure the Ethernet transport port.

Transit management

Transit port	Enable	Input mapper	Custom
1	Enable Disable	disabled	☐
2	Enable Disable	disabled	☐
3	Enable Disable	disabled	☐
4	Enable Disable	disabled	☐
5	Enable Disable	disabled	☐
6	Enable Disable	disabled	☐
7	Enable Disable	disabled	☐
8	Enable Disable	disabled	☐
9	Enable Disable	disabled	☐
10	Enable Disable	disabled	☐

Apply

Figure 89: Web slot interface form – Transit management.

Transit port management frame let the user configure the transit ports of the incoming transit connection; transit ports are identified with ten numbers (1-10) and for each one it is possible to:

- 1. Enable or disable the port.
- 2. Associate a transport channel number (from 1 to 10; one number can be tied to only one input at a time).

8.4.3 Slot – TX.

Web section of transmitter board is composed by 4 frames:

1. Status
2. Temperature Management
3. Power Management
4. Frequency

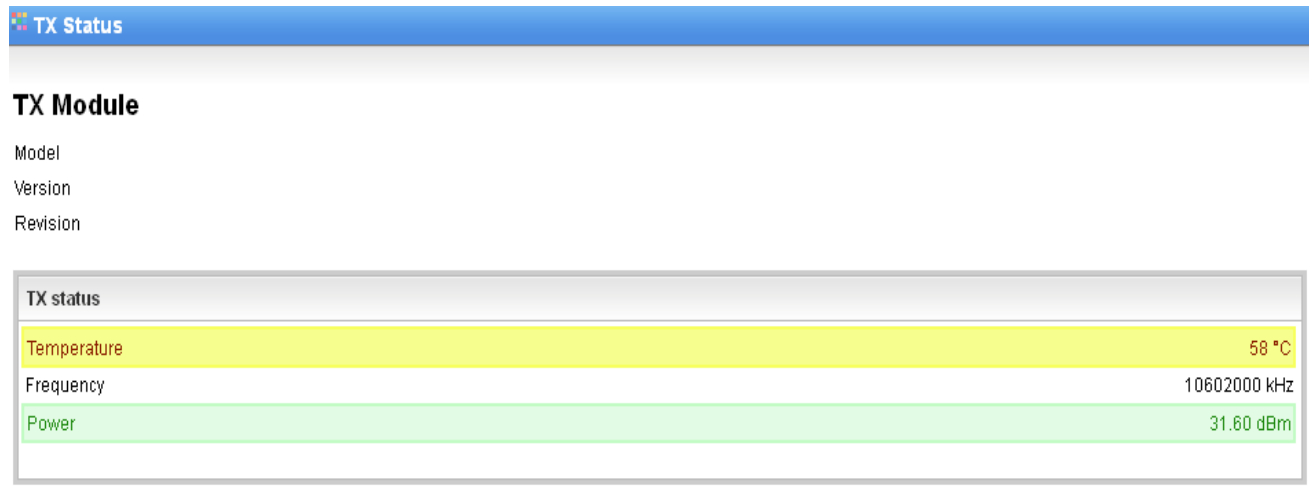


Figure 90: Web slot TX form – status.

Status frame reports information already shown in homepage (see par.8.2.1).

