

ETG5200
ETG3500
ETG2500

(list of variations available in the manual)

SOLID STATE FM TRANSMITTER

Rev. 01- 27/08/2013
Cod. MAN1008UUK

ELENOS
World Broadcast Experience

USER MANUAL



Via G. Amendola 9, 44028 Poggio Renatico Ferrara (Italy)
C.C.I.A.A. 101 216, Tax code and VAT reg. no. IT00415540384



UNI EN ISO 9001:2008 certified company
Certificate No.102222A

Please remember to register the product purchased on <http://www.elenos.com/product-registration/>

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Please complete the RMA form (ITA <http://www.elenos.com/it/elenos-rma/> or ENG <http://www.elenos.com/elenos-rma/>) and provide the equipment serial number (indicated on the nameplate).

Elenos s.r.l. declares that the equipment described in this document is compliant with the 1999/05/EC Directive.



For details please refer to the "EC Marking" section.

EC Declaration of Conformity

According to Directive 1999/5/EC (R&TTE)



We : ELENOS s.r.l. - via G.Amendola, 9 – 44028 Poggio Renatico (FE) - Italy

Declare under our sole responsibility that the product:

ETG5200, ETG5000, ETG4000/5, ETG3500/5, ETG3000/5, ETG2500/5, ETG2000/5, ETG1800/5, ETG1500/5, ETG1200/5, ETG1000/5, ETG800/5, ETG500/5

ETG3500, ETG3000/3.5, ETG2500/3.5, ETG2000/3.5, ETG1800/3.5, ETG1500/3.5, ETG1200/3.5, ETG1000/3.5, ETG800/3.5, ETG500/3.5

ETG2500, ETG2000/2.5, ETG1800/2.5, ETG1500/2.5, ETG1200/2.5, ETG1000/2.5, ETG800/2.5, ETG500/2.5

E5200, E5000, E4000/5, E3500/5, E3000/5, E2500/5, E2000/5, E1800/5, E1500/5, E1200/5, E1000/5, E800/5, E500/5

E3500, E3000/3.5, E2500/3.5, E2000/3.5, E1800/3.5, E1500/3.5, E1200/3.5, E1000/3.5, E800/3.5, E500/3.5

E2500, E2000/2.5, E1800/2.5, E1500/2.5, E1200/2.5, E1000/2.5, E800/2.5, E500/2.5

With intended purpose: VHF FM broadcast transmitters and amplifiers

And manufactured by: ELENOS s.r.l.

To which this declaration relates is in conformity with the essential requirements and other relevant requirements of the R&TTE Directive (1999/5/CE).

The product is in conformity with the following standards and/or other normative documents:

Health and safety requirements pursuant to Article 3.1.a

Standards applied: EN60215:1989+A1:1992+A2:1994

Protection requirements concerning electromagnetic compatibility pursuant to Article 3.1.b

Standards applied: EN 301 489-1 V1.9.2 ; EN 301 489-11 V1.3.1

Measures for the efficient use of the radio frequency spectrum pursuant to Article 3.2

Standards applied: EN 302 018-2 V1.2.1

Supplementary information :

Notified body involved: Nemko AS

Technical file held by : Elenos s.r.l and Nemko AS

Place and Date: Ferrara March 11, 2013

Responsible person : Leonardo Busi (Amministratore unico)

Tel. +39 0532 829965

e-mail: leonardobusi@elenos.com

Signature:

The image shows a handwritten signature in black ink, which appears to be 'Leonardo Busi'. Below the signature is a circular stamp containing the text 'ELENOS S.R.L.' and 'AMMINISTRATORE UNICO'.

Series models

| Transmitter | Number of modules | Number of drivers | Maximum output power |
|---|-------------------|-------------------|--------------------------|
| ETG5200 | 7 | 1 | 5200W |
| ETG5000 | 7 | 1 | 5000W |
| ETG4000/5 ETG3500/5 ETG3000/5 ETG2500/5 ETG2000/5 ETG1800/5 ETG1500/5 ETG1200/5 ETG1000/5 ETG800/5 ETG500/5 | 7 | 1 | Equal to the rated value |
| ETG3500 | 5 | 1 | 3500W |
| ETG3000/3.5 ETG2500/3.5 ETG2000/3.5 ETG1800/3.5 ETG1500/3.5 ETG1200/3.5 ETG1000/3.5 ETG800/3.5 ETG500/3.5 | 5 | 1 | Equal to the rated value |
| ETG2500 | 4 | 1 | 2500W |
| ETG2000/2.5 ETG1800/2.5 ETG1500/2.5 ETG1200/2.5 ETG1000/2.5 ETG800/2.5 ETG500/2.5 | 4 | 1 | Equal to the rated value |

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1 General information

1.1 Intended use

The equipment referred to in this manual is solid state transmitters with adjustable output power from 0W to a maximum rated value (see Section "Series models"), to be used in the whole FM band between 87.5 and 108 MHz, in 10 kHz steps.

With this product, Elenos has achieved its aim of obtaining high values of power in just 4 rack units.

The transmitter is also a starting point for developing a new concept of scalability.

The RF performance, obtained with 7, 5 or 4 amplifier modules, is close to the highest target physically possible by the devices and current technology, in terms of efficiency. This enables a drastic reduction in the electrical operating costs.

The distinctive characteristics of Elenos products remain constant: ECOSAVING, ICEFET, VSWR PEAK HOLD, monitoring possibility, protection against corrosion, etc.

The available options STEREO or AES/EBU (both with integrated MPX).

The LIFEEXTENDER functionality can be added.

1.2 Transport

The equipment must only be transported in its original packaging. However, although it has been designed to prevent the machine being damaged, even in the event of incorrect manoeuvres, it is recommended to respect the "HIGH/LOW" direction and not to subject it to impact.

Ensure that the transport and lifting equipment are suitable for supporting the load.

1.3 Unpacking

The personnel in charge of handling the load must use protective gloves and accident-prevention footwear.

Before lifting or moving the equipment or any of its parts, check that the operating area has been cleared, also considering a safe area in order to prevent damage to people and/or properties that could be within the manoeuvring radius.

1.4 Storage

Should it be necessary to store the equipment for any reason, it is necessary that:

- in the storage area, the temperature is between -20° and +55°C, with humidity of no more than 90% at 55°C;
- the equipment is disconnected from energy sources;
- the equipment is clean and there are no dust deposits;
- the equipment is covered with a waterproof sheet.

1.5 Decommissioning and disposal

For all the aspects regarding the disposal of the product, please refer to the specific European Directives.

Please note that **the equipment DOES NOT CONTAIN POLLUTANT OILS.**

1.6 Checking the product purchased

Before installing the equipment, it is important to check that it was not damaged during transport or storage. Check that all standard components and accessories ordered have been delivered correctly, otherwise contact Elenos s.r.l .

In this case, the package must contain at least the following:

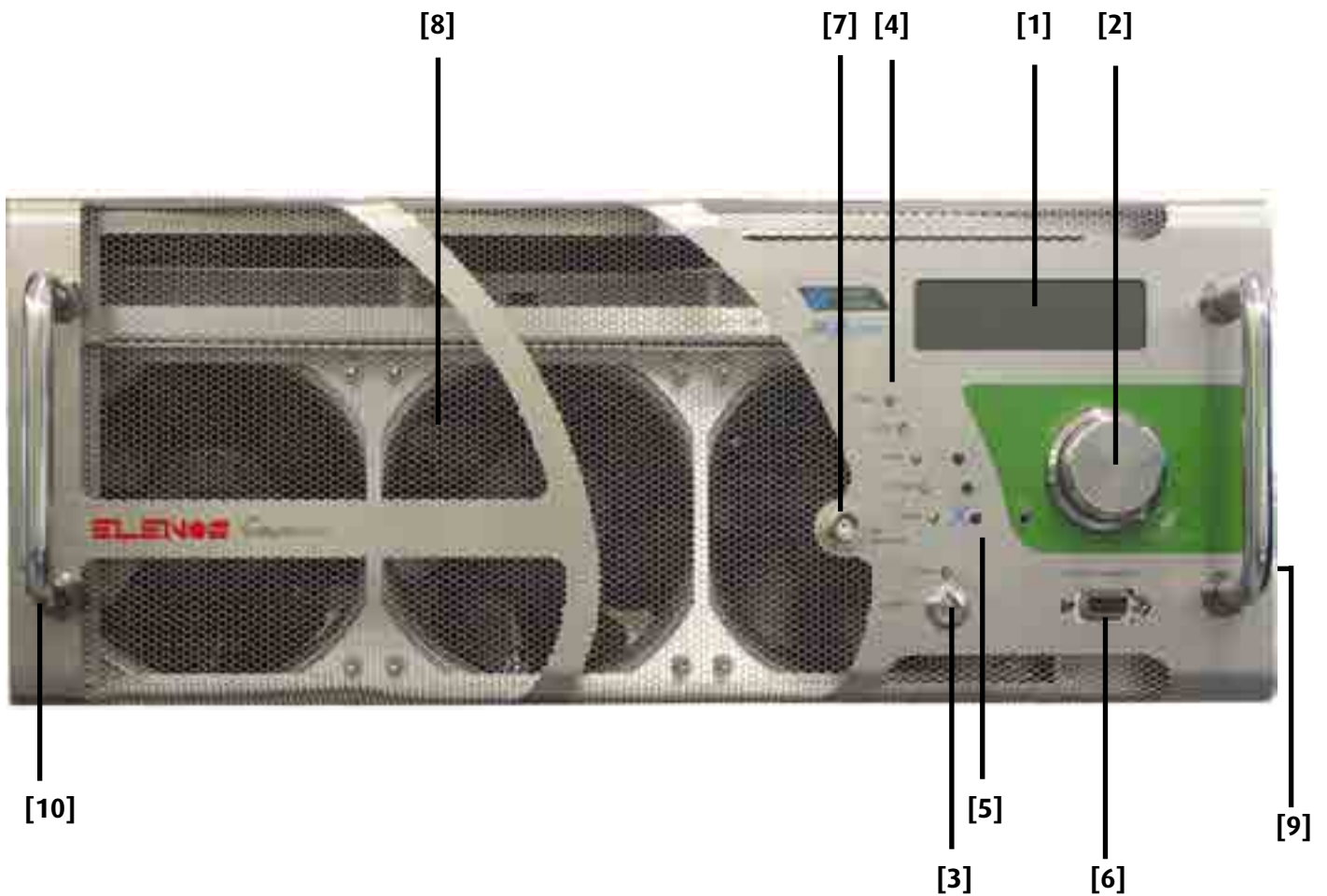
- n°1 piece of equipment from the ETG5200, ETG3500 or ETG2500 series;
- n°1 "Identification and Quick Start" manual, which we recommend keeping with the product;

It may also contain:

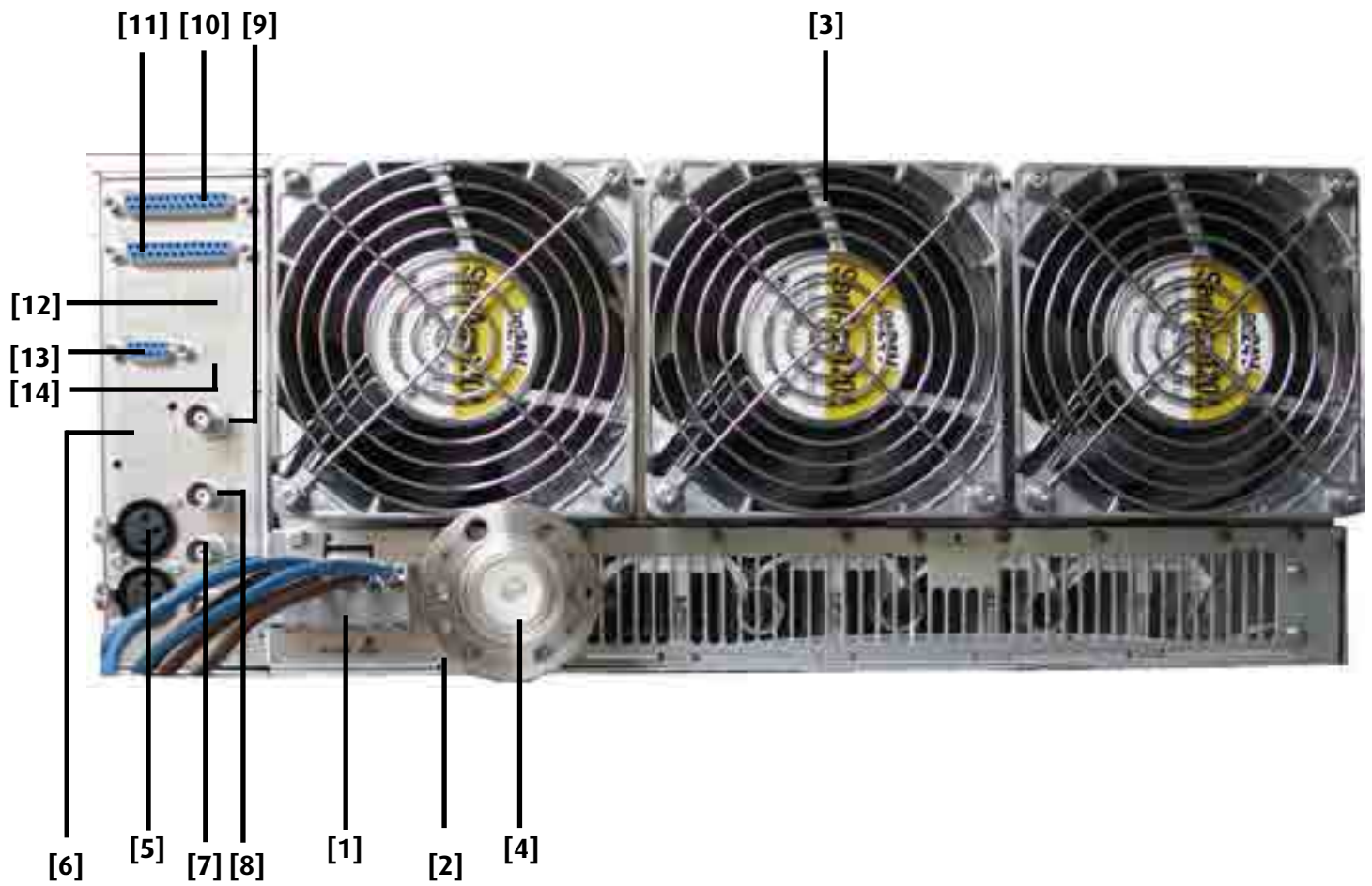
- n°1 "User" manual;
- n°1 CD containing all the documentation relative to Elenos s.r.l. manuals;
- n°1 PC connection cable.

Cables, spare parts and other accessories may be requested from Elenos S.r.l. or Elenos retailers.

2 Product description



You can find a detailed description of section here flagged in the Quick Start manual.



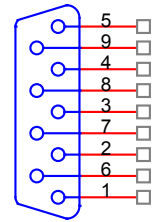
You can find a detailed description of section here flagged in the Quick Start manual.

2.1 Description of external connectors

2.1.1 EIA485 connector/Telemetry

N. 6 Front panel (type DB9 - female)

This connector uses Com1, as the connector n. 13 (rear). The two connectors can't be used simultaneously.



| Connector | Pin | Meaning | Notes |
|---------------------------|-----|---------------|------------------------|
| CN3 on board TG5K2A881 | 1 | Com1 TX+ | EIA485/422 |
| | 2 | Com1 TX- | EIA485/422 |
| | 3 | Com1 RX+ | EIA485/422 |
| | 4 | Com1 RX- | EIA485/422 |
| | 5 | Common ground | Connected to the frame |
| | 6 | Common ground | Connected to the frame |
| | 7 | Common ground | Connected to the frame |
| | 8 | Common ground | Connected to the frame |
| | 9 | Common ground | Connected to the frame |

2.1.2 LEFT/RIGHT connectors

N. 5 Rear panel (XLR type - female)

The input impedance is 10 kOhm (default), 600 ohm selectable with jumpers on the card.

If you have an unbalanced signal, connect the signal at the positive, the common ground and the negative input to ground (optional if $Z_{in} = 10\text{ kOhm}$, required if $Z_{in} = 600\text{ ohms}$).



| Connector | Pin | Meaning | Notes |
|---|-----|-----------------------------------|--------------------|
| J01 on board TG3K1A866 or J1 on board TG3K2A867 | 1 | Common ground | |
| | 2 | Right channel audio signal "+" | Differential input |
| | 3 | Right channel audio signal "-" | |
| J02 on board TG3K1A866 or J2 on board TG3K2A867 | 1 | Common ground | |
| | 2 | Left channel audio signal "+" | Differential input |
| | 3 | Left channel audio signal "-" | |

2.1.3 AES/EBU connector

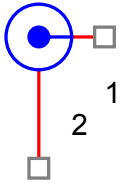
N. 6 Rear panel (XLR type - female)

| Connector | Pin | Meaning | Notes |
|--------------------------|-----|--|-------|
| J3 on board TG3K2A867 | 1 | Common ground | |
| | 2 | "Positive" differential AES-EBU input | |
| | 3 | "Negative" differen- tial AES-EBU input | |



2.1.4 AUX connectors

N. 7 Rear panel (BNC type - female)

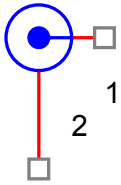


| Connector | Pin | Meaning | Notes |
|--------------------------|-----|---------------|-------|
| J2 on board TG3K0B866 | 1 | RDS/SCA AUX1 | Input |
| | 2 | Common ground | |
| J3 on board TG3K0B866 | 1 | AUX2 | Input |
| | 2 | Common ground | |

2.1.5 MPX connector

N. 8 Rear panel (BNC type - female)

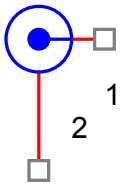
The input signal on the connector is in parallel, inside the card, to the signal L + right channel. For the correct operation ($Z_{in} = 10 \text{ k}\Omega$) requires that the jumper on the board, to select the impedance of 600 ohms on the right channel is removed (the jumper is not present by default).



| Connector | Pin | Meaning | Notes |
|--------------------------|-----|---------------|-------|
| J1 on board TG3K0B866 | 1 | MPX | Input |
| | 2 | Common ground | |

2.1.6 Monitor connector/19kHz

N. 9 Rear panel (BNC type - female)



| Connector | Pin | Meaning | Notes |
|--------------------------|-----|---------------------|--------|
| J4 on board TG3K0B866 | 1 | Monitor MPX (19KHz) | Output |
| | 2 | Common ground | |

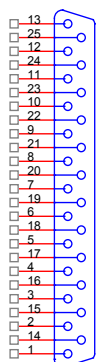
2.1.7 TC/TS connector

N. 10 Rear panel (DB25 type - female)




Signals compatible with standard IEC 60864-1.