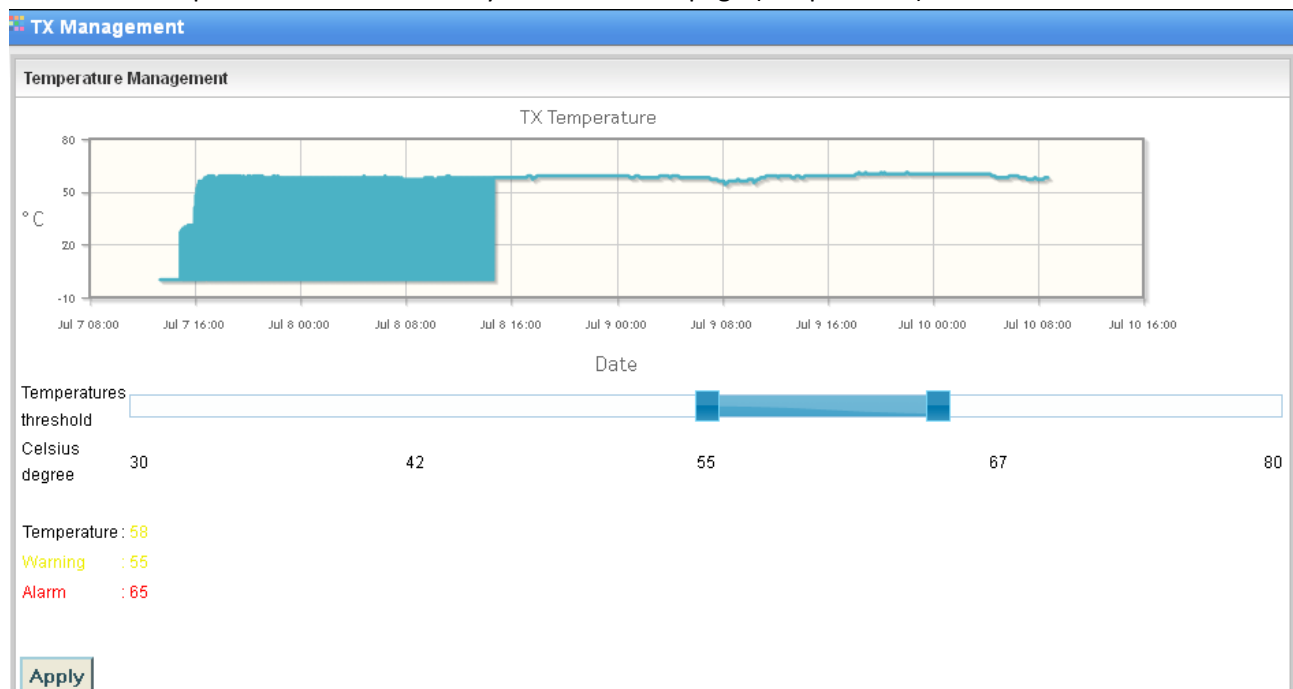


Figure 91: Web slot TX form – Temperature management.

Temperature management frame reports transmitter board temperature trend of last 10 days, with 5 seconds sampling time. Furthermore, it is possible to set and check alarm and warning thresholds (through the interactive bar and the **Apply** button), and the actual temperature.

Power management

Power Management in dB [-2.0:+2.0]:
Current (dBm):

-0.5

31.6

Apply

Squelch



Figure 92: Web slot TX form – Power management.

Power management frame let the user manage transmitter output power, modifying it from factory default calibration. Power, shown in lower part of the frame and measured in dBm, can be adjusted in a -2 to +2 dB range from the calibration value. It is possible to mute the transmitter by clicking on the related switch in the right part of the frame.

Frequency

Frequency in KHz: 10597000 10607000

Figure 93: Web slot TX form – Frequency.

Frequency frame let the user change the transmitter frequency, depending on the factory limits (shown in the interactive bar); by default, it is possible to modify the frequency in a +/- 5 MHz range (channel filter is generally installed).

8.4.4 Slot – Rx.

Web section receiver board is composed by 4 frames:

1. Status
2. RSSI Graphic
3. Frequency
4. Temperature Management

RX Status

RX Module

Model

R10

Version

V2-610

Revision

00018/2012

RX status

Temperature

42 °C

Frequency

10140000 kHz

Rssi

-52.80 dBm

Figure 94: Web slot Rx form – status.

Status frame reports information already shown in homepage (see par.8.2.2).

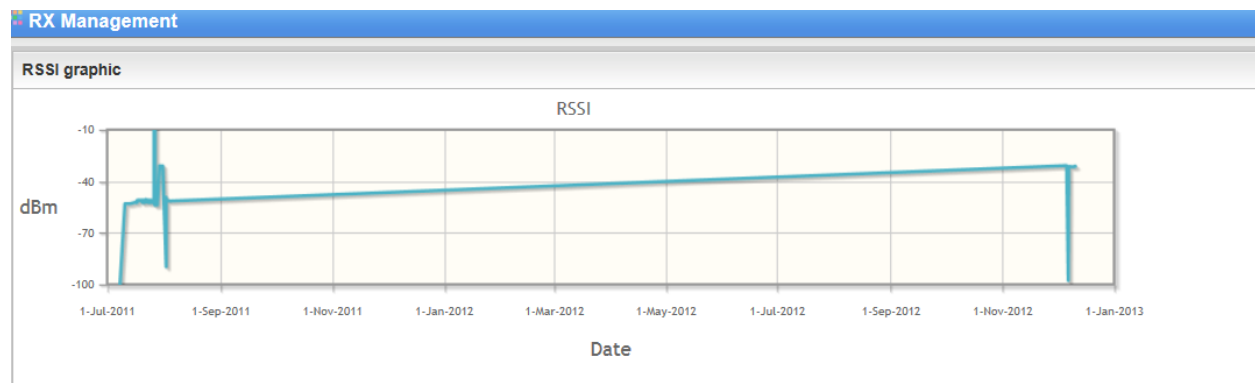


Figure 95: Web slot Rx form – RSSI Graphic.

RSSI Graphic frame reports the received signal strength trend of last 190 days with 5 seconds sampling time.

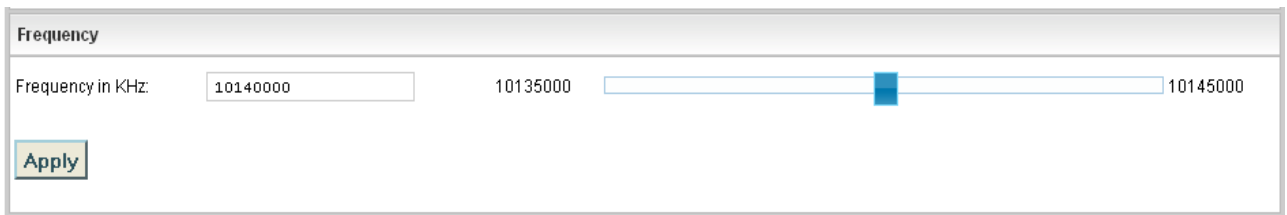


Figure 96: Web slot Rx form – Frequency.

Frequency frame let the user change the receiver frequency, depending on the factory limits (shown in the interactive bar); by default, it is possible to modify the frequency in a +/- 5 MHz range (channel filter is generally installed).

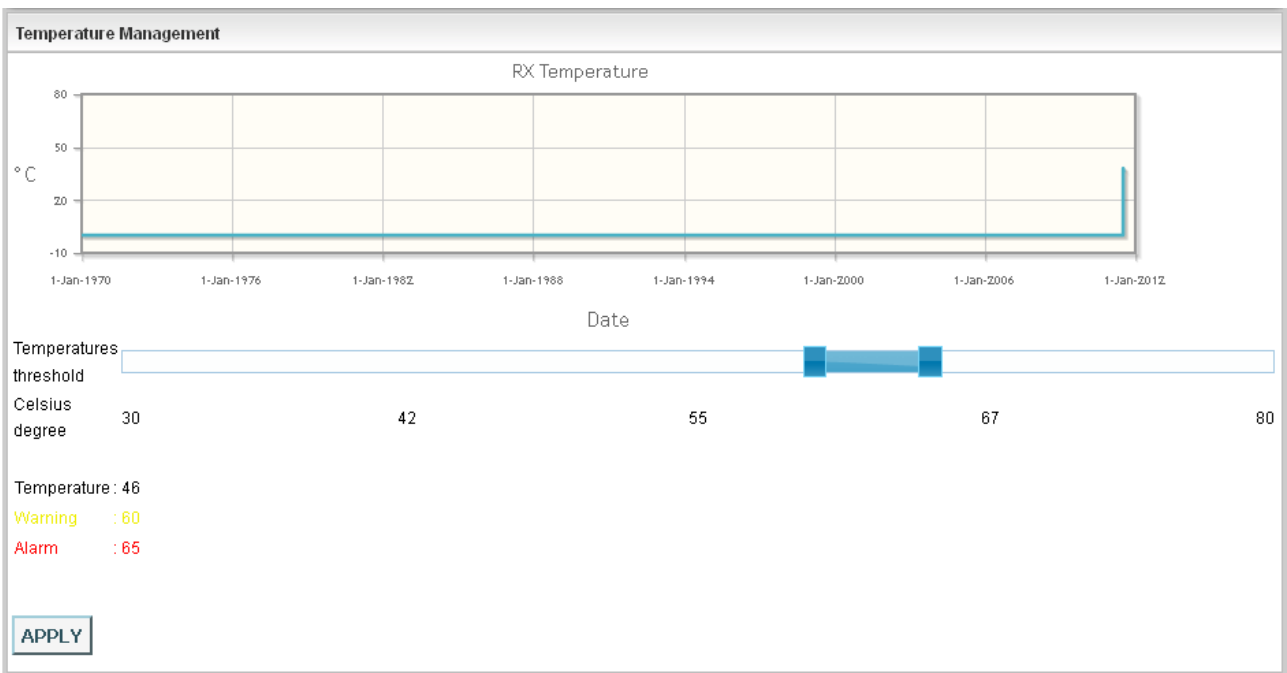


Figure 97: Web slot Rx form –Temperature Management.