As reported here applies both to the signals TC/TS that for the signals PROFILES.

- Digital I/O
- Polarity N
- Maximum voltage range: 0 to +30 V
- Operating voltage: between +0.5 and +5 .. +24 V
- Input Current : 5mA (controlled in parallel)
- Output current : 50mA max. Of the open drain type, can be connected in parallel (or wired, with the exception of the fault signal that is reversed polarity). Can drive inductive loads, in which case it is recommended to clamp diode in parallel with the load (cathode power supply).
- The inputs are supplied on board (pull up = 1 kOhm, +5 V) with EMI filter series and diode. This allows the command in parallel. Are considered active when they are shorted to ground (active between 0 and +0.5 V). Are considered inactive if open or input voltage > = +4 V. Some are for command to state, for other command pulse, the pulse duration must be > = 0.5 seconds.
- The output signal is active (mos) with the circuit breaker closed. One exception is the default output, which is reversed polarity to ensure the signaling in the absence of power. The parallel connection of multiple fault lines does not cause electrical problems, but the primary message is meaningless.
- The analog outputs are between 0 and +4.5 V, Z = 470 ohms. Are protected against short circuit to ground or the voltage fed up to a maximum of +5 V.



| Connector | Pin | Meaning | Notes |
|---------------------------|-----|------------------------------|--|
| CN1 on board TG2U1A899 | | | |
| | 1 | Enable (interlock) | Command to state Pin grounded = active command |
| | 2 | TX ON | Command pulse Pin grounded = active command |
| | 3 | TX OFF | Command pulse Pin grounded = active command |
| | 4 | Reflected power | Output in voltage See full scale values |
| | 5 | Common ground | Connected to the frame |
| | 6 | RX- | Com2 EIA485/422 |
| | 7 | - | Not connected |
| | 8 | TX- | Com2 EIA485/422 |
| | 9 | Common ground | Connected to the frame |
| | 10 | IPA (Current amplifier) | Output in voltage See full scale values |
| | 11 | Fault main | Power supply FAULT status The pin must be po- wered externally. "Open" Status → Fault active |
| | 12 | TX ON | Signaling output The pin must be po- wered externally. "Closed to ground" status → TX ON |
| | 13 | Warning/Bad audio | Signaling output The pin must be po- wered externally. "Closed to ground" status → Active Warning The operation is affec- ted by settings of the machine |
| | 14 | Reset alarm | Command pulse Pin grounded = active command |
| | 15 | UPS target | Command to state |
| | 16 | - | Reserved for Elenos |
| | 17 | Forward power | Output in voltage See full scale values |
| | 18 | Common ground | Connected to the frame |
| | 19 | RX+ | Com2 EIA485/422 |
| | 20 | TX+ | Com2 EIA485/422 |
| | 21 | Common ground | Connected to the frame |
| | 22 | VPA (Voltage ampli- fier) | Output in voltage See full scale values |

| | | | |
|---|----|--------------------------|---|
|  | 23 | Bad audio | Signaling output The pin must be powered externally. "Closed to ground" status → Active alarm |
|  | 24 | /FLT (reversed polarity) | Signaling output The pin must be powered externally. "Open" Status → Active alarm The operation can be affected by the settings of the machine |
|  | 25 | Remote | Signaling output The pin must be powered externally. "Closed to ground" status → Remote signal active |

2.1.7.1 Full scale values

The nominal full scale corresponds to +4 V, with over stroke of up to more than +4.5 (max +5 V).

ETG5000

| Parameters | Full scale | Scale factor | Resolution |
|-------------------------|------------|--------------|----------------|
| Forward power | 5000W | 1250W * V | Full scale/204 |
| Reflected power | 500W | 125W * V | |
| IPA (current amplifier) | 200A | 50A * V | |
| VPA (voltage amplifier) | 50V | 12.5V * V | |

ETG3500

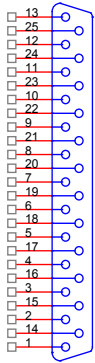
| Parameters | Full scale | Scale factor | Resolution |
|-------------------------|------------|--------------|----------------|
| Forward power | 3500W | 875W * V | Full scale/204 |
| Reflected power | 350W | 87.5W * V | |
| IPA (current amplifier) | 150A | 37.5A * V | |
| VPA (voltage amplifier) | 50V | 12.5V * V | |

ETG2500

| Parameters | Full scale | Scale factor | Resolution |
|-------------------------|------------|--------------|----------------|
| Forward power | 2500W | 625W * V | Full scale/204 |
| Reflected power | 250W | 62.5W * V | |
| IPA (current amplifier) | 150A | 37.5A * V | |
| VPA (voltage amplifier) | 50V | 12.5V * V | |

2.1.8 Profiles connector

N. 11 Rear panel (DB25 type - female)

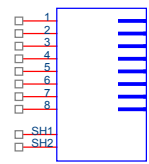


| Connector | Pin | Meaning | Notes |
|------------------------|-----|------------------|------------------------|
| CN1 on boardT-G2U2A899 | 1 | Channel 1 | Command pulse |
| | 2 | Channel 3 | Command pulse |
| | 3 | Channel 5 | Command pulse |
| | 4 | Riserve | Command pulse |
| | 5 | Common ground | Connected to the frame |
| | 6 | Common ground | Connected to the frame |
| | 7 | - | Not connected |
| | 8 | Common ground | Connected to the frame |
| | 9 | Common ground | Connected to the frame |
| | 10 | Common ground | Connected to the frame |
| | 11 | Channel 5 status | Signaling output |
| | 12 | Channel 3 status | Signaling output |
| | 13 | Channel 1 status | Signaling output |
| | 14 | Channel 2 | Command pulse |
| | 15 | Channel 4 | Command pulse |
| | 16 | Channel 6 | Command pulse |
| | 17 | - | Not connected |
| | 18 | Common ground | Connected to the frame |
| | 19 | Common ground | Connected to the frame |
| | 20 | Common ground | Connected to the frame |
| | 21 | Common ground | Connected to the frame |
| | 22 | Common ground | Connected to the frame |
| | 23 | Channel 6 status | Signaling output |
| | 24 | Channel 4 status | Signaling output |
| | 25 | Channel 2 status | Signaling output |

2.1.9 TCP/IP connectors - Reserved

N. 12 Rear panel (RJ48 type)

| Connector | Pin | Meaning | Notes |
|---------------------------|-----|--|-------|
| CN3 on board TG2U2A899 | 1 | ETHERNET interface 10Base-T or 100Base-TX | |
| | 2 | | |
| | 3 | | |
| | 4 | | |
| | 5 | | |
| | 6 | | |
| | 7 | | |
| | 8 | | |
| CN2 on board TG2U2A899 | 1 | Reserved | |
| | 2 | | |
| | 3 | | |
| | 4 | | |
| | 5 | | |
| | 6 | | |
| | 7 | | |
| | 8 | | |

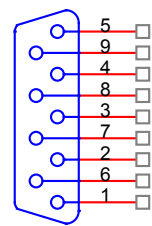


2.1.10 EIA485 connector

N. 13 Rear panel (DB9 type - female)

This connector uses Com1, as the connector n. 6 (front). The two connectors can't be used simultaneously.

| Connector | Pin | Meaning | Notes |
|---------------------------|-----|---------------|------------------------|
| CN2 on board TG2U1A899 | 1 | Com1 TX+ | EIA485/422 |
| | 2 | Com1 TX- | EIA485/422 |
| | 3 | Com1 RX+ | EIA485/422 |
| | 4 | Com1 RX- | EIA485/422 |
| | 5 | Common ground | Connected to the frame |
| | 6 | Common ground | Connected to the frame |
| | 7 | Common ground | Connected to the frame |
| | 8 | Common ground | Connected to the frame |
| | 9 | Common ground | Connected to the frame |



2.2 Technical data sheet



Datasheet

FM TRANSMITTER MEDIUM POWER | ETG5000

ETG5000

FM TRANSMITTER MEDIUM POWER

| GENERAL DATA | |
|---|---|
| Output Nominal Power | 5000 W adjustable |
| Operating band | 87.5 ÷ 108 MHz |
| RS232/RS485 | Yes. Connector DB9 female |
| Points of measure | RF Sample - MPX Monitor |
| Displayed Parameters | More than 50 parameters displayed on a wide graphic 0-LED screen |
| Adjustments | From the frontal panel through OLED/from PC |
| Number of L-DMOS in amplifier stage | 7 |
| RF power stage technology | ICEFET & ECOSAVING |
| Dimensions: Rack units | 4U |
| Dimensions: W - H - D | 48.5 - 17.6 - 70 cm |
| Weight | 45 Kg |
| Number of power supplies | 3 |
| Number of cooling fans | 6 |
| CONNECTORS | |
| RF Output | 7/8 |
| MPX | BNC Female |
| LEFT & RIGHT | XLR Female |
| AES/EBU | XLR Female |
| AUX | BNC Female |
| Monitor/19 kHz | BNC Female |
| RF PERFORMANCE | |
| Output impedance | 50 Ω |
| Automatic power RF control | Stabilizes the output power value on the set value |
| Overall output power RF stability | +/- 0,1 dB |
| VSWR | 2:1 at full power. Automatic power reduction beyond 1.7:1. Transmitter is protected fro open and short circuit. |
| Harmonics | < -75 dBc |
| Out of band emission (spurious) | < -80 dBc |
| AUDIO PERFORMANCE | |
| MPX input level | +15/-10 dBu for 75 KHz standard deviation |
| MPX level adjustment | Soft adjust 0.1 dB steps from front panel |
| MPX input impedance | 5 KΩ selectable |
| L/R input level | +15/-10 dBu for 75 KHz standard deviation |
| L/R level adjustment | Soft adjust 0.1 dBu steps from front panel |
| L/R Input Impedance | Selectable 10K - 600 Ω, balanced |
| AES/EBU input resolution | 24 bits |
| AES/EBU input sample rate | 32,44.1,48,96 KHz Automatically selected |
| AES/EBU input level | -20 dBFS - 0 dBFS |
| AES/EBU input impedance | 110 Ω balanced |
| AES/EBU-Analog input automatic changeover | Yes |
| PILOT Amplitude adjustment | Soft adjust 0.05% steps from front panel |
| PILOT Phase adjustment | Soft adjust 0.01 degree steps from front panel |
| PILOT tone frequency | 19 KHz |
| PILOT tone deviation | Soft adjust +/- 7.5 KHz |
| PILOT tone frequency stability | +/- 1 Hz |
| THD+N (stereo/mono operation) | < 0.05% with 75 KHz frequency deviation < 0.05% with 100 KHz frequency deviation 30 Hz to 15 KHz |
| Pre-emphasis | 0/25/50/75 microseconds, selectable |
| Pre-emphasis tolerance | +/- 0.1 dB |
| FM S/N (MPX operation) | 82 dB 20 Hz to 23KHz @ 53 KHz - detector RMS |
| FM S/N CCIR (stereo/mono operation) | > = 72 dB weighted > = 72 dB unweighted 400 Hz, 75 kHz frequency deviation, quasi-peak detector, 50 us de-emphasis |

FM TRANSMITTER MEDIUM POWER | ETG5000

| | |
|--|---|
| Asynchronous AM S/N unweighted | > = 55 dB a 400 Hz, 75 us de-emphasis |
| Synchronous AM S/N | > = 50 dB a 400 Hz, 75 us de-emphasis |
| Amplitude-frequency characteristic (stereo/mono operation) | +/- 0.1 dB (without pre-emphasis) +/- 0.1 dB (with pre-emphasis) 20 Hz to 15 KHz, @ 400hz |
| Stereo Crosstalk (typical) | 60 dB @ 400 Hz to 10 KHz |
| Linear crosstalk | >60 db 20 Hz to 15 KHz |
| Intermodulation distortion | <0.05% Measured with two of tones 1 KHz & 1.3 KHz, ratio 1:1 at 100% modulation |
| Class of emission | F3 |
| Stereo emission | According to ITU-R recommendation 450 (pilot tone) |
| EXCITER PERFORMANCE | |
| PLL lock time | <10 sec |
| Frequency deviation | +/- 75 KHz 0.1 dB steps adjustable |
| Maximum frequency deviation | +/- 150 KHz |
| Frequency stability | 1 ppm |
| RF Frequency steps | 10 KHz |
| Phase Response | +/- 0.1 degree from linear phase; 20 KHz to 100 KHz |
| INSTALLATION REQUIREMENTS | |
| Power supply | 230/400 Threephase-Singlephase Version 50-60 Hz VAC |
| Power consumption (typical) | 7.1 KW |
| Overall efficiency (typical from -3dB to Pnom) | > = 70% |
| Power factor | > 0.95 |
| Current Consumption @ 230VAC/single phase | 31 Amp |
| Magneto-thermic capacity @ 230VAC/single phase | 45 Amp |
| Conductor size @ 230VAC/single phase | 10 sqrt.mm |
| Conductor size @ 230VAC/single phase | 7 AWG |
| Current Consumption @ 230VAC/three phase | 18.5 Amp |
| Magneto-thermic capacity @ 230VAC/three phase | 32 Amp |
| Conductor size @ 230VAC/three phase | 6 sqrt.mm |
| Conductor size @ 230VAC/three phase | 9 AWG |
| Current Consumption @ 400VAC/three phase | 10.5 Amp |
| Magneto-thermic capacity @ 400VAC/three phase | 20 Amp |
| Conductor size @ 400VAC/three phase | 4 sqrt.mm |
| Conductor size @ 400VAC/three phase | 11 AWG |
| COOLING/NOISE/DATA | |
| Cooling system | Forced air-cooling . From 600 to 1200 m3/h |
| Air temperature increase | 17 °C |
| Acoustic noise | < 65 phon @ transmitter room, 2 m distance of the front of transmitter |
| ENVIRONMENT | |
| Temperature range (operating) | -5 ÷ +45 °C, 23 ÷ 113 °F |
| Temperature range (non operating) | -20 ÷ +55 °C, -4 ÷ 131 °F |
| Humidity range (operating) | 95% @ 40 °C, 104 °F |
| Humidity range (non operating) | 90% @ 55 °C, 131 °F |
| Altitude range (operating) | <3000 meters / <9840 Feet |
| Altitude range (non operating) | <15000 meters / < 49200 Feet |
| TELECONTROL & TELEMETRY | |
| Remote control | Yes |
| Remote control, dry contacts | Yes |
| SNMP option | Yes (external) |



Datasheet

FM TRANSMITTER MEDIUM POWER | ETG3500

ETG3500

FM TRANSMITTER MEDIUM POWER

GENERAL DATA

| | |
|-------------------------------------|--|
| Output Nominal Power | 3500 W adjustable |
| Operating band | 87.5 ÷ 108 MHz |
| RS232/RS485 | Yes. Connector DB9 femate |
| Points of measure | RF Sample - MPX Monitor |
| Displayed Parameters | More than 50 parameters displayed on a wide graphic OLED |
| Adjustments | From the frontal panel through OLED/from PC |
| Number of L-DMOS in amplifier stage | 5 |
| RF power stage technology | ICEFET & ECOSAVING |
| Dimensions: Rack units | 4U |
| Dimensions: W - H - D | 48.5 - 17.6 - 70 cm |
| Weight | 38 Kg |
| Number of power supplies | 3 |
| Number of cooling fans | 6 |

CONNECTORS

| | |
|----------------|------------|
| RF Output | 7/8 |
| MPX | BNC Female |
| LEFT & RIGHT | XLR Female |
| AES/EBU | XLR Female |
| AUX | BNC Female |
| Monitor/19 kHz | BNC Female |

RF PERFORMANCE

| | |
|-----------------------------------|---|
| Output impedance | 50 Ω |
| Automatic power RF control | Stabilizes the output power value on the set value |
| Overall output power RF stability | +/- 0,1 dB |
| VSWR | 2:1 at full power. Automatic power reduction beyond 1.7:1. Transmitter is protected fro open and short circuit. |
| Harmonics | < -75 dBc |
| Out of band emission (spurious) | < -80 dBc |

AUDIO PERFORMANCE

| | |
|---|---|
| MPX input level | +15/-10 dBu for 75 KHz standard deviation |
| MPX level adjustment | Soft adjust 0.1 dB steps from front panel |
| MPX input impedance | 5 KΩ selectable |
| L/R input level | +15/-10 dBu for 75 KHz standard deviation |
| L/R level adjustment | Soft adjust 0.1 dBu steps from front panel |
| L/R Input Impedance | Selectable 10 K - 600 Ω, balanced |
| AES/EBU input resolution | 24 bits |
| AES/EBU input sample rate | 32,44.1,48,96 KHz Automatically selected |
| AES/EBU input level | -20 dBFS - 0 dBFS |
| AES/EBU input impedance | 110 Ω balanced |
| AES/EBU-Analog input automatic changeover | Yes |
| PILOT Amplitude adjustment | Soft adjust 0.05% steps from front panel |
| PILOT Phase adjustment | Soft adjust 0.01 degree steps from front panel |
| PILOT tone frequency | 19 KHz |
| PILOT tone deviation | Soft adjust +/- 7.5 KHz |
| PILOT tone frequency stability | +/- 1 Hz |
| THD+N (stereo/mono operation) | < 0.05% with 75 KHz frequency deviation < 0.05% with 100 KHz frequency deviation 30 Hz to 15 KHz |
| Pre-emphasis | 0/25/50/75 microseconds, selectable |
| Pre-emphasis tolerance | +/- 0.1 dB |
| FM S/N (MPX operation) | 82 dB 20 Hz to 23KHz @ 53 KHz - detector RMS |
| FM S/N CCIR (stereo/mono operation) | > = 72 dB weighted > = 72 dB unweighted 400 Hz, 75 kHz frequency deviation, quasi-peak detector, 50 us de-emphasis |

FM TRANSMITTER MEDIUM POWER | ETG3500

| | |
|--|--|
| Asynchronous AM S/N unweighted | > = 55 dB a 400 Hz, 75 us de-emphasis |
| Synchronous AM S/N | > = 50 dB a 400 Hz, 75 us de-emphasis |
| Amplitude-frequency characteristic (stereo/mono operation) | +/- 0.1 dB (without pre-emphasis) +/- 0.1 dB (with pre-emphasis) 20 Hz to 15 KHz, @ 400 Hz |
| Stereo Crosstalk (typical) | 60 dB @ 400 Hz to 10 KHz |
| Linear crosstalk | >60 db 20 Hz to 15 KHz |
| Intermodulation distortion | <0.05% Measured with two of tones 1 KHz & 1.3 KHz, ratio 1:1 at 100% modulation |
| Class of emission | F3 |
| Stereo emission | According to ITU-R recommendation 450 (pilot tone) |
| EXCITER PERFORMANCE | |
| PLL lock time | <10 sec |
| Frequency deviation | +/- 75 KHz 0.1 dB steps adjustable |
| Maximum frequency deviation | +/- 150 KHz |
| Frequency stability | 1 ppm |
| RF Frequency steps | 10 KHz |
| Phase Response | +/- 0.1 degree from linear phase; 20 KHz to 100 KHz |
| INSTALLATION REQUIREMENTS | |
| Power supply | 230/400 Threephase-Singlephase Version 50-60 Hz VAC |
| Power consumption (typical) | 4.9 KW |
| Overall efficiency (typical from -3 dB to Pnom) | > = 70% |
| Power factor | > 0.95 |
| Current Consumption @ 230VAC/single phase | 21.3 Amp |
| Magneto-thermic capacity @ 230VAC/single phase | 32 Amp |
| Conductor size @ 230VAC/single phase | 10 sqrt.mm |
| Conductor size @ 230VAC/single phase | 7 AWG |
| Current Consumption @ 230VAC/three phase | 12.5 Amp |
| Magneto-thermic capacity @ 230VAC/three phase | 20 Amp |
| Conductor size @ 230VAC/three phase | 6 sqrt.mm |
| Conductor size @ 230VAC/three phase | 9 AWG |
| Current Consumption @ 400VAC/three phase | 7.1 Amp |
| Magneto-thermic capacity @ 400VAC/three phase | 16 Amp |
| Conductor size @ 400VAC/three phase | 4 sqrt.mm |
| Conductor size @ 400VAC/three phase | 11 AWG |
| COOLING/NOISE/DATA | |
| Cooling system | Forced air-cooling . From 600 to 1200 m3/h |
| Air temperature increase | 17 °C |
| Acoustic noise | < 65 phon @ transmitter room, 2 m distance of the front of transmitter |
| ENVIRONMENT | |
| Temperature range (operating) | -5 ÷ +45 °C, 23 ÷ 113 °F |
| Temperature range (non operating) | -20 ÷ +55 °C, -4 ÷ 131 °F |
| Humidity range (operating) | 95% @ 40 °C, 104 °F |
| Humidity range (non operating) | 90% @ 55 °C, 131 °F |
| Altitude range (operating) | <3000 meters / <9840 Feet |
| Altitude range (non operating) | <15000 meters / < 49200 Feet |
| TELECONTROL & TELEMETRY | |
| Remote control | Yes |
| Remote control, dry contacts | Yes |
| SNMP option | Yes (external) |



Datasheet

FM TRANSMITTER MEDIUM POWER | ETG2500

ETG2500

FM TRANSMITTER MEDIUM POWER

GENERAL DATA

| | |
|-------------------------------------|--|
| Output Nominal Power | 2500 W adjustable |
| Operating band | 87.5 ÷ 108 MHz |
| RS232/RS485 | Yes. Connector DB9 female |
| Points of measure | RF Sample - MPX Monitor |
| Displayed Parameters | More than 50 parameters displayed on a wide graphic OLED |
| Adjustments | From the frontal panel through OLED/from PC |
| Number of L-DMOS in amplifier stage | 4 |
| RF power stage technology | ICEFET & ECOSAVING |
| Dimensions: Rack units | 4U |
| Dimensions: W - H - D | 48.5 - 17.6 - 70 cm |
| Weight | 38 Kg |
| Number of power supplies | 3 |
| Number of cooling fans | 6 |

CONNECTORS

| | |
|----------------|--------------|
| RF Output | 7/8 |
| MPX | BNC Female |
| LEFT & RIGHT | XLR Female |
| AES/EBU | XLR Female |
| AUX | BNC Female |
| Ext.ref 10 MHz | SMA (option) |
| Monitor/19 kHz | BNC Female |

RF PERFORMANCE

| | |
|-----------------------------------|---|
| Output impedance | 50 Ω |
| Automatic power RF control | Stabilizes the output power value on the set value |
| Overall output power RF stability | +/- 0,1 dB |
| VSWR | 2:1 at full power. Automatic power reduction beyond 1.7:1. Transmitter is protected for open and short circuit. |
| Harmonics | < -75 dBc |
| Out of band emission (spurious) | < -80 dBc |

AUDIO PERFORMANCE

| | |
|---|---|
| MPX input level | +15/-10 dBu for 75 KHz standard deviation |
| MPX level adjustment | Soft adjust 0.1 dB steps from front panel |
| MPX input impedance | 5 KΩ selectable |
| L/R input level | +15/-10 dBu for 75 KHz standard deviation |
| L/R level adjustment | Soft adjust 0.1 dBu steps from front panel |
| L/R Input Impedance | Selectable 10 K - 600 Ω, balanced |
| AES/EBU input resolution | 24 bits |
| AES/EBU input sample rate | 32,44.1,48,96 KHz Automatically selected |
| AES/EBU input level | -20 dBFS - 0 dBFS |
| AES/EBU input impedance | 110 Ω balanced |
| AES/EBU-Analog input automatic changeover | Yes |
| PILOT Amplitude adjustment | Soft adjust 0.05% steps from front panel |
| PILOT Phase adjustment | Soft adjust 0.01 degree steps from front panel |
| PILOT tone frequency | 19 KHz |
| PILOT tone deviation | Soft adjust +/- 7.5 KHz |
| PILOT tone frequency stability | +/- 1 Hz |
| THD+N (stereo/mono operation) | < 0.05% with 75 KHz frequency deviation < 0.05% with 100 KHz frequency deviation 30 Hz to 15 KHz |
| Pre-emphasis | 0/25/50/75 microseconds, selectable |
| Pre-emphasis tolerance | +/- 0.1 dB |
| FM S/N (MPX operation) | 82 dB 20 Hz to 23 KHz @ 53 KHz - detector RMS |
| FM S/N CCIR (stereo/mono operation) | > = 72 dB weighted > = 72 dB unweighted 400 Hz, 75 kHz frequency deviation, quasi-peak detector, 50 us de-emphasis |

FM TRANSMITTER MEDIUM POWER | ETG2500

| | |
|--|--|
| Asynchronous AM S/N unweighted | > = 55 dB a 400 Hz, 75 us de-emphasis |
| Synchronous AM S/N | > = 50 dB a 400 Hz, 75 us de-emphasis |
| Amplitude-frequency characteristic (stereo/mono operation) | +/- 0.1 dB (without pre-emphasis) +/- 0.1 dB (with pre-emphasis) 20 Hz to 15 KHz, @ 400 Hz |
| Stereo Crosstalk (typical) | 60 dB @ 400 Hz to 10 KHz |
| Linear crosstalk | >60 db 20 Hz to 15 KHz |
| Intermodulation distortion | <0.05% Measured with two of tones 1 KHz & 1.3 KHz, ratio 1:1 at 100% modulation |
| Class of emission | F3 |
| Stereo emission | According to ITU-R recommendation 450 (pilot tone) |
| EXCITER PERFORMANCE | |
| PLL lock time | <10 sec |
| Frequency deviation | +/- 75 KHz 0.1 dB steps adjustable |
| Maximum frequency deviation | +/- 150 KHz |
| Frequency stability | 1 ppm |
| RF Frequency steps | 10 KHz |
| Phase Response | +/- 0.1 degree from linear phase; 20 KHz to 100 KHz |
| INSTALLATION REQUIREMENTS | |
| Power supply | 230/400 Threephase-Singlephase Version 50-60 Hz VAC |
| Power consumption (typical) | 3.5 KW |
| Overall efficiency (typical from -3 dB to Pnom) | > = 70% |
| Power factor | > 0.95 |
| Current Consumption @ 230VAC/single phase | 15 Amp |
| Magneto-thermic capacity @ 230VAC/single phase | 32 Amp |
| Conductor size @ 230VAC/single phase | 6 sqrt.mm |
| Conductor size @ 230VAC/single phase | 9 AWG |
| Current Consumption @ 230VAC/three phase | 9 Amp |
| Magneto-thermic capacity @ 230VAC/three phase | 20 Amp |
| Conductor size @ 230VAC/three phase | 4 sqrt.mm |
| Conductor size @ 230VAC/three phase | 11 AWG |
| Current Consumption @ 400VAC/three phase | 5 Amp |
| Magneto-thermic capacity @ 400VAC/three phase | 10 Amp |
| Conductor size @ 400VAC/three phase | 2.5 sqrt.mm |
| Conductor size @ 400VAC/three phase | 13 AWG |
| COOLING/NOISE/DATA | |
| Cooling system | Forced air-cooling . From 600 to 1200 m3/h |
| Air temperature increase | 17 °C |
| Acoustic noise | < 65 phon @ transmitter room, 2 m distance of the front of transmitter |
| ENVIRONMENT | |
| Temperature range (operating) | -5 ÷ +45 °C, 23 ÷ 113 °F |
| Temperature range (non operating) | -20 ÷ +55 °C, -4 ÷ 131 °F |
| Humidity range (operating) | 95% @ 40 °C, 104 °F |
| Humidity range (non operating) | 90% @ 55 °C, 131 °F |
| Altitude range (operating) | <3000 meters / <9840 Feet |
| Altitude range (non operating) | <15000 meters / < 49200 Feet |
| TELECONTROL & TELEMETRY | |
| Remote control | Yes |
| Remote control, dry contacts | Yes |
| SNMP option | Yes (external) |

2.3 Protections

The equipment has a protection system which is partially integrated and partially optional both for the hardware and the software.

2.3.1 Software protections

2.3.1.1 IPF (Intelligent Proportional Foldback)

The IPF is an intelligent system which reduces the equipment's output power in the event of strong load mismatch, thus preventing the machine from turning off.

The activation of this feature is shown on the display as alarm "026".

2.3.1.2 IPC (Intelligent Power Control)

When the equipment is working properly, the IPC keeps the output power constant within $\pm 1\%$ of the target set, irrespective of mains voltage, temperature and load variations.

This contributes greatly to making the equipment insensitive to its working conditions. The IPC also allows to optimize the RF section efficiency by making the MOSFETs constantly work at maximum efficiency, thus minimizing overall electrical consumption.

2.3.1.3 Safety Management ("Lifextender" option) ®

The Safety Management consists of algorithms which perform a real-time analysis of the transmitter's operating status and operates in order to maintain the output power set, according to the type and severity of any anomalies (internal or environmental) which may occur.

The Safety Management can command an output power reduction proportional to the severity of the anomaly that arises

The algorithms act at different levels and in various sections of the equipment: Thermal Management on the RF unit, Current Management on the power supply unit, Thermal Management on the power supply unit, Fault management on the RF unit, Fault Management on the power supply unit, Cooling Management on the fan unit.

Thermal Management on the RF unit (Lifextender) ®

Should the temperature measured in the vicinity of the MOSFETs exceed 72 °C, a first level of Derating intervenes slightly in order to reduce the temperature through an output power reduction. This power reduction is the minimum allowed in order to reach a thermal balance at a temperature lower than 72°C. The output power reduction never exceeds 48% with this first Derating. In other words, the output power always stays above 52% of that set by the user and the

"-3 dB" warning and relative alarm do not intervene.

This first Derating level is effective in virtually all cases.

The activation of this feature is shown on the display as alarm "010".

Should the first level Derating be insufficient (extremely rare), a second level intervenes, further reducing the power, thus obtaining a thermal balance status which is compatible with the safe operation of the equipment even if it is below

- 3dB (with subsequent alarm "005").

Should the second Derating be ineffective (in case of external conditions which are not compatible with the safe operation of the equipment) the equipment switches off.

In this case, if the temperature decreases, the power increases proportionally. If it decreases by 10°C (i.e. it reaches 62°C) the Derating mechanism stops and full power is restored. After 3 failed attempts, the control logic blocks the equipment (alarm "011").

Current management on the power supply (Lifextender) ®

This is activated when the maximum current for continuous operation of the power supply is exceeded. This value is set below the deliverable current limit and constitutes the threshold which can be exceeded only for short periods (maximum 1 minute at a time). Should this situation arise, the "PSU current derating" function is activated (alarm "013" and if necessary alarm "014") and the ALC management algorithm, envisaged for normal operating conditions, is replaced by another one wherein the VDS control and Bias is determined by the power set and, with even higher priority, by the current delivered by the power supply.

The current derating condition is deactivated when the power delivered returns to the value set by the user and if the maximum current delivered by the power supply is less than or equal to the maximum value allowed for continuous operation.

Thermal management on the power supply (Lifextender) ®

The power supply management algorithm according to the temperature, is the same as that on the RF unit and is logically connected in "OR" to the latter.

The first Derating level (acting directly on the output power) is activated when the power supply temperature exceeds 75°C, while the second level is activated - if the first is ineffective - if the temperature does not stabilize below this value. In the latter case, the output power is brought below - 3 dB with the same procedure as that described for the RF section.

The activation of this feature is shown on the display as alarm "015" and possibly "016".

Fault Management on the RF modules (Lifextender) ®

This manages the maximum deliverable power according to the number of RF amplifier modules considered to be operating correctly.

If one or more MOSFETs are considered faulty (this happens when the absorbed current is 10% below the average value), the RF output power is reduced to the expected value when a fault occurs and the fans rotation speed is activated at the maximum value. The fault case study and corresponding maximum power is described through a complex table obtained through tests. It is designed to stop the fault spreading and to prevent

the MOSFETs that are still working from being put under excessive strain by the ALC mechanism (which would require them to provide all the missing output power).

In order to avoid a ridiculously high number of alarm SMSs, no messages are sent during this phase: the alarm SMS, if validated, is only sent after the adaptation procedure of the output power according to the table parameters and only if the -3dB condition occurs on the output power.

The activation of this feature is shown on the display as alarm "008" and "009".

Cooling Management on the fan unit (Lifextender) ®

According to the actual cooling requirements, the rotation speed of the fans is adjusted from a minimum of 60% to a maximum of 120% approx. (these values may vary according to the models of fan used). The cooling requirement is evaluated based on accurate measurements of the temperature in the vicinity of the RF MOSFETs and the power supply unit. The Cooling Management aims to extend the useful life of the fans, minimize the quantity of dust which can be transported by the air flow and allow the safe operation of the equipment also under extreme temperature conditions.

Without Lifextender, the fans always operate at 100%.

2.3.2 Hardware protections

The hardware protection system comprises:

- fast electronic and fuse protection of power supplies;
- fast electronic protection on the fan power supply;
- fast protection against excess reflected power (SWR/VSWR) following a strong load mismatch.

This protection is activated when the reflected power value exceeds 10% of the direct one.