Temperature management frame reports transmitter board temperature trend of last 10 days, with 5 seconds sampling time. Furthermore, it is possible to set and check alarm and warning thresholds (through the interactive bar and the **Apply** button), and the actual temperature.

8.4.5 Slot – Communicator.

This frame let the user check the status of the communication between IDU and ODU.

Communicator

General Information

Board Model	Reble ODU	Customer	Elber s.r.l.
Version	1.02	Serial Number	REB610/00001
Revision	2620	Part Number	REB610/00001/2013

Local communication interface

Model	Local Comm Unit
Version	1.00
Revision	2128

Remote communication interface

Model	Head Comm Unit
Version	1.00
Revision	2128

Local communication interface status

Local BER	0.0E+00
Remote BER	0.0E+00
FPGA Temperature	31 °C
Step up Temperature	45 °C
Step up voltage pre switch (48V)	47.9 V
Step up post switch (48V)	47.8 V
Step up current	1.7 A

Local communication interface alarm

Remote communication interface status

Temperature	70 °C
Voltage 1 (48V)	47.6 V
Voltage 2 (12V)	12.0 V

Remote communication interface alarm

Figure 98: Web slot communicator IDU.

ODU / Communicator

ODU Temperature Management

Temperatures threshold

Celsius degree

3042556780

Temperature : 70

Warning : 55

Alarm : 60

APPLY

Figure 99: ODU temperature monitoring and threshold configuration.

Communicator Temperature Management

Temperatures threshold

Celsius degree

3042556780

Temperature : 31

Warning : 55

Alarm : 58

APPLY

Figure 100: Communication boards temperature monitoring and thresholds configuration.

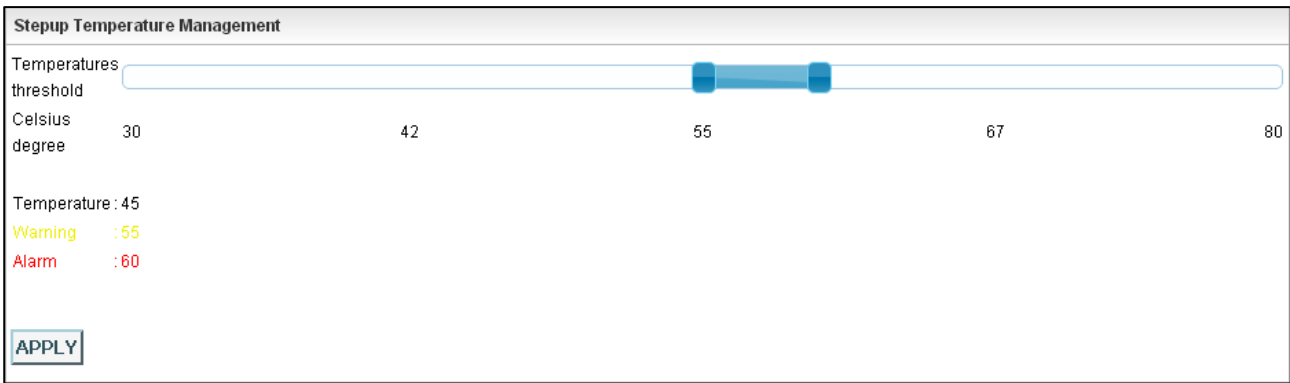


Figure 101: Step-up temperature monitoring and thresholds configuration.

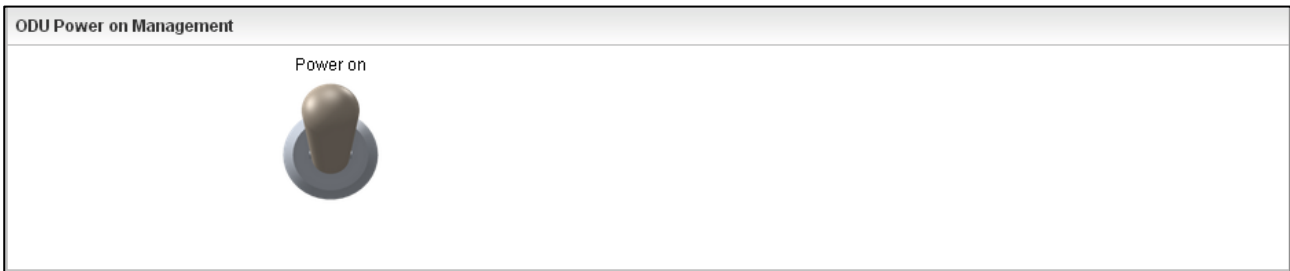


Figure 102: RF Head enabling/disabling frame.

The switch icon is intuitive for the user and let switch on or off the RF Head, for maintenance or troubleshooting purposes. It has the same function of the real switch depicted in

8.5 Tab Upgrade.

Web tab of the Upgrade is composed by 2 sections:

- Configuration uploader
- Machine upgrade

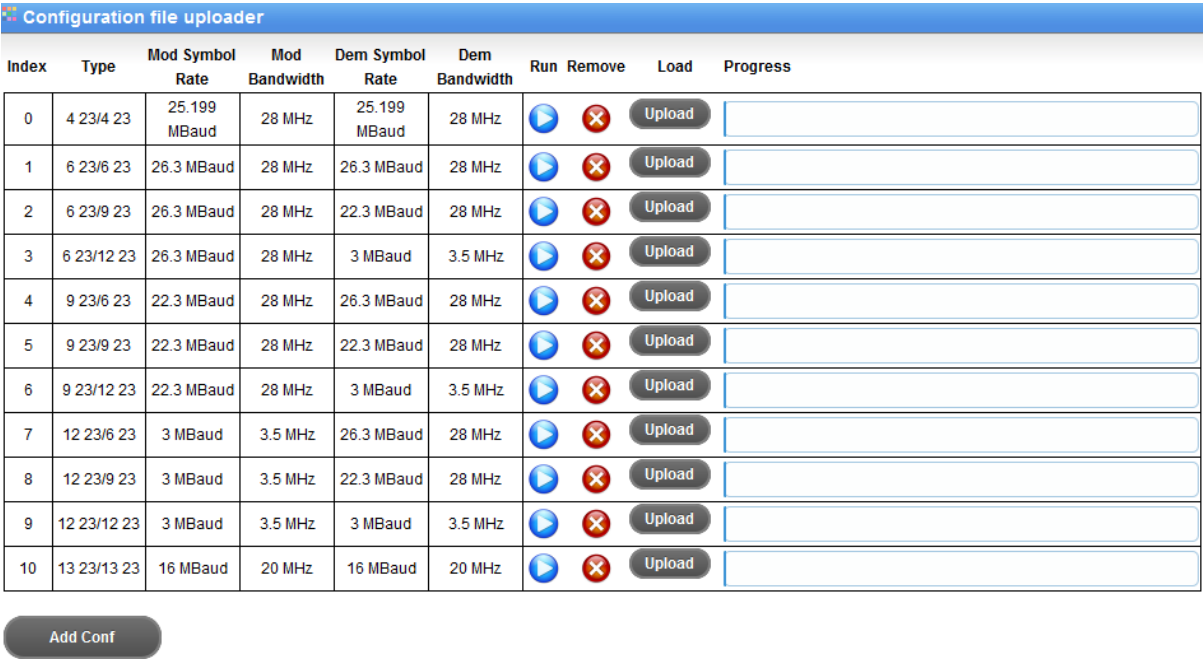
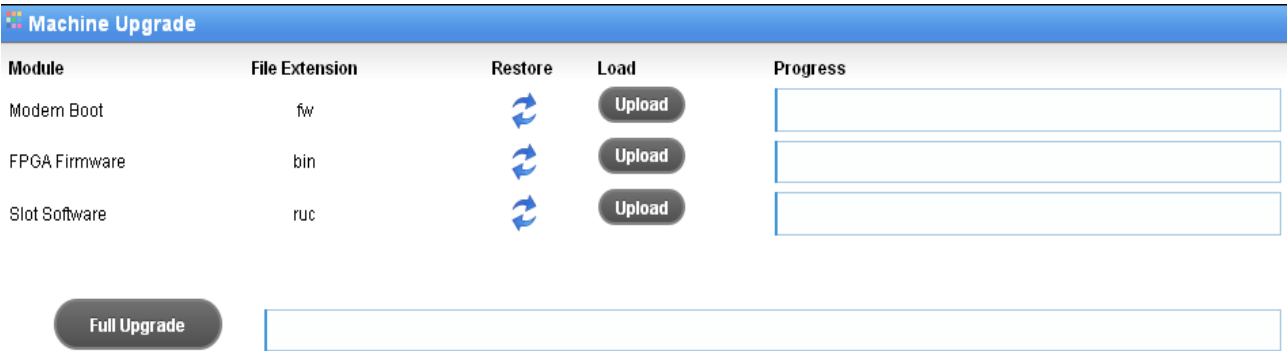