2.4 Options

The models belonging to this series can be purchased with different options included:

| Version with modulating signal input | Purchase information: please request the following codes |
|---|--|
| STEREO Inputs: <ul style="list-style-type: none"> • Left channel • Right channel • MPX • Aux1 • Aux Outputs: <ul style="list-style-type: none"> • MPX monitor/19 kHz | 00E-JLA-10 (ETG5000) 00E-JLA-15 (ETG5000 with internal E.Box) 00E-ILA-30 (ETG3500) 00E-ILA-40 (ETG3500 with internal E.Box) 00E-ILA-35 (ETG2500) 00E-ILA-45 (ETG2500 with internal E.Box) |
| AES/EBU Inputs: <ul style="list-style-type: none"> • Left channel • Right channel • MPX • Aux 1 • Aux 2 • AES-EBU Outputs: <ul style="list-style-type: none"> • MPX monitor/19 kHz | 00E-JLD-10 (ETG5000) 00E-JLD-15 (ETG5000 with internal E.Box) 00E-ILD-30 (ETG3500) 00E-ILD-40 (ETG3500 with internal E.Box) 00E-ILD-35 (ETG2500) 00E-ILD-45 (ETG2500 with internal E.Box) |

The LifExtender can be requested as an option using the previous codes. To be specified in the order.

3 Instructions for use

3.1 User interface

The controls and display views are described below.

Please note that in order to have complete visibility of all the available interfaces, **the equipment must be set to LOCAL mode** and it must be accessed with the specific passwords.

Specifically in REMOTE mode you lose visibility of the menus PASSWORD SETTING, LI-FEXTENDER, GSM/MODEM menu and DIAGNOSTIC menu.

Rotate the encoder to navigate through the menu items.

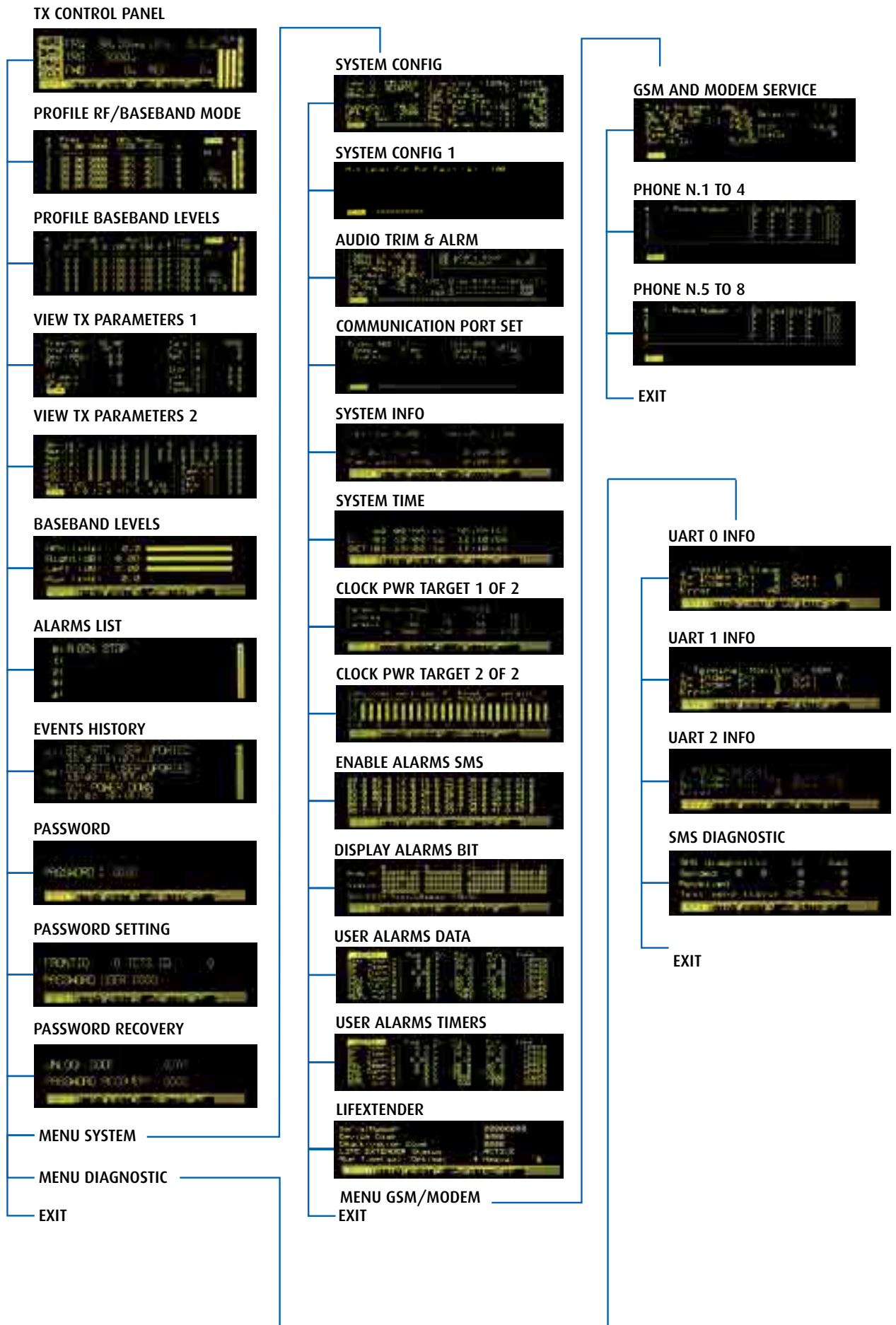
Press the encoder to access the desired item or to browse through submenus.

To exit an item go onto the "MENU" tab and press the encoder.

To return to the previous level go to the "Exit" item and press the encoder.

If you change the value of a parameter, to maintain it, before turn off the machine wait at least 60seconds.

Warning: the screen pictures shown below and the values attributed to the parameters are provided for illustrative purposes only. The parameters shown may vary slightly according to the equipment and setup type of the audio board.



3.1.1 TX control panel

Main screen which appears automatically when turning on in LOCAL mode. It is used to set and check the main operating parameters.

Warning light: when it is on it indicates the opening of the interlock contacts.

Warning light: when it is on it indicates a power drop below 3dB (<50% of target)

Warning light: when it is on it indicates the clipper engagement caused by overdrive

Warning light: when it is on it indicates an absence of signal beyond the limits set

Target frequency: 98.00MHz

Target audio level: 0.0 dB

Vu-meter: it must indicate approx. 0dB

Target power: 5000W

Forward power effectively delivered: 0W

Reflected power: it must be null or very low: 0W

ITLK

F3dB

CLIP

NOAU

FRQ

TRG

FWD

LEV.

REF

MLP

STBY

REST

US

STER

PF

To access the list of menus

To switch on /put the system on stand-by

To reset the alarms

To set the pre-emphasis level

To set the audio signal

To set the profile

ITLK

F3dB

CLIP

NOAU

FRQ

TRG

FWD

LEV.

REF

MLP

STBY

REST

US

STER

PF

3.1.2 Profile RF/Baseband mode

Setting and display screen.

For every profile, the frequency, target power, type of audio signal and pre-emphasis are defined.

The active profile values are indicated by the letter "A". The deviation is displayed (in kHz).

| # | Freq | Trg | MPX | Mode | |
|-----|-------|------|------|------|---|
| A 1 | 98.00 | 5000 | STER | AUTO | 0 |
| 2 | 98.00 | 5000 | MPX | AUTO | 0 |
| 3 | 98.00 | 5000 | MPX | AUTO | 0 |
| 4 | 98.00 | 5000 | MPX | AUTO | 0 |
| 5 | 98.00 | 5000 | MPX | AUTO | 0 |
| 6 | 98.00 | 5000 | MPX | AUTO | 0 |

PF 1
Dev (kHz)
0.0

3.1.3 Profile baseband levels

Setting and display screen.

For each profile, the audio signal level, auxiliary channel level (expressed as a percentage, 100% equals the maximum amplitude for 75kHz deviation), clipping value and reference voltage value are defined.

The active profile values are indicated by the letter "A". The deviation is displayed (in kHz).

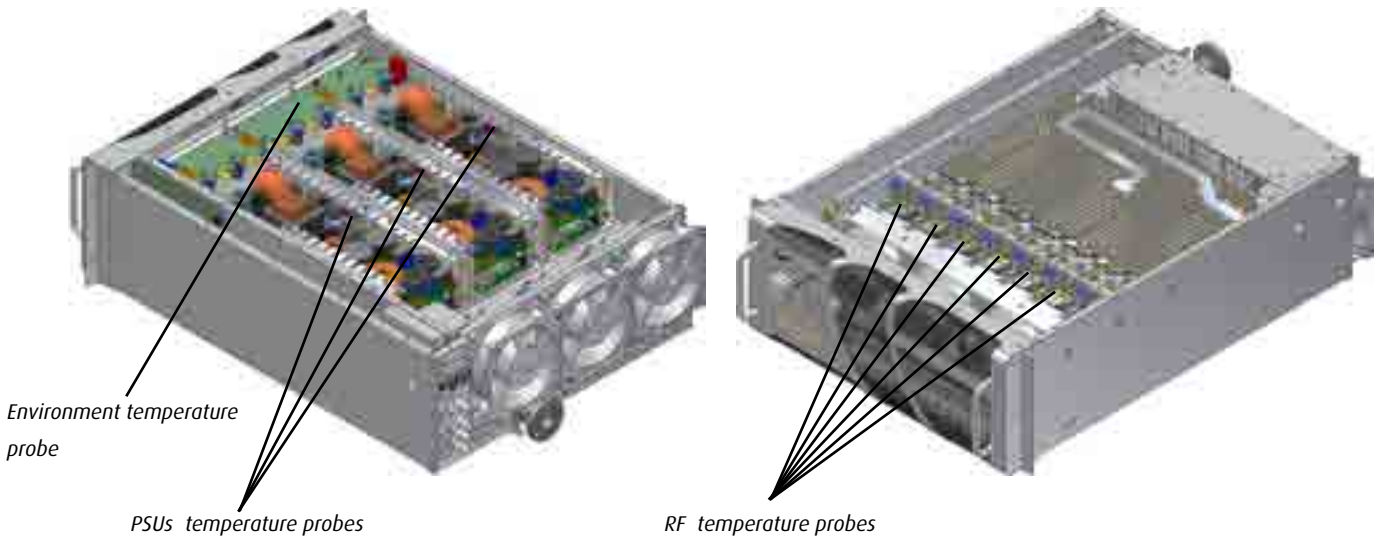
| # | Lev (dB) | Aux (%) | Clipping | Ref Voltage |
|-----|----------|---------|----------|-------------|
| A 1 | 0.0 | 100.0 | F 150.0 | |
| 2 | 0.0 | 100.0 | F 150.0 | |
| 3 | 0.0 | 100.0 | F 150.0 | |
| 4 | 0.0 | 100.0 | F 150.0 | |
| 5 | 0.0 | 100.0 | F 150.0 | |
| 6 | 0.0 | 100.0 | F 150.0 | |

PF 1
Dev (kHz)
0.0

3.1.4 View TX parameters 1

Display only screen.

The parameters which can be monitored are as follows: frequency, active profile number, deviation, efficiency, transmitter working hours, fan working hours, direct power target, effective direct power value, reflected power, current, voltage, maximum temperature (the following pictures show the probe position) and fan speed.



3.1.5 View TX parameters 2

Display only screen.

The parameters which can be monitored are as follows: current and temperature of the amplifier modules, current, voltage and temperature of the power supplies, voltages and auxiliary power supply polarization, sum of the power supply currents, sum of the module currents, voltage, ambient temperature and efficiency.



3.1.6 Baseband levels

Setting and display screen.

There are levels of the audio signal.

The display changes depending on the audio mode selected.



3.1.7 Alarms list

Display only screen.

It is possible to monitor the list of most recent alarms. The alarms indicated by the letter "A" are still active.

In order to understand the meaning of the alarms, please refer to paragraph "Alarms/ events list".



3.1.8 Events history

Display only screen.

The log of all the events/alarms occurred (up to 99) can be monitored. These are indicated by code, description, date and time.



3.1.9 Password

The equipment is delivered with the default password "0000" that can be customized by the user (for more details, please see paragraph "Password Setting"). In this screen the access password must be entered.



3.1.10 Password setting

There are two levels of user privilege: USER and SYSTEM, which are both initially protected by the default password "0000". In this screen it is possible to define customized passwords by the user with "SYSTEM" privileges.

Other parameters that can be set from this menu are the machine addresses (reference for communication with it).



3.1.11 Password recovery

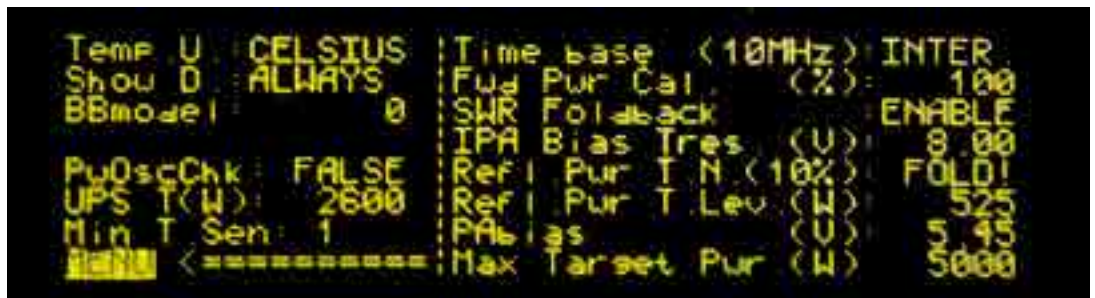
If you lose your password, please contact Elenos. Elenos must be given the "Unlock code" in this screen. Elenos will provide a password valid for 24 hours to be entered on the same screen under the "Password Recovery" item. The user must later define new passwords through the "Password Setting" screen.



3.1.12 System config

Setting and display screen.

The following parameters can be set by the user: temperature measurement unit (Temp. U.), remote display operating mode (Show D.), audio board model (BB model, automatically detected, or STEREO view as default), equipment protection in case of oscillations (PwOscChk), power target when working with a UPS (UPS T), VCO synchronization (Time base, internal or external at 10MHz), power reading calibration (FwdPwrCal), SWR foldback, polarization threshold (IPA Bias Tres.), reflected power nominal threshold (Refl.Pwr T.N., when active it is 10% of direct power), reflected power customized threshold (Refl.Pwr T.Lev., when the nominal threshold is inactive, it is possible to set values below 10%), final polarization (PAbias), maximum settable power full scale (Max Target Pwr).



3.1.12.1 Power oscillation algorithm

In Elenos devices, if there is a power variation of “n” W (“n” being defined in specific tables) at least 3 consecutive times within 15 seconds, the “035” alarm is activated and the three block out mechanism is triggered (if this mechanism fails, the “003” alarm is then activated).

3.1.12.2 Foldback algorithm

The Elenos devices feature two different and independent protections which are activated when there is an excess of reflected power.

The first is a hardware threshold which operates when the reflected power exceeds 10% of the maximum rated output power of the transmitter in a very short space of time.

In these conditions the transmitter switches off.

The second is a software protection, called “foldback algorithm”.

It is activated when the reflected power increase is slower (for example, when there is snow or ice on the antenna).

In these conditions, the transmitter gradually reduces its output power until the reflected power threshold is exceeded, while the output power is gradually restored when the values go back to normal.

If normal operating conditions continue for more than 60 seconds, the algorithm is inactive.

The activation of this second protection is left to the user (from the System config screen).

3.1.13 System config 1

Setting and display screen.

The alarm signal, caused by wrong output power, snaps by default at -3dB of target power and disappears when you reach the 2/3 of that.

The "Min Level Fwr Pwr Fault" additional parameter, set here, acts in an AND condition with the standard algorithm: so, the alarm will snap when there is the first between the two conditions "-3dB" and "Min Level Fwr Pwr Fault", while will disappear when the highest value between "2/3 Ptarget" and "Min Level Fwr Pwr Fault+typical step related to apparatus" occurs.

For stand-alone devices meant to set Min Level Fwr Pwr Fault to a value greater than -3dB, while using lower values may have meaning in N+1 systems.

By default Min Level Fwr Pwr Fault is set to the minimum value of power.



3.1.14 Audio trim & alarm

Setting and display screen.

The following parameters can be set by the user: pilot tone level, pilot tone phase, clipping voltage.

It is possible to monitor the audio board model (BB board model, automatically detected, or STEREO view as default) and the firmware version of the audio board (BB Firmware).

The alarms connected to the audio section are set. The management uses the TC/TS connector.

The alarm is activated when it is below the threshold set (Modulation), after the set period of time (Delay Alarm Timer).

The user can choose from five operating modes (Bad mod.) : DISABLE, NO AUDIO, SWAP, FAULT, FLT/SWAP.

3.1.14.1 Audio "Disable" alarm

By setting the "Bad mod." field to "DISABLE", the alarm is completely deactivated without needing to change the levels (Modulation, Delay Alarm Timer).

3.1.14.2 "No audio" audio alarm

By setting the "Bad mod." field to "NO AUDIO", the default setting is kept, i.e. "No Audio" on pin 23 of the TC/TS connector.

If the transmitter is inside an N+1 system, the "No Audio" signal is not available at the exchange unit.

3.1.14.3 "Swap" audio alarm

By setting the "Bad mod." field to "SWAP", the "No Audio" line (pin 23) is exchanged with the "Warning" line (pin 13) on the TC/TS connector.

If the transmitter is inside an N+1 system, the "No Audio" signal is available at the exchange unit.