Figure 103: Web Upgrade form – Configuration File Uploader.

This frame let the user select a modem configuration, remove it from database, upload a new one and check the stored ones.



The 'Machine Upgrade' form features a table with columns: Module, File Extension, Restore, Load, and Progress. It lists three modules: Modem Boot (fw), FPGA Firmware (bin), and Slot Software (ruc). Each row has a 'Restore' icon, an 'Upload' button, and a progress bar. Below the table is a 'Full Upgrade' button and a large progress bar.

Module	File Extension	Restore	Load	Progress
Modem Boot	fw		Upload	
FPGA Firmware	bin		Upload	
Slot Software	ruc		Upload	

Full Upgrade

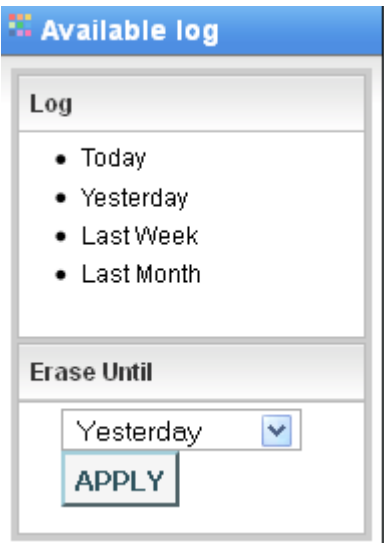
Figure 104: Web Upgrade form – Machine Upgrade.

This frame let the user upload equipment software upgrade; three kinds of upgrades exist:

- Modem boot
- FPGA firmware
- Modem board microcontroller firmware

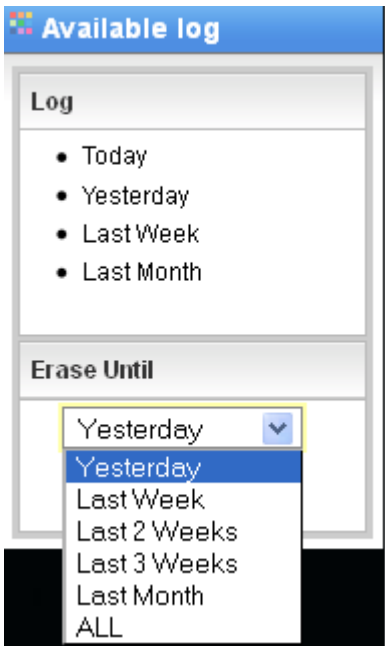
Update status can be real time monitored through the Progress bar; moreover it is possible to make a complete update by pushing **Full Upgrade** button.

8.6 Tab Log.



The 'Available log' form shows a 'Log' section with radio buttons for Today, Yesterday, Last Week, and Last Month. Below is an 'Erase Until' section with a dropdown menu set to 'Yesterday' and an 'APPLY' button.

Figure 105 : Web Log form – available log.



This image shows the 'Available log' form with the 'Erase Until' dropdown menu expanded. The menu options are: Yesterday, Yesterday, Last Week, Last 2 Weeks, Last 3 Weeks, Last Month, and ALL.

Figure 106: Web Log form – available log expanded.

The equipment offers an operation log service that can be checked in this tab of the web interface.

In left part of the web page, the form concerning available logs is present, grouped by:

- Daily report
- Last day
- Last week
- Last month

In order to avoid huge memory usage, it is recommended to delete old records using **Erase until** form and selecting desired interval (Figure 106).

In central part of the page, log messages are reported, organized in a table that can be ordered, filtered and resized in terms of number of rows per page.

Records belong to 4 different categories are shown with different colors for user facility:

1. Messages
2. Configurations
3. Alarms
4. Warnings

Every record has a time, a description and an origin; an alarm event is described in appendix with OCCURRED tag, while the alarm condition recovery is a Message with appendix RECOVERED. Records can be ordered in every column and filtered (with related checkbox).

Log can be saved as .csv file with button **SAVE TO DISK**.

Log content			
Today			
Event Type Filter		Description Filter	
☒ Alarms	☒ Warnings	☒ Messages	☒ Configurations
			Clear Res
SAVE TO DISK			
Date Time	Event Type	Description	Origin
012-12-10 15:34:35	MESSAGE	INTERFACE OUTPUT MAP G overflow ALARM RECOVERED	REBLE MONITOR
2012-12-10 14:46:18	MESSAGE	LOG MANAGER STARTED	LOGMANAGER
2012-12-10 14:46:27	ALARM	PSU secondary ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:28	MESSAGE	PSU volt_12 ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:32	ALARM	INTERFACE fpga ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:32	ALARM	INTERFACE BNC J crd ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:32	ALARM	INTERFACE BNC J locked ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:32	ALARM	INTERFACE BNC E crd ALARM OCCURRED	REBLE MONITOR
2012-12-10 14:46:32	ALARM	INTERFACE BNC E locked ALARM OCCURRED	REBLE MONITOR
2012-12-10 15:31:38	ALARM	INTERFACE BNC D locked ALARM OCCURRED	REBLE MONITOR

Figure 107: Web Log form – log.

Log content			
Today			
Event Type Filter		Description Filter	
☒ Alarms	☒ Warnings	☒ Messages	☒ Configurations
			Clear Res
Date Time	Event Type	Description	Origin
LOG NOT FOUND			
H L 1/1 R H 30 per page v			

Figure 108: Web Log form – filters.

Log content

Today

Event Type Filter

☒ Alarms ☒ Warnings ☒ Messages ☒ Configurations

Description Filter

Clear

Res

Date Time

Event Type

Description

Origin

LOG NOT FOUND

1/1

30 per page

10 per page

20 per page

30 per page

50 per page

100 per page

Figure 109: Web Log form – filters (selection of number of lines per page).

9 Mechanics.

9.1 Front Panel.

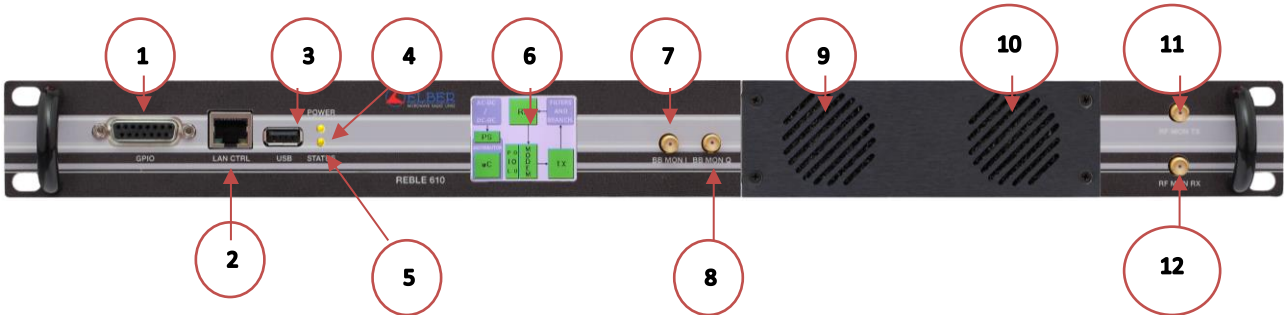


Figure 110 : REBLE610-ODU front panel.

Table 21: Front Panel description.

Item	Description	Function
1	Connector DB15	Remote control.
2	Connector RJ-45	Ethernet 10/100 port for Management.
3	Connector USB	Upgrade firmware and token connection for TFT access.
4	Green led	“On” indication.
5	Three-colors led for general status	Green: ok Yellow: warning Red: alarm
6	Display TFT touchscreen	User interface (needs token to accede).
7	Connector SMA (f) 75 Ohm	I-path reception monitor out.
8	Connector SMA (f) 75 Ohm	Q-path reception monitor out.
9	Left fan	Modem, data interface and receiver cooling fan.
10	Right fan	Transmitter cooling.
11	Connector SMA (f) 75 Ohm	Not used in split type version.
12	Connector SMA (f) 75 Ohm	Not used in split type version.