3.1.14.4 "Fault" audio alarm

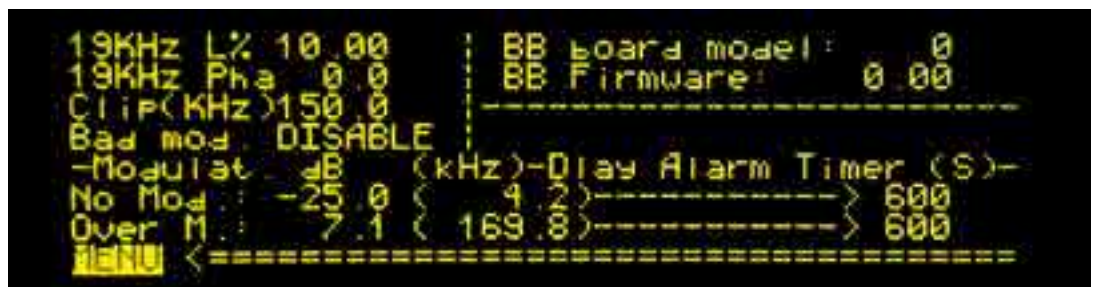
By setting the "Bad mod." field to "FAULT", the "No Audio" line (pin 23) is in "or" condition with the "Fault" line (pin 24) on the TC/TS connector.

If the transmitter is inside an N+1 system, the exchange unit activates the switching in the presence of No Audio.

3.1.14.5 "Flt/Swap" audio alarm

By setting the "Bad mod." field to "FLT/SWAP", there is a combination of the two "Swap" and "Fault" modes.

In this way, if the transmitter is inside an N+1 system, the "No Audio" signal is available at the exchange unit and the exchange unit activates the switching.



```
19KHz L% 10.00 | BB board model: 0
19KHz Pha 0.0 | BB Firmware: 0.00
Clipping(KHz) 150.0
Bad mod. DISABLE
-Modulat. dB (kHz)-Delay Alarm Timer (S)-
No Mod.: -25.0 ( 4.2)-----> 600
Over M.: 7.1 ( 169.8)-----> 600
MENU <=====
```

3.1.15 Communication port set

Setting and display screen.

The parameters which can be set by the user are the speed and the front and rear 485 door addresses.



3.1.16 System info

Setting and display screen.

The equipment software version, the protocol version, the equipment activity time and the fan operating time are indicated.

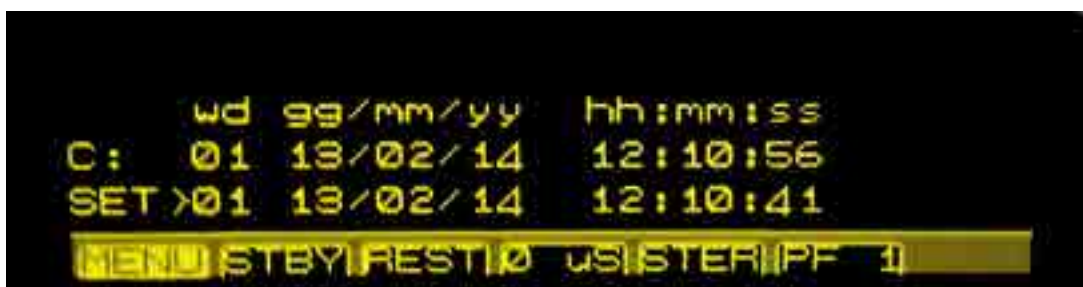
It is possible to reset the latter by clicking "R".



3.1.17 System Time

Setting and display screen.

The following parameters can be set by the user: the day of the week, date and time.



3.1.18 Clock Pwr Target

Setting and display screen.

As well as the standard power adjustment, it can also be set according to time slots in order to save energy. In order to be able to set the power according to individual time slots, the field "Target Power Mode" must be set to "CLOCKED".

Then, the various times of day can be matched with four different power percentage values (100%, 75%, 50% or 25% of the set power).

After defining the day of the week to be set (Target Power on day of) for each time of day, press the cursor to enter the setting bar, rotate it to define the percentage (nothing displayed corresponds to 25%, T1 corresponds to 50%, T2 corresponds to 75%, T3 corresponds to 100%) and press the cursor to confirm.

By setting the "Copy over next day" field to "T", the previous day setting is copied to the next day.

By setting the "Reset at default" field to "T", the settings are reset to default, where the power is low at night and full during the day.



3.1.19 Enable Alarms Sms

Setting and display screen.

Besides the alarm management "by status", it is possible to have alarm management "by event".

The alarms for which this management mode is enabled merge in a buffer.

If the value "0" is attributed to the relative alarm, it means that is deactivated, while the value

"1" means that is activated to be managed in "by event" mode.

This function is available only by means of connection on the Omron protocol.

In order to understand the meaning of the alarms, please refer to paragraph "Alarms/ events list".



3.1.20 Display Alarms Bit

Setting and display screen.

Here is summarized the event configuration set in the menu "Enable Alarms SMS" (the "Enable") and those that are active are highlighted ("Status" field).

If the field "SMS / PSTN StatusReady" is "TRUE" means that an event is active, and has been sent alarm or phone call.

To return the field "FALSE" you need to reset alarms.



3.1.21 User Alarms Data

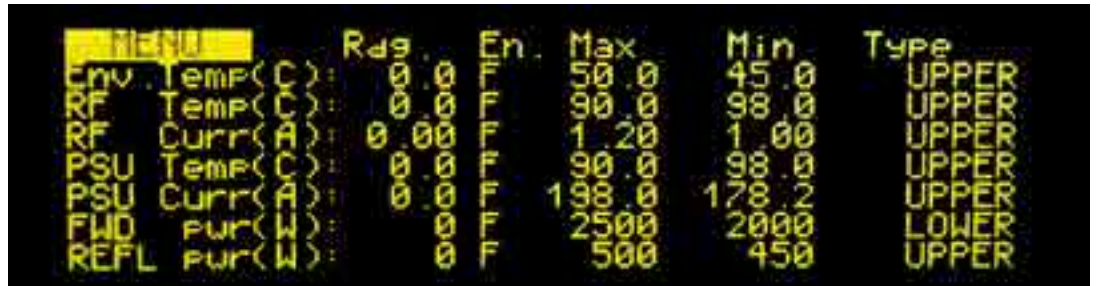
Setting and display screen.

Some alarms can be set according to activation conditions.

The current value of the alarm condition parameter (ambient temperature, RF temperature, RF current, power supply temperature, power supply current, direct power, reflected power) can be monitored.

By setting the "En." parameter to "T/F" the respective alarm is enabled/disabled.

The following parameters can be set by the user: the parameter minimum and maximum values, and the type of condition to be met (upper, lower, inside, outside).



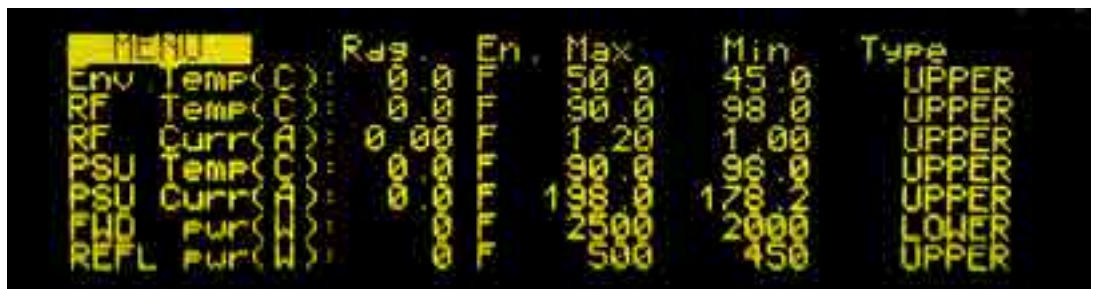
| Parameter | Range | En. | Max | Min | Type |
|-------------|-------|-----|-------|-------|-------|
| Chv Temp(C) | 0.0 | F | 50.0 | 45.0 | UPPER |
| RF Temp(C) | 0.0 | F | 90.0 | 98.0 | UPPER |
| RF Curr(A) | 0.00 | F | 1.20 | 1.00 | UPPER |
| PSU Temp(C) | 0.0 | F | 90.0 | 98.0 | UPPER |
| PSU Curr(A) | 0.0 | F | 198.0 | 178.2 | UPPER |
| FWD Pwr(W) | 0 | F | 2500 | 2000 | LOWER |
| REFL Pwr(W) | 0 | F | 500 | 450 | UPPER |

3.1.22 User Alarms Timers

Setting and display screen.

In some alarms, it is possible to set a time frame in which the condition must occur in order to make the alarm effective ("Dlay").

The trend of the meter for this time can be monitored as well as the possible enabling of the alarm by means of a status flag (Alrm).



| Parameter | Range | En. | Max | Min | Type | Dlay |
|-------------|-------|-----|-------|-------|-------|------|
| Chv Temp(C) | 0.0 | F | 50.0 | 45.0 | UPPER | |
| RF Temp(C) | 0.0 | F | 90.0 | 98.0 | UPPER | |
| RF Curr(A) | 0.00 | F | 1.20 | 1.00 | UPPER | |
| PSU Temp(C) | 0.0 | F | 90.0 | 96.0 | UPPER | |
| PSU Curr(A) | 0.0 | F | 198.0 | 178.2 | UPPER | |
| FWD Pwr(W) | 0 | F | 2500 | 2000 | LOWER | |
| REFL Pwr(W) | 0 | F | 500 | 450 | UPPER | |

3.1.23 Lifextender

Setting and display screen.

The parameters relative to the Lifextender option can be monitored: equipment serial number, equipment code (parameter to be notified to Elenos should the user require the activation/deactivation of this function), activation/deactivation code (parameter supplied by Elenos to be entered for the function activation/deactivation), function status, work days in good operating conditions, work days in critical operating conditions. The algorithm considers the following parameters to define the critical days: RF temperature, power supply temperature, ambient temperature and reflected power with respect to maximum operating power.

These parameters must exceed the threshold values for a certain amount of time.

In this way, the duration and intensity of the event is assessed: intense short events are heavy; less intense but longer events are heavy too.

```
SerialNumber      : 00000000
Device Code       : 9A00
Deactivation Code  : 0000
LIFE EXTENDER Status : ACTIVE
Run Time(ddd): Optimal 4 Heavy: 0
MENU|STBY|REST|0 US|STER||PF 1|
```

3.1.24 GSM and modem service

Setting and display screen.

The GSM signal field intensity can be monitored.

It is possible to enable the submission of an alarm by SMS and/or PSTN in case of no mains power (No Mains SMS) for the period of time set (Delay).

It is possible to enable the submission of an alarm by SMS and/or PSTN if the power delivered is at least 3dB less than the target set (SMS FWD over 2/3).

The codes to be displayed in the different message strings can be defined (PagerId, StatId, String Id).



3.1.25 Phone N.1 to N.8

Setting and display screen.

The equipment can "communicate" with up to 8 SIM cards.

The telephone numbers and authorizations can be defined in international format

The number can be globally enabled for SMS transmission and reception SMS (En.), be enabled to send commands (Cmd), be enabled to request and receive the machine status (Sts), be enabled to receive the echo any of commands sent by other numbers (Glb) and be enabled to receive SMSs in text or digital format (PC.).



3.1.26 Uart 0,1,2 info

Control menu for testing the serial ports.

```
HostLink Slave
Tx Index In: 000 Out: 00
Rx Index In: 000 Out: 00
Error      : A0
[MENU] STBY|REST|0 us|MUTE|PF 1
```

```
Terminal Monitor / GSM
Tx Index In: 0 Out: 0
Rx Index In: 1 Out: 1
Error      : 0
[MENU] STBY|REST|0 us|MUTE|PF 1
```

```
PSU Protocol
Tx Index In: 132 Out: 132
Rx Index In: 1 Out: 1
Error      : 0
[MENU] STBY|REST|0 us|MUTE|PF 1
```

3.1.27 SMS diagnostic

To see the number of SMS sent and received successfully.
For more detail see paragraph "SMS List".

```
SMS diagnostic      ok      bad
Sended      0      0      0      0
Received          0      0
Test send status SMS FALSE
[MENU] STBY|REST|0 us|MUTE|PF 1
```

3.2 Alarms/events list

There is an “Alarm management” module.

In order to check the alarm conditions, physical and logical digital inputs are used.

The status of each input is sampled and the condition is then logically processed by a combinational network so as to establish whether the alarm or signalling is active.

The minimum intervention time is 100ms.

This module is repeatedly performed with the same priority as ALC management, so as to constantly monitor the alarm cause onset and therefore to intervene within the required time frame.

A log stores the sequence of the last events generating alarms with the date and time of activation.

The alarms/event list which can be found is as follows:

| Alarm/event | Description |
|-------------------------------------|--|
| “000 CORRECT WORKING” | This indicates correct equipment operation. The “On air” event has higher priority. |
| “001 SYSTEM RESET” | This indicates that the alarm reset is in progress. All stored and inactive alarms are removed from the list. |
| “002 EEPROM CHKSUM ERROR” | This indicates that the stored data is not reliable any longer and the machine is reconfigured according to the default parameters. |
| “003 BLOCKED” | This indicates that the machine is blocked after making 5 restore attempts. the user must reset in order to allow the equipment to restart. |
| “004 STOP” | This indicates that the equipment is in stand-by mode and is ready to start without alarms. |
| “005 -3dB CARRIER” | This indicates that the equipment has been delivering power at least 3dB less than the target set, for at least a minute in start-up and 5 seconds of normal operation. |
| “006 HIGH REF PWR” | This indicates that the level of reflected output power is too high, meaning that the equipment will turn off in three block out. |
| “007 MIN 12V” | This indicates that the negative voltage reference is altered and prevents correct operation of the protections. Stop in three block out. |
| “008 RF AMP. FAULT” | This indicates a fault on one or more RF . |
| “009 RF AMP. FAULT DERATING” | This indicates a fault on one or more RF modules, which implies a reduction in the overall maximum deliverable power. |
| “010 RF THERMAL DERATING” | This indicates an excessive temperature on the RF modules which implies a reduction in the maximum output power. |
| “011 RF OVER TEMPERATURE” | This indicates that the maximum operating temperature has been exceeded, thus causing machine turn off in three block out. This protection intervenes in extreme cases in which the Derating mechanism is not sufficient to make the temperature values go back to normal. |
| “012 PSU FAULT” | This indicates the malfunctioning of the power supply(ies). |
| “013 PSU CURRENT DERATING” | This indicates power supply overload which causes a decrease in the power delivered. |
| “014 PSU OVER CURRENT” | This indicates that the machine switches off if 1 minute after derating the current still does not decrease. |
| “015 PSU THERMAL DERATING” | This indicates power supply overheating which causes a decrease in the power delivered. |

| | |
|---|---|
| "016 PSU OVER TEMPERATURE" | This indicates power supply overheating which causes the equipment to switch off. |
| "017 PSU COMM TIMEOUT" | This indicates malfunctioning of the IEEE485 internal bus for communication between CPU, PSU and SHUNT. |
| "018 EXTERNAL INTERLOCK" | This indicates the presence of the active interlock. |
| "019 ON AIR" | This indicates that the device is working properly and is transmitting. |
| "020 POWER UP" | This indicates that the equipment restart signalling is being added to the log. |
| "021 POWER DOWN" | This indicates that the equipment switch off signalling is being added to the log. |
| "022 PSU THERMAL FAULT" | This indicates power supply overheating with subsequent switching off of the machine. For ELENOS equipment with more than one power supply, the intervention of this protection aims to allow operation at reduced power, should a power supply be disconnected to protect the hardware from excessive temperature. |
| "023 PSU LOW POWER" | This indicates a power drop with subsequent switching off of the equipment. For ELENOS equipment with more than one power supply, the intervention of this protection aims to allow operation at reduced power, should a power supply be disconnected to protect the hardware from a power decrease. |
| "024 PSU RF OFF" | This indicates a problem on 50V with subsequent switching off of the machine. For ELENOS equipment with more than one power supply, the intervention of this protection aims to allow operation at reduced power, should a power supply be disconnected to protect the hardware from the absence of RF power. |
| "025 WORKING MODE COMBINED" | This indicates the operation of the machine in a combined system. |
| "026 SWR FOLDBACK" | This indicates that the machine is having a power reduction since the reflected power detected is too high. |
| "027 UNLOCK" | This indicates that the PLL is not engaged, therefore the machine is stopped. |
| "028 EXCITER COMM ERROR" | This indicates that the PLL and VCO are not programmable. |
| "029 NO AUDIO" | This indicates the absence of the audio signal. |
| "030 OVER 2/3 CARRIER" | This indicates that 2/3 of the power set has been exceeded. |
| "031 PREAMPLIFIER NOT CONNECTED" | This indicates 100% reflected power. Not implemented here. |
| "032 OVER MODULATION" | This indicates over modulation. |
| "033 FAST INHIBIT" | This indicates that there are problems on the hardware lines leading to RF delivery inhibition. |
| "034 TEMPERATURE SENSOR ERROR" | Where there are multiple RF temperature probes, this indicates that one is faulty if it measures a noticeably different value from the other probes. |
| "035 PWR FORWARD OSCILLATION" | This indicates oscillations in the output power. |
| "036 THREE BLOCK OUT" | This indicates that restore procedure. |
| "037 USER ENV TEMP OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the ambient temperature measured by the equipment. |
| "038 USER RF TEMP OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the RF module temperature. |

| | |
|---|--|
| "039 USER PSU TEMP OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the power supply temperature. |
| "040 USER RF CURRENT OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the RF module currents. |
| "041 USER PSU CURRENT OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the power supply current. |
| "042 USER FRW PWR OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the direct power. |
| "043 USER RFL PWR OUT LIMIT" | This indicates a variation with respect to the conditions set by the user relating to the reflected power. |
| "044 OUT PWR NOT VERIFIED" | This indicates that the output power cannot be detected properly. |
| "045 UPS ACTIVE" | This indicates that the UPS is active, therefore the equipment is using the target power set for operation in this mode. |
| "046 SHUNT COMM TIMEOUT" | This indicates the communication timeout on the polarizer. It stops the operation of the apparatus. |
| "047 WARNING TEMPERATURE SENSOR" | This indicates a fault in the temperature probes. |
| "048 AUDIO OK MASK" | This indicates that the No audio alarm is finished. |
| "049 DRAIN VOLTAGE FEEDBACK ERROR" | This indicates the lack of control of V_{ds} for causes such as power failures, wrong feeding, etc.. |
| "050 OVER FRW PWR ERROR" | This indicates the presence of overshoot in power. |
| "058 RTC FAULT" | This indicates that there were 3 consecutive mismatches between date/time hardware and firmware, or the date is incorrectly formatted. |
| "059 RTC USER UPDATED" | This indicates a date upgrade. |
| "060 RTC AUTOMATIC RECOVERY" | This indicates that there is a misalignment of more than 5 seconds between date/time hardware and firmware. |