9.2 Back Panel.

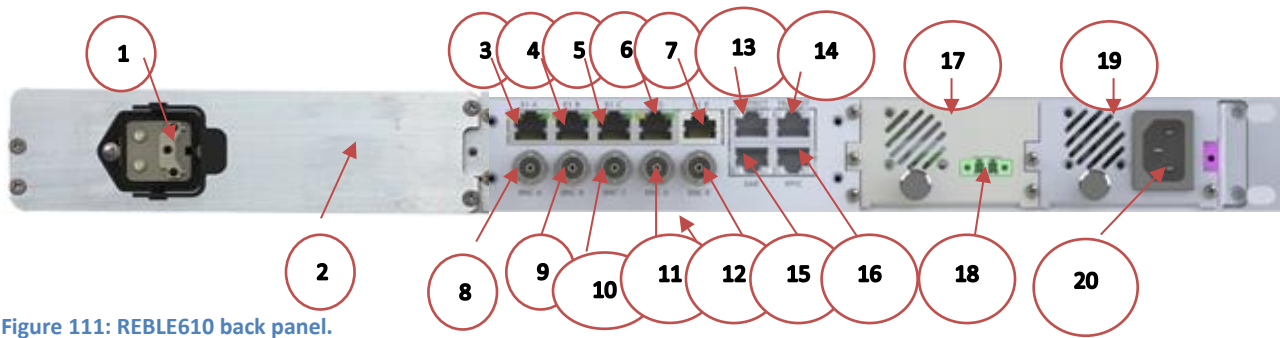


Figure 111: REBLE610 back panel.

Item	Description	Function
1	Harting hybrid connector	RF Head connection.
2	Switch	On/Off head button.
3	Connector RJ48C	In/out E1 A INOUT.
4	Connector RJ48C	In/out E1 B INOUT.
5	Connector RJ48C	In/out E1 C INOUT.
6	Connector RJ48C	In/out E1 D INOUT.
7	Connector RJ48C	In/out E1 E INOUT.
8	Connector BNC 75 Ohm	In/out SMPTE310/ASI A (software configuration).
9	Connector BNC 75 Ohm	In/out SMPTE310/ASI B (software configuration).
10	Connector BNC 75 Ohm	In/out SMPTE310/ASI C (software configuration).
11	Connector BNC 75 Ohm	In/out SMPTE310/ASI D (software configuration).
12	Connector BNC 75 Ohm	In/out SMPTE310/ASI E (software configuration).
13	Connector RJ-45	Not used.
14	Connector RJ-45	Baseband data transit between a receiving terminal and a transmitting terminal (software configuration).
15	Connector RJ-45	Ethernet 10/100/1000 "Gigabit Ethernet" for data transport.
16	Connector RJ-45	Link for XPIC configuration with paired REBLE610 (hw configuration) for exchange of data received and demodulated from different polarization than used, for opportune cancelling.
17	PSU	Backup Power supply, AC or DC; in Figure 111 the DC input model is shown. Hot swappable.
18	2 pin connector	Batteries connection, independent on polarity.
19	PSU	Main Power supply, AC or DC; in Figure 111 the AC input model is shown. Hot swappable.
20	Plug IEC320	AC supply plug.

9.3 RF Head.



Figure 112: RF Head 10 GHz.

The RF Head features one or two antenna connections depending on customer needs; indeed the circulator to couple transmitter and receiver modules can be inside or outside the head. Adapters and rigid waveguide branches are provided if frequencies are above 10 GHz. If required by customer, the RF head operating in 6L or 6U bands can be supplied with waveguide flanges instead of N connector(s).

The RF head can come with analog meter to check main measurements, such as output power and RSSI, as well as some voltages (48V coming from IDU and 12V post step-down converter for RF modules supply).

Connection between IDU and ODU is performed through a hybrid cable with two fiber optics and three copper conductors to provide 48V to the RF Head; telemetry is part of the digital data stream travelling through fiber optics, together with I and Q components, transmitted and/or received, digitalized on communication boards.