3.3 SMS list

3.3.1 SMS commands (submit)

It is possible to submit SMSs in order to perform the following commands:

| Command | SMS text |
|---|-----------|
| Setting power to xxxxx | PWR xxxxx |
| Setting the equipment to stand-by mode | STBY |
| Setting the equipment to stand-by mode | OFF |
| Setting the equipment to On Air mode | ON |
| Status request | STS |
| Reset request | RES |
| Setting data request | STS1 |
| Setting the equipment to mute mode for xx minutes (no in MPX version) | MUTE xx |
| Restoring the audio by excluding the command MUTE AUDIO | AUDIO |
| Activating power in Clocked mode | CLKP |
| Activating power in Fixed Mode | FIXP |
| The number that sends this SMS will be disabled upon receipt alarm/status | SMSNO |
| The "n" number will be disabled upon receipt alarm/status | SMSNO n |
| The "n" number will be enabled upon receipt alarm/status | SMSYES n |

3.3.2 Status/alarm SMS (reception)

It is possible to receive status or alarm SMSs, for example composed in this way:

```

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
STBY
No mains xx m
NoAudio
AudioOK
xxx Messaggio di segnalazione
FWD yyyyy W
REFL yyyyy W
FRQ xxx.xxMHz
VDS xxx.xV
IDS xxx.xxA
TEMPMAX xxx.xC
TEMPENV xxx.xC

```

```

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
-3dB Alarm
No mains xx m
NoAudio
AudioOK
xxx Messaggio di segnalazione
FWD yyyyy W
REFL yyyyy W
FRQ xxx.xxMHz
VDS xxx.xV
IDS xxx.xxA
TEMPMAX xxx.xC
TEMPENV xxx.xC

```

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Status
No mains xx m
NoAudio
AudioOK
xxx Messaggio di segnalazione
FWD yyyyy W
REFL yyyyy W
FRO xxx.xxMHz
VDS xxx.xV
IDS xxx.xxA
TEMPMAX xxx.xC
TEMPENV xxx.xC

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Command
No mains xx m
NoAudio
AudioOK
xxx Messaggio di segnalazione
FWD yyyyy W
REFL yyyyy W
FRO xxx.xxMHz
VDS xxx.xV
IDS xxx.xxA
TEMPMAX xxx.xC
TEMPENV xxx.xC

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Set
STBY
FRO xxx.xxMHz
[TRG]/[24hTRG]xxxxxW
SmsOver-3dB OFF
PwrAdj xxx%
Ver x.xx-x.xx
MaxPwr xxxxxW

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Set
STBY
FRO xxx.xxMHz
[TRG]/[24hTRG]xxxxxW
SmsOver-3dB ON
PwrAdj xxx%
Ver x.xx-x.xx
MaxPwr xxxxxW

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Set
ON AIR
FRO xxx.xxMHz
[TRG]/[24hTRG]xxxxxW
SmsOver-3dB OFF
PwrAdj xxx%
Ver x.xx-x.xx
MaxPwr xxxxxW

Exxxx ID xx
SMS String
+39xxxxxxxxxxx
Set
ON AIR
FRO xxx.xxMHz
[TRG]/[24hTRG]xxxxxW
SmsOver-3dB ON
PwrAdj xxx%
Ver x.xx-x.xx
MaxPwr xxxxxW

Where :

Exxxx ID xx is the description of the apparatus with indication of the ID number
SMS String is a customizable string of 10 characters
+39xxxxxxxxxx is the telephone number of origin of the last command
STBY/ON AIR indicates (command) that the machine is in Standby (Off)/On Air
-3dB Alarm indicates that the machine is working below the -3dB
Status is the response to an SMS status command
Command is the confirmation to a command
No mains xx m indicates that the machine has been off for the indicated time (in minutes)
NoAudio indicates that the machine is in no audio alarm
AudioOK indicates that the audio was restored to the level required
xxx Messaggio di segnalazione indicates a cause of arrest or a major signaling
FWD yyyyy W indicates the forward power
REFL yyyyy W indicates the reflected power
FRQ xxx.xxMHz indicates the frequency
VDS xxx.xV indicates the voltage
IDS xxx.xxA indicates the current
TEMPMAX xxx.xC indicates the max temperature
TEMPENV xxx.xC indicates the environmental temperature
Set are settings information
[TRG]/[24hTRG]xxxxxW indicates the target power
SmsOver-3dB ON/OFF indicates that the SMS to restore power is ON/OFF
PwrAdj xxx% indicates the correction of the display of forward power
Ver x.xx-x.xx indicates the firmware/datamap release
MaxPwr xxxxxW indicates the power omologation

Please note: The functionality of the SMS reception is interrupted for an hour, if they are sent by the system more than 5 messages over 5 min.

3.4 Externally connectable optional equipment

The equipment can be connected externally to the following units:

- PC
- Telemetry
- Exchange and/or Audio matrix
- Elenos E.BOX. module

3.4.1 Connection to PC

This connection is useful to analyse the equipment operating parameters in detail, for example during the performance assessment stage or during repairs.

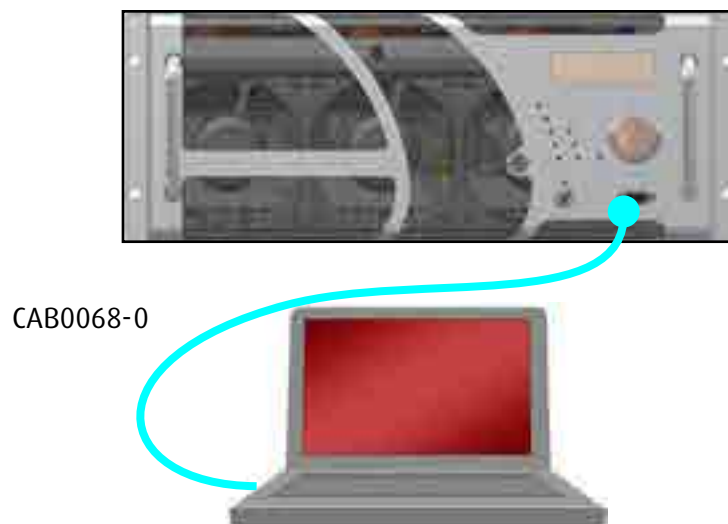
To connect the equipment to a PC, insert an interface cable into the “Interface” connector, DB9, located on the front panel of the machine.

This may be supplied with the product (Elenos code CAB0068-0).

The connection can also be made when the machine is operating.

The Windows Hyperterminal programme can be used to display, or another equivalent available programme.

For the detailed procedure for using an ASCII terminal, please request technical bulletin No. 127 from the manufacturer.



3.4.1.1 Hyperterminal interface

The Hyperterminal pages have a very similar structure to the display view, hence they will not be further described herein.

Since there is more available space, there could be additional parameters.

```

ELENOS KIT65000 7Y S/N.00000000 ELENOS <id 0000> life <Xtend> [menu=Q]
-----
Status : 004 STOP                               17:15 12/02 | Reset alarms :F
-----
Forward (W): 0 [ 5000] Frequency (MHz): 98.00  RF : STBY
Reflected (W): 0 LOCK _____ VDS (V): 0.0
KII. (%): 0.0 Prof.#: 1 _____ MPX IDB (A): 0.00
-----
MAIN MENU (level 1) ---->                       17:15:22 12/02/2014
-----
M - Main RF data
D - Profiles
K - Kauter monitor
S - Status/Alarms
H - Events History
E - Password...
Y - System...
O - Setup...
-----
ELENOS Sri
Via G.Amendola, 9
44078 Poggio Renatico (FE)
ITALY
Tel.+39 0532 829965
Fax.+39 0532 829177
www.elecos.com
-----
Ver. 2.00 /1.10 (c)2011 Elecos
  
```

Main Menu

```

ELENOS KIT65000 7Y S/N.00000000 ELENOS <id 0000> life <Xtend> [menu=Q]
-----
Status : 004 STOP                               17:15 12/02 | Reset alarms :F
-----
RF CURRENTS (A)
Ampl. n:      1      2      3      4      5      6      7
I drain:      0.0    0.0    0.0    0.0    0.0    0.0    0.0      Sum: 0.0
-----
PSU1 (V): 0.0 Vcc (5V): 5.0 | STANDBY : TRUE
PSU2 (V): 0.0 V+ (12V): 12.0 | FREQUENCY (MHz): 98.00 (rt) 98.00
PSU3 (V): 0.0 V- (12V): -11.4 | TARGET PWR (W): 5000
PSU1 (A): 0.0 Vbias (V): 0.0
PSU2 (A): 0.0 Vds (V): 0.0 | TEMPERATURES (C)
PSU3 (A): 0.0 Ids (PSU, A): 0.0 | Int. Env: 0.0  Rf 1 : 0.0
Max RF : 0.0  Rf 2 : 0.0
Rf 3 : 0.0
Rf 4 : 0.0
Rf 5 : 0.0
Rf 6 : 0.0
Rf 7 : 0.0
-----
Pwr (W): 0
Ref (W): 0 Profile (n): 1 | Max PSU: 0.0
KII (%) : 0.0 Dev. (KHz): 0.0 | PSU1 0.0
PSU2 0.0
PSU3 0.0
-----
WORKING TIME : 0:00:00
FAN WORKING T.: 0:00:00 Reset: F | Fan s.b.: 0
  
```

Main Menu
Main RF data (M)

Main Menu
Profiles (0)

```

ETG5000_7F  S/N.00000000  ELENGS <id 0000>  Life vKamaler  [menu-Q]
-----
Status : 004 STOP                               17:17 12/02 | Reset alarms :F
-----
Forward (W):  0 | 5000 | Frequency (MHz):  98.00  RF      :  STBY
Reflected (W):  0      LOCK -----          VDS (V):  0.0
Eff. (%):  0.0  Prof.#:  1 -----          MPX    IDS (A):  0.0
-----
          L e v e l s
#  Freq.  Target  Mode  Input  Right  Left  Aux1  Aux2  Pres  Clipping
   MHz      W      Ext.MPX  AUTO  dB    dB    %    %    u3  Enab. Lev.
Car. 98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
-----
1
2  98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
3  98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
4  98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
5  98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
6  98.00  5000  Ext.MPX  AUTO  0.0  0.0 100.0 100.0  0  OFF 150.0
-----
Current Profile # :  1
Delta F (+/- kHz):  0.0                               BB board model:  0

```

Main Menu
Exciter monitor (E)

```

ETG5000_7F  S/N.00000000  ELENGS <id 0000>  Life vKamaler  [menu-Q]
-----
Status : 004 STOP                               17:17 12/02 | Reset alarms :F
-----
0 (kHz)  15      30      45      60      75      90      105
|MpX---|  0.0 |-----+-----+-----+-----+-----+
|>
-----
0 (kHz)   5.0    10.0    15.0    20.0    25.0    30.0
|Aux---|  0.0 |-----+-----+-----+-----+
|>
-----
Tx Frequency (MHz):  98.00
-----
Imp. level (dB):      0.0 | Mode      :Ext.MPX | SW Ver:  0.00
                        |             |           | HW brd mod.: 0
                        |             |           |
Aux1 (%):100.0  Aux2 (%):100.0 |           | Pll    : LOCK

```

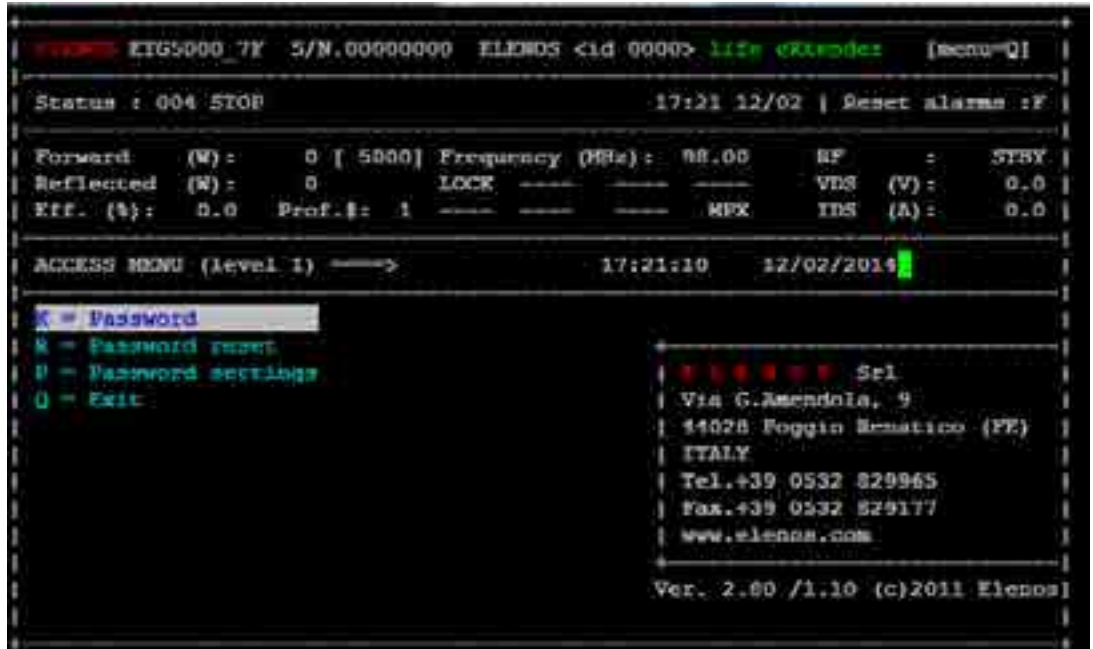
Main Menü
Status/Alarms (S)

```
ETCS5000_7E S/N.00000000 ELEPOS <id 0000> life Alexander [menu-Q]
-----
Status : 004 STOP 17:10 12/02 | Reset alarms :F
-----
STATUS/ALARMS (1 - 17) -->
ACTIVE 004 STOP
```

Main Menü
Events History (H)

```
ETCS5000_7F S/N.00000000 ELEPOS <id 0000> life Alexander [menu-Q]
-----
ALARMS HISTORY --> ([-] prev.pag. [+] next pag. [arrow up/down] next/prev.)
44) 046 SHUNT COMM TIMEOUT 12/02 16:58:56 >>
43) 017 PSU COMM TIMEOUT 12/02 16:58:55
42) 020 POWER UP 12/02 16:58:51
41) 021 POWER DOWN 12/02 16:58:15
40) 001 SYSTEM RESET 12/02 16:41:41
39) 047 WARNING TEMPERATURE SENSOR 12/02 16:24:58
38) 028 EXCITER COMM ERROR 12/02 16:24:58
37) 046 SHUNT COMM TIMEOUT 12/02 16:24:57
36) 017 PSU COMM TIMEOUT 12/02 16:24:57
35) 020 POWER UP 12/02 16:24:53
34) 021 POWER DOWN 12/02 16:24:06
33) 001 SYSTEM RESET 12/02 16:23:59
32) 047 WARNING TEMPERATURE SENSOR 12/02 16:23:43
31) 028 EXCITER COMM ERROR 12/02 16:23:43
30) 046 SHUNT COMM TIMEOUT 12/02 16:23:43
29) 017 PSU COMM TIMEOUT 12/02 16:23:42
28) 020 POWER UP 12/02 16:23:38
27) 021 POWER DOWN 12/02 16:06:21
26) 017 PSU COMM TIMEOUT 12/02 16:06:14 >>
```

Main Menu
Password (K)



Main Menu
Password (K)
Password (K)




```

| ELENOS <id 0000> life <Remainder> [menu-Q]
|-----|
| Status : 004 STOP                               17:22 12/02 | Reset alarm : F
|-----|
| Forward (W): 0 | 5000 | Frequency (MHz): 98.00   RF      : STBY
| Reflected (W): 0     LOCK -----             VDS (V): 0.0
| Eff. (%): 0.0 Prof.#: 1 -----             MPX   IDS (A): 0.0
|-----|
| PASSWORD RESET ---->
|-----|
|
| Unlock Code      : 02A6
| Password Recovery : 0000
|-----|

```

Main Menu
 Password (K)
 Password reset (R)

```

| ELENOS <id 0000> life <Remainder> [menu-Q]
|-----|
| Status : 004 STOP                               17:23 12/02 | Reset alarm : F
|-----|
| Forward (W): 0 | 5000 | Frequency (MHz): 98.00   RF      : STBY
| Reflected (W): 0     LOCK -----             VDS (V): 0.0
| Eff. (%): 0.0 Prof.#: 1 -----             MPX   IDS (A): 0.0
|-----|
| PASSWORD SETTINGS ---->
|-----|
|
| User password    (n.): 0000
| System password  (n.): 0000
|-----|

```

Main Menu
 Password (K)
 Password settings (P)

Main Menu
System (Y)

```

ELENOS ET65000 7F S/N.00000000 ELENOS <id 0000> life eXtender [menu-Q]
-----
Status : 004 STOP                               17:24 12/02 | Reset alarms : F
-----
Forward (W): 0 [ 5000] Frequency (MHz): 98.00 RF : STBY
Reflected (W): 0 LOCK ----- VDS (V): 0.0
Eff. (A): 0.0 Prof.#: 1 ----- MPX IDS (A): 0.0
-----
SYSTEM MENU (level 2) ---->                    17:24:03 12/02/2014
-----
X = System settings
U = Comm. settings
J = Audio trim & alarm
C = Clock power set
P = SMS phone set.
F = User Warning
V = En. 0-31 Alarm SMS
H = En. 32-63 Alarm SMS
L = life eXtender
-----
+-----+
+ 1 1 1 1 1 1 Sri
+ Via G.Amendola, 9
+ 44020 Poggio Renatico (FE)
+ ITALY
+ Tel.+39 0532 829965
+ Fax.+39 0532 829177
+ www.elekos.com
+-----+
Ver. 2.00 /1.10 (c)2011 Elekos

```

Main Menu
System (Y)
System settings (X)

```

ELENOS ET65000 7F S/N.00000000 ELENOS <id 0000> life eXtender [menu-Q]
-----
Status : 004 STOP                               17:24 12/02 | Reset alarms : F
-----
Forward (W): 0 [ 5000] Frequency (MHz): 98.00 RF : STBY
Reflected (W): 0 LOCK ----- VDS (V): 0.0
Eff. (A): 0.0 Prof.#: 1 ----- MPX IDS (A): 0.0
-----
SYSTEM SETTINGS ---->
-----
Temperature Unit : CELSIUS Min Temp Sensor Number : 1
Show Display : ALWAYS PLL reference (10MHz) : INT.
Min Level Pwr Pwr Fault (W): 100 PwrOscillationCheck : FALSE
Pwr Pwr Cal. (W): 100
SWR Foldback Enable : TRUE
Base band board code : 0 IFA Bias Treshold (V): 8.00
Target PWR UPS (W) : 2600 Refl. Pwr Tresh. nom. (10A): FOLD#
Refl. Pwr Tresh. Level (W): 525
PAbias (V): 5.45
-----
Actual date : 12/02/2014 07 17:24:39
New date : 12/02/2014 07 17:24:26 UPDATE

```

```

| ETC5000 KTGS000_7F S/N.00000000 ELEPOS <id 0000> life >Allmode [menu-Q]
|-----|
| Status : 004 STOP                               17:25 12/02 | Reset alarms :F
|-----|
| Forward (W): 0 [ 5000] Frequency (MHz): 98.00 RF : STBY
| Reflected (W): 0 LOCK ----- VDS (V): 0.0
| Eff. (%): 0.0 Prof.#: 1 ----- MPX IDS (A): 0.0
|-----|
| COMM. SETTINGS ==>
|-----|
| Front 485 Id (n.): 0 Front 485 Speed : 9600
| TcTs 485 Id (n.): 0 TcTs 485 Speed : 57600
| P20 485 Speed : 9600
| Station Id : 0
| Pager Id : 0

```

Main Menu
System (Y)
Comm. settings (U)

```

| ETC5000 KTGS000_7F S/N.00000000 ELEPOS <id 0000> life >Allmode [menu-Q]
|-----|
| Status : 004 STOP                               17:26 12/02 | Reset alarms :F
|-----|
| Forward (W): 0 [ 5000] Frequency (MHz): 98.00 RF : STBY
| Reflected (W): 0 LOCK ----- VDS (V): 0.0
| Eff. (%): 0.0 Prof.#: 1 ----- MPX IDS (A): 0.0
|-----|
| 19KHz Level: 10.00 %
| 19KHz Phase: 0.0 deg.
| Limiter(Clipper): 150.0 kHz
|-----|
| MODULATION ALARM SET ==> | Base Band mod: 0
| Modulation Alarm DISABLE | Firmware : 2.80
| (TC/TS slave connector)
|-----|
| No mod. level (dB): -25.0 Time (s): 600
| Over mod. level (dB): 7.1 Time (s): 600

```

Main Menu
System (Y)
Audio trim & alm (J)

Main Menu
System (Y)
Clock power set (C)

```

ETG5000_7E  S/N.00000000  ELENOS <id 0000> 11Te eKLeno0r: [menu=Q]
-----
Status : 004 STOP                               17:30 12/02 | Reset alarm : F
-----
CLOCK POWER SET ==>
-----
Target power mode fixed for all the 24 hours: TRUE
Fixed target power                               (W): 5000
-----
copy over next day                               : FALSE
reset all at factory default : FALSE
-----
Target power on the 24 hours of Sunday (7 of 7)
|T3 | | | | | | | | | | | | | | | | | | | | | | | |
|T2 | | | | | | | | | | | | | | | | | | | | | | | |
|T1 | | | | | | | | | | | | | | | | | | | | | | | |
|X0 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
      Hours
-----
Target 3: 5000 = 100% of fixed target power
Target 2: 3750 = 75% of fixed target power
Target 1: 2500 = 50% of fixed target power
Target 0: 1250 = 25% of fixed target power

```

Main Menu
System (Y)
SMS phone set (P)

```

ETG5000_7F  S/N.00000000  ELENOS <id 0000> 11Te eKLeno0r: [menu=Q]
-----
Status : 004 STOP                               17:30 12/02 | Reset alarm : F
-----
SMS PHONE SET ==>
-----
Field Strength dBm: -113
-----
> | En.this/command/status | global | dig.
  | amount|create|request|echo ra| SMS
-----
Example : +393371234567890123
Phone N.1: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.2: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.3: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.4: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.5: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.6: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.7: | FALSE | FALSE | FALSE | FALSE | T_SMS
Phone N.8: | FALSE | FALSE | FALSE | FALSE | T_SMS
-----
id string : ELENOS | Enable SMS : FALSE | PSTN : FALSE
Pager id : 0 | SMS: Ok Bad | Mains alarm Enable : TRUE
Station id: 0 | s. 0 0 | Mains alarm delay (s): 30
           | r. 0 0 | FWD over 2/3 TARGET (-1,76DB): FALSE

```

```

ETG5000 ETG5000_7F 5/N.00000000 ELENOS <id 0000> life <Xtender [menu=Q]
-----
Status : 004 STOP 17:31 12/02 | Reset alarms :F
-----
Forward (W): 0 | 5000 | Frequency (MHz): 98.00 RF : STBY
Reflected (W): 0 LOCK VDS (V): 0.0
Eff. (%): 0.0 Prof.#: 1 HPX ID5 (A): 0.0
-----
USER LIMIT WARNING SETTINGS ---->
-----
Act.Value Enable Max Min Type Delay Timer Alarm
Internal Temp (C): 0.0 F 50.0 45.0 UPPER 120 1200 F
RF Temp (C): 0.0 F 90.0 98.0 UPPER 120 1200 F
PSU Temp (C): 0.0 F 90.0 98.0 UPPER 120 1200 F
PSU Current (A): 0.0 F 198.0 178.2 UPPER 120 1200 F
RF Current (A): 0.00 F 1.20 1.00 UPPER 120 1200 F
Forward PWR (%): 0 F 2500 2000 LOWER 120 1200 F
Reflected PWR (W): 0 F 500 450 UPPER 120 1200 F
-----

```

Main Menu
System (Y)
User warning (F)

```

ETG5000 ETG5000_7F 5/N.00000000 ELENOS <id 0000> life <Xtender [menu=Q]
-----
Status : 004 STOP 17:32 12/02 | Reset alarms :F
-----
Hit Status Hit Status
| / Enable | / Enable
| 0 F F 000 CORRECT WORKING | 16 F F 016 PSU OVER TEMPERATURE
| 1 F F 001 SYSTEM RESET | 17 F F 017 PSU COMM TIMEOUT
| 2 F F 002 EEPROM CHECKSUM ERROR | 18 F F 018 EXTERNAL INTERLOCK
| 3 F F 003 BLOCKED | 19 F F 019 ON AIR
| 4 T F 004 STOP | 20 F F 020 POWER UP
| 5 F T 005 -3dB CARRIER | 21 F F 021 POWER DOWN
| 6 F F 006 HIGH REF PWR | 22 F F 022 PSU THERMAL FAULT
| 7 F F 007 MIN 12V | 23 F F 023 PSU LOW POWER
| 8 F F 008 RF AMP. FAULT | 24 F F 024 PSU RF OFF
| 9 F F 009 RF AMP. FAULT DERATING | 25 F F 025 WORKING MODE COMBINED
| 10 F F 010 RF THERMAL DERATING | 26 F F 026 SWR FOLIBACK
| 11 F F 011 RF OVER TEMPERATURE | 27 F F 027 UNLOCK
| 12 F F 012 PSU FAULT | 28 F F 028 EXCITER COMM ERROR
| 13 F F 013 PSU CURRENT DERATING | 29 F T 029 NO AUDIO
| 14 F F 014 PSU OVER CURRENT | 30 F F 030 OVER 2/3 CARRIER
| 15 F F 015 PSU THERMAL DERATING | 31 F F
-----

```

Main Menu
System (Y)
En. 0-31 alrm SMS (V)

Main Menü
 System (Y)
 En. 32-63 alrm SMS (B)

```

***** ETC5000_7F  S/N.00000000  ELENOS <id 0000> Life eXtender [menu-Q]
-----
Status : 004 STOP                                     17:33 12/02 | Reset alarm : F
-----
Bit  Status                                         Bit  Status
|  / Enable                                         |  / Enable
|32  F F      032 OVER MODULATION                    48  F T      048 AUDIO OK
|33  F F                                         49  F F      049 DRAIN VOLTAGE FEEDBACK
|34  F F      034 TEMPERATURE SENSOR ERRO          50  F F      050 OVER PWR PWR ERROR
|35  F F      035 PWR FORWARD OSCILLATION          51  F F      051 PSU VOLTAGE DERATING
|36  F F      036 THREE BLOCK OUT                  52  F F
|37  F F      037 USER EAV TEMP OUT LIMIT          53  F F
|38  F F      038 USER RF TEMP OUT LIMIT           54  F F
|39  F F      039 USER PSU TEMP OUT LIMIT
|40  F F      040 USER RF CURRENT OUT LIM
|41  F F      041 USER PSU CURRENT OUT LI
|42  F F      042 USER FRW PWR OUT LIMIT
|43  F F      043 USER RFL PWR OUT LIMIT
|44  F F      044 OUT PWR NOT VERIFIED
|45  F F      045 UPS ACTIVE
|46  F F      046 SHUNT COMM TIMEOUT
|47  F F      047 WARNING TEMPERATURE SEN
  
```

Main Menü
 System (Y)
 Life eXtender (L)

```

***** ETC5000_7F  S/N.00000000  ELENOS <id 0000> Life eXtender [menu-Q]
-----
Status : 004 STOP                                     17:34 12/02 | Reset alarm : F
-----
Forward  (W):    0 [ 5000] Frequency (MHz):  98.00    RF      :    STBY
Reflected (W):    0      LOCK                VDS  (V):    0.0
Eff. (%) :  0.0  Prof.#:  1                    MFX    IDS  (A):    0.0
-----
LIFE EXTENDER ACTIVATION / DEACTIVATION -->
-----
SerialNumber      : 000000000
Unlock Code       : 8A00
Deactivation Code :
-----
LIFE EXTENDER Status : ACTIVE
Examinated (Days) 1      Run Time (Hours) 0
Examinated (Days)in Optimal Conditions 0
Examinated (Days)in Heavy Conditions 0
  
```

Main Menu
Debug (D)

```

ELENOS ETG5000_7F S/N.00000000 ELENOS <id 0000> life <Access> [menu-Q]
-----
Status : 004 STOP                               17:35 12/02 | Reset alarms :F
-----
Forward (W): 0 [ 5000] Frequency (MHz): 98.00   RF      : STBY
Reflected (W): 0      LOCK _____         VDS (V): 0.0
Eff. (%): 0.0 Prof.#: 1 _____           MPX   IDS (A): 0.0
-----
DEBUG MENU (level 3) ==>                        17:35:09  12/02/2014
-----
D - GSM debug
F - Gsm...
Q - Exit
-----
***** Srl
Via G. Amendola, 9
44028 Foggiasemionico (FE)
ITALY
Tel.+39 0532 829965
Fax.+39 0532 829177
www.elecom.com
-----
Ver. 2.80 /1.10 (c)2011 Elenos

```

Main Menu
Debug (D)
GSM debug (G)

```

ELENOS ETG5000_7F S/N.00000000 ELENOS <id 0000> life <Access> [menu-Q]
-----
Status : 004 STOP                               17:36 12/02 | Reset alarms :F
-----
Forward (W): 0 [ 5000] Frequency (MHz): 98.00   RF      : STBY
Reflected (W): 0      LOCK _____         VDS (V): 0.0
Eff. (%): 0.0 Prof.#: 1 _____           MPX   IDS (A): 0.0
-----
|SmsStatusRequest  [] :  F  F  F  F  F  F  F  F  F
|SmsEchoCdRequest  :  F
|dataMemoryReq     :  000000
|SmsDataMemoryRequest [] :  F  F  F  F  F  F  F  F  F
|SmsStatusPollRequest [] :  P  P  P  P  P  P  P  P  P
-----
|SMS diagnostic      ok          bad
|Sended              0          0
|Received             0          0

```

Main Menü
 Debug (D)
 Uarts (F)

```

ELENOS ETC5000_7E S/N.00000000 ELENOS <id 0000> life eXtender [menu=Q]
-----
Status : 004 STOP                               17:37 12/02 | Reset alarm :F
-----
Forward (W): 0 [ 3000] Frequency (MHz): 98.00 RF : SIBY
Reflected (W): 0 LOCK _____ VDS (V): 0.0
Eff. (%): 0.0 Prof.#: 1 _____ MPX IDS (A): 0.0
-----
UARTS MENU (level 4) ---->                    17:37:49 12/02/2014
-----
Uart 0
Uart 1
Uart 2
Q = Exit
-----
ELENOS Srl
Via G.Amendola, 9
44028 Foggia Sanatico (FG)
ITALY
Tel.+39 0532 829965
Fax.+39 0532 829177
www.eleNos.com
-----
Ver. 2.80 /1.10 (c)2011 EleNos
  
```

Main Menü
 Debug (D)
 Uarts (F)
 Uart 0,1,2

```

ELENOS ETC5000_7E S/N.00000000 ELENOS <id 0000> life eXtender [menu=Q]
-----
ON BOARD UART 0 ---->
-----
HostLink Slave
-----
Rx_Errors           A0
Errors_Counter      1
txd_in_ptr          0
txd_out_ptr         0
rxd_in_ptr          2
rxd_out_ptr         2
  
```


3.4.2 Connection to telemetry

This connection allows remote control through a device especially designed for that purpose.

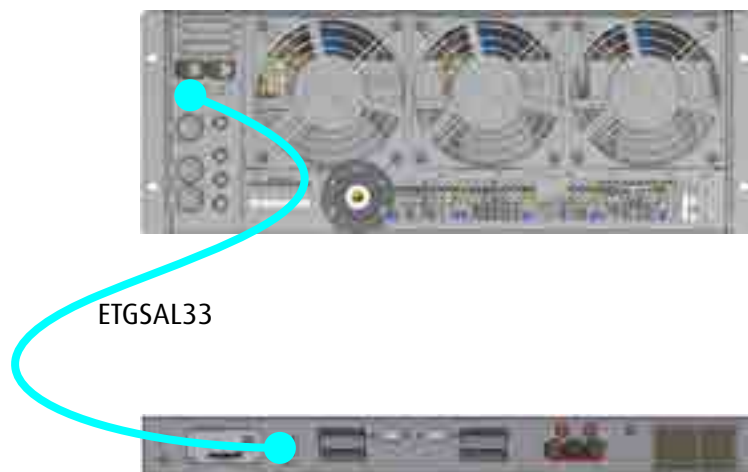
The telemetry unit performs the energy backup for the continuous operation of the modem and is equipped with all the utilities for the general control of the parameters of other equipment and the work station.

To connect to an external telemetry unit, insert a standard extension cable into the "EIA485" connector, DB9, located on the rear panel of the machine.

This cable is supplied with the telemetry unit (Elenos code ETGSAL33).

The connection can also be made when the machine is operating.

For further information please refer to the telemetry unit manual.



3.4.3 Connection to exchange unit and/or audio matrix

This connection allows the transmitter to be used in a system which provides for the exchange of a faulty transmitter with a spare one.

In order to connect to an N+1 exchange unit, if the equipment is not a spare, insert a standard extension cable into a "TC/TS" connector, DB25, located on the rear panel of the machine.

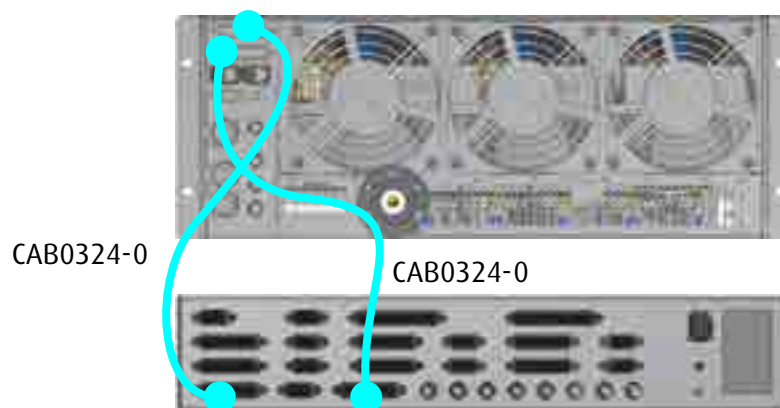
If the equipment is used as a spare, also provide an additional standard extension cable to be inserted into the "PROFILES" connector, DB25, located on the rear panel of the machine.

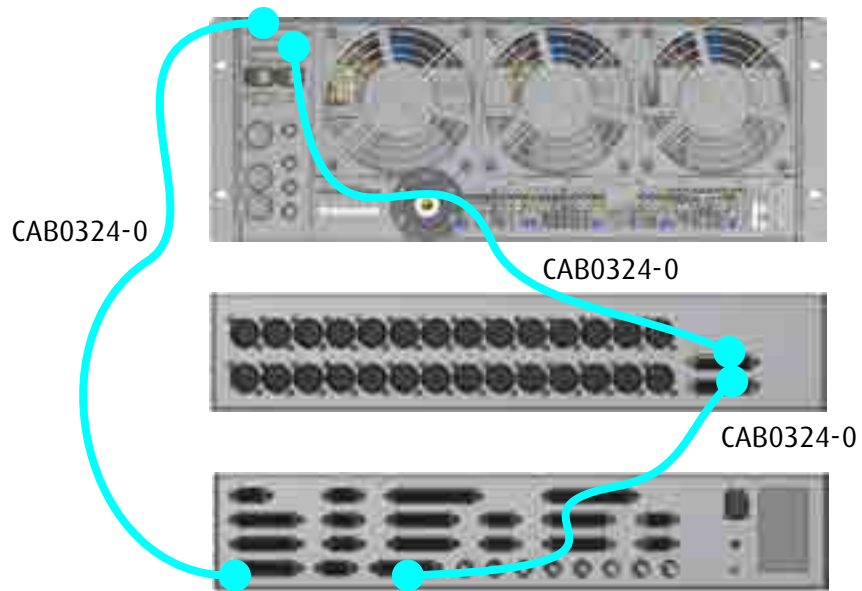
If the system has an audio matrix, this latter cable must be connected the matrix itself and not to the exchange unit.

These cables are supplied with the exchange unit (Elenos code CAB0324-0).

The signal cables can also be connected when the equipment is working, excluding all RF cables.

For more information, please refer to the exchange unit manual.





3.4.4 Connection to Elenos E.BOX module

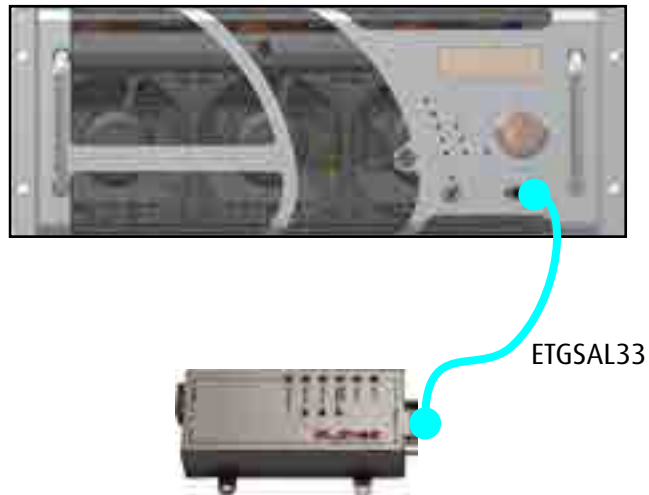
This connection allows to have a “bridge” between the EIA485 bus of the equipment and the Ethernet network.

To connect to the E.BOX module, insert a standard extension cable into the “EIA485” connector, DB9, located on the front or rear panel of the machine.

This cable is supplied with the module (Elenos code ETGSAL33).

The connection can also be made when the machine is operating.

For further information, please refer to the E.BOX module manual.



4 Maintenance

4.1 Device overview

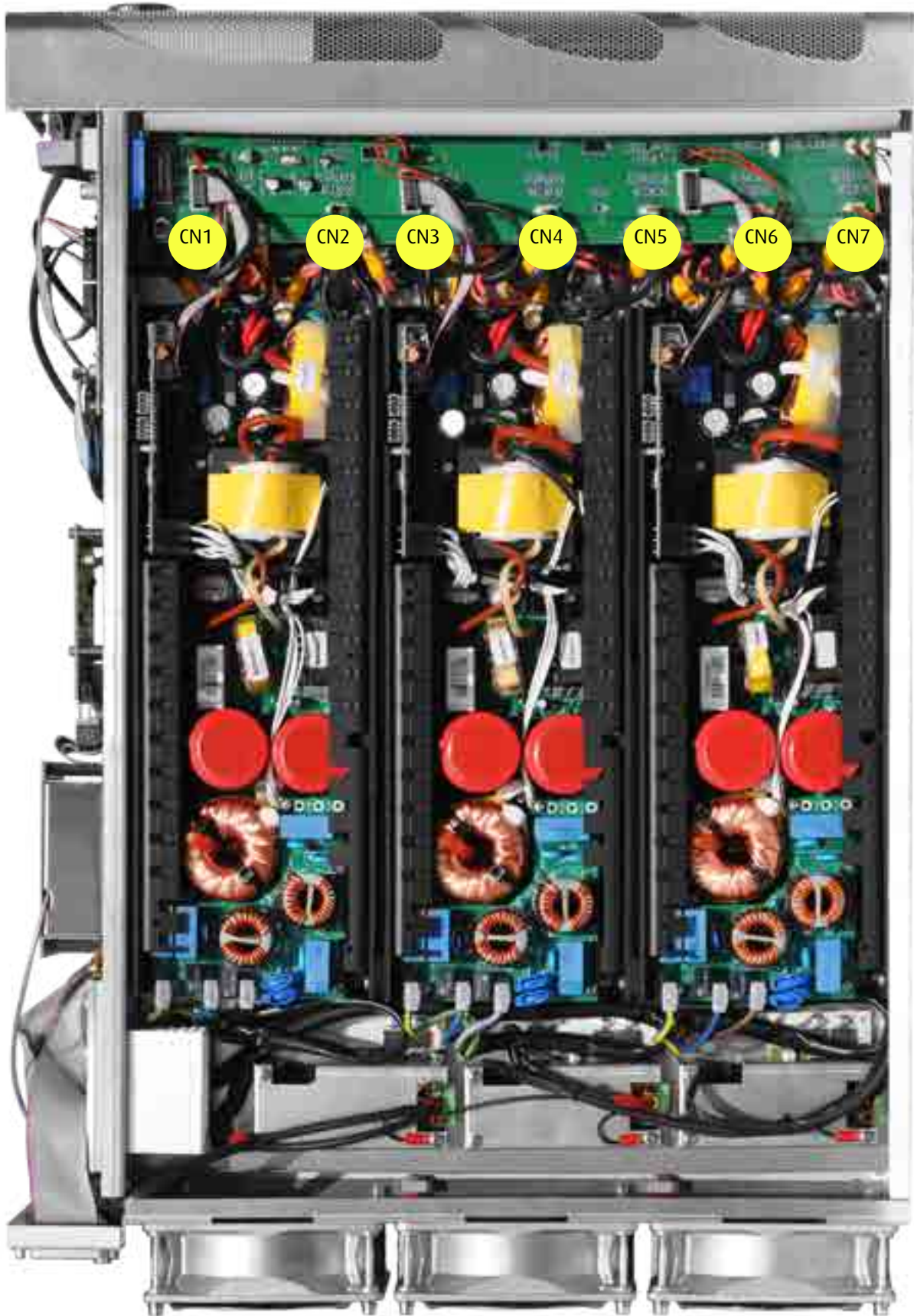
We report here the images of how, less than specific customizations, the apparatus out by the manufacturer.

If necessary, refer to these to restore the configuration of the transmitter.

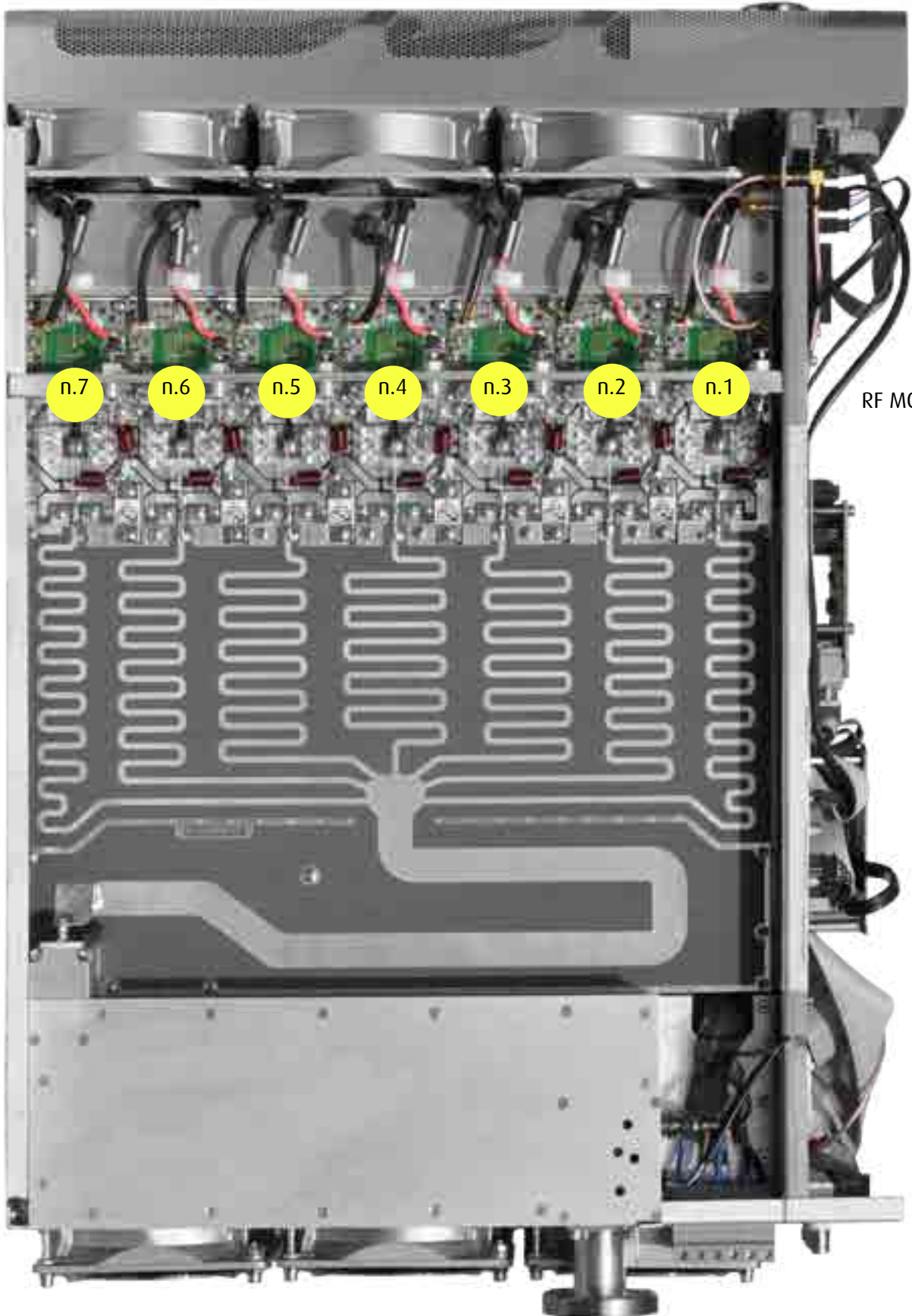
The figures are related to ETG5000. For ETG3500 and ETG2500 the only significant differences to mention are that:

- in ETG3500 are absent the RF modules n.1 and n.7, and the connections between modules and concentrator board are to be carried out so
 - module n.2 to CN1 on concentrator board
 - module n.3 to CN2 on concentrator board
 - module n.4 to CN3 on concentrator board
 - module n.5 to CN4 on concentrator board
 - module n.6 to CN5 on concentrator board
- ETG2500 are absent the RF modules n.1, n.4, and n.7, and the connections between modules and concentrator board are to be carried out so
 - module n.2 to CN1 on concentrator board
 - module n.3 to CN2 on concentrator board
 - module n.5 to CN3 on concentrator board
 - module n.6 to CN4 on concentrator board

For more details, to carry out repairs, if you are an authorized technician or bodies, you can request at the Manufacturer the Service Manual, including wiring diagrams.



CONCENTRATOR BOARD



RF MODULES



4.2 Settings

4.2.1 Power supply Dip-switch

In this series there are three power supplies (2.5KW or 3KW).

On the power supplies must set the operating mode (analog, digital), using the dip-switch SW1, and the address, using the dip-switch SW2.

| | SW1 | | | | SW2 | | | |
|------------------|---------|---------|---------|---------|-----------|-----------|---------|---------|
| | Switch1 | Switch2 | Switch3 | Switch4 | Switch1 | Switch2 | Switch3 | Switch4 |
| Power supply N.1 | OFF | OFF | OFF | OFF | ON | OFF | OFF | OFF |
| Power supply N.2 | OFF | OFF | OFF | OFF | OFF | ON | OFF | OFF |
| Power supply N.3 | OFF | OFF | OFF | OFF | ON | ON | OFF | OFF |

Dip-switch setting parameters



POWER SUPPLIES



4.3 Spare parts and mounting

Refer to the Spare Parts manuals, technical bulletins, e-learning videos and training courses provided by the Manufacturer.

4.4 Routine maintenance (cleaning, replacements, checks)

During normal operation, we recommend performing routine checks in order to verify that there are no critical operating conditions.

We recommend following the following schedule:

| Frequency | Intervention |
|-----------|---|
| 15 days | Filter cleaning (very dusty environment). |
| 30 days | Filter cleaning (not very dusty environment). |
| | Check the direct and reflected output power. |
| | Check telemetry operates properly, if applicable. |
| | Check the RF modules operate properly. |
| | Check the power supplies operate properly |
| 6 months | Check the fans work properly. |
| | Check the operating temperatures of the equipment. |
| | Check the electric consumption. |
| 12 months | Check the output RF connector closes properly. |
| | Check the condition of the electric connections. |
| | Check that the fan blades and the air grille are clean (dusty environment). To be performed when the equipment is in Stand-by mode. |
| | Filter washing (dusty environment). |
| 24 months | Filter washing (not very dusty environment). |
| | Filter replacement (dusty environment). |

4.5 Operating faults (symptoms, causes and remedies)

| Fault | Cause | Remedy |
|---|--|---|
| The equipment does not start. | <ul style="list-style-type: none"> Faulty or missing power supply cable Auxiliary power supply incorrect (Led MAINS on the front panel off) Fault on the power supply stage | <ul style="list-style-type: none"> Replace the power supply cable and connect it to the equipment Contact the manufacturer Contact the manufacturer |
| The equipment does not reach the required power | <ul style="list-style-type: none"> Equipment in Stand By mode No jumper for interlock PLL not engaged (ON AIR warning light on the front panel off) Power supply fault RF module fault Fault on the power measurement system | <ul style="list-style-type: none"> Put the equipment in RF ON Insert the jumper for the interlock Contact the manufacturer Contact the manufacturer Contact the manufacturer Contact the manufacturer |
| The equipment transmits on a different frequency from the one set | <ul style="list-style-type: none"> PLL board failure VCO board failure | <ul style="list-style-type: none"> Contact the manufacturer Contact the manufacturer |
| Absence of modulation in output and on display | <ul style="list-style-type: none"> Audio cable interruption or missing MPX board failure Stereo Coder board failure Modulation is off | <ul style="list-style-type: none"> Audio cable connection or replacement Contact the manufacturer Contact the manufacturer Reactivate modulation using the relative menu |
| Output modulation absent, but shown on the display | <ul style="list-style-type: none"> MPX board failure Stereo Coder board failure | <ul style="list-style-type: none"> Contact the manufacturer Contact the manufacturer |
| Output modulation does not reach the desired value | <ul style="list-style-type: none"> Input audio level low MPX board failure | <ul style="list-style-type: none"> Increase the source audio level Increase the sensitivity of the ETG input and/or contact the manufacturer |
| Stereophonic modulation absence | <ul style="list-style-type: none"> Stereophonic carrier off Audio cables interrupted or missing Stereo Coder board failure Stereo Coder board missing | <ul style="list-style-type: none"> Turn the stereophonic carrier on from the relative menu Audio cable connection or replacement Contact the manufacturer The equipment does not feature the "Stereo Coder" option, therefore it cannot be used for stereophonic transmission |
| One or more fans stopped | <ul style="list-style-type: none"> Fan failure Fan power supply failure | <ul style="list-style-type: none"> Contact the manufacturer Contact the manufacturer |

| | | |
|--|--|---|
| <p>Lack of communication with telemetry/PC</p> | <ul style="list-style-type: none"> • Incorrect equipment address • Connection cable unsuitable • Incorrect parameter setting • Connection cable faulty or interrupted • CPU board failure | <ul style="list-style-type: none"> • Check the equipment address from the menu and set the correct address • Check that the cable used is that supplied by ELENOS or equivalent • Check the correct parameters and set them in the section "Instructions for use", at paragraph "Optional equipment connected externally" (User manual) • Cable connection or replacement • Contact the manufacturer |
|--|--|---|

