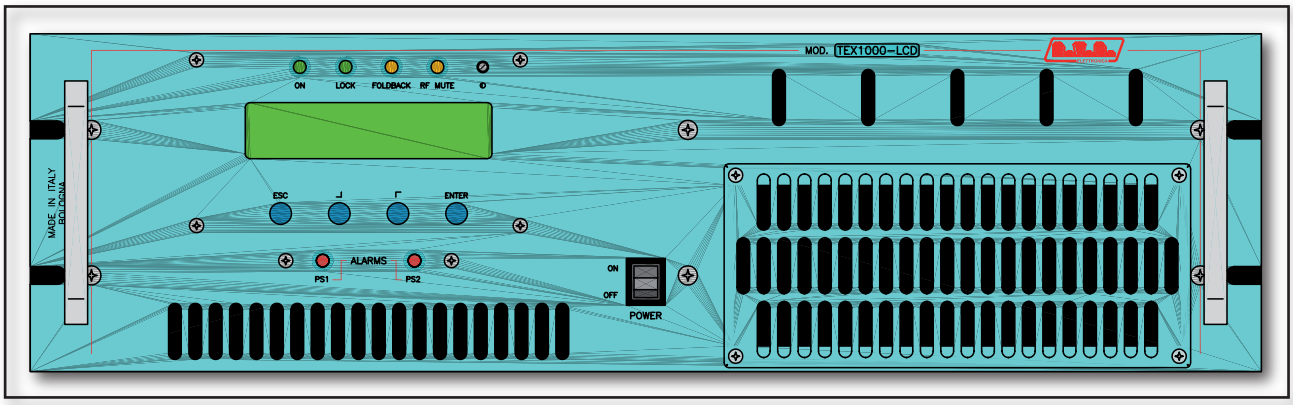
TEX1000-LIGHT



User Manual

Volume 1

Manufactured by R.V.R. ELETTRONICA **Italy**

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TEX1000-LIGHT - User Manual
Version 1.0

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Notification of intended purpose and limitations of product use
This product is a FM transmitter intended for FM audio broadcasting. It utilises operating frequencies not harmonised in the intended countries of use.
The user must obtain a license before using the product in intended country of use. Ensure respective country licensing requirements are complied with.
Limitations of use can apply in respect of operating freuency, transmitter power and/or channel spacing.

Declaration of Conformity
Hereby, R.V.R. Elettronica SpA, declares that this FM transmitter is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Table of Contents

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1. Preliminary Instructions

This manual is written as a general guide for those having previous knowledge and experience with this kind of equipment, well conscious of the risks connected with the operation of electrical equipment.

It is not intended to contain a complete statement of all safety rules which should be observed by personnel in using this or other electronic equipment.

The installation, use and maintenance of this piece of equipment involve risks both for the personnel performing them and for the device itself, that shall be used only by trained personnel.

R.V.R. Elettronica SpA doesn't assume responsibility for injury or damage resulting from improper procedures or practices by untrained/unqualified personnel in the handling of this unit.

Please observe all local codes and fire protection standards in the operations of this unit.

WARNING: always disconnect power before opening covers or removing any part of this unit.

Please observe all local codes and fire protection standards in the operations of this unit.

WARNING: this device can irradiate radio frequency waves, and if it's not installed following the instructions contained in the manual and local regulations it could generate interferences in radio communications.

This is a "CLASS A" equipment. In a residential place this equipment can cause hash. In this case can be requested to user to take the necessary measures.

R.V.R. Elettronica SpA reserves the right to modify the design and/or the technical specifications of the product and this manual without notice.

2. Warranty

Any product of **R.V.R. Elettronica** is covered by a 24 (twenty-four) month warranty.

For components like tubes for power amplifiers, the original manufacturer's warranty applies.

R.V.R. Elettronica SpA extends to the original end-user purchaser all manufacturers warranties which are transferrable and all claims are to be made directly to R.V.R. per indicated procedures.

Warranty shall not include:

1 Re-shipment of the unit to R.V.R. for repair purposes;

2 Any unauthorized repair/modification;

3 Incidental/consequential damages as a result of any defect;

4 Nominal non-incidental defects;

5 Re-shipment costs or insurance of the unit or replacement units/parts.

Any damage to the goods must be reported to the carrier in writing on the shipment receipt.

Any discrepancy or damage discovered subsequent to delivery, shall be reported to **R.V.R. Elettronica** within **5** (five) days from delivery date.

To claim your rights under this warranty, you shold follow this procedure:

1 Contact the dealer or distributor where you purchased the unit. Describe the problem and, so that a possible easy solution can be detected.

Dealers and Distributors are supplied with all the information about problems that may occur and usually they can repair the unit quicker than what the manufacturer could do. Very often installing errors are discovered by dealers.

2 If your dealer cannot help you, contact **R.V.R. Elettronica** and explain the problem. If it is decided to return the unit to the factory, **R.V.R. Elettronica** will mail you a regular authorization with all the necessary instructions to send back the goods;

3 When you receive the authorization, you can return the unit. Pack it carefully for the shipment, preferably using the original packing and seal the package perfectly. The customer always assumes the risks of loss (i.e., R.V.R. is never responsible for damage or loss), until the package reaches R.V.R. premises. For this reason, we suggest you to insure the goods for the whole value. Shipment must be effected C.I.F. (PREPAID) to the address specified by R.V.R.'s service manager on the authorization

DO NOT RETURN UNITS WITHOUT OUR AUTHORIZATION AS THEY WILL BE REFUSED

4 Be sure to enclose a written technical report where mention all the problems found and a copy of your original invoice establishing the starting date of the warranty.

Replacement and warranty parts may be ordered from the following address. Be sure to include the equipment model and serial number as well as part description and part number.

R.V.R. Elettronica SpA
Via del Fonditore, 2/2c
40138 BOLOGNA
ITALY
Tel. +39 051 6010506

3. First Aid

The personnel employed in the installation, use and maintenance of the device, shall be familiar with theory and practice of first aid.

3.1 Treatment of electrical shocks

3.1.1 If the victim is not responsive

Follow the A-B-C's of basic life support.

- Place victim flat on his backon a hard surface.
- Open airway: lift up neck, push forehead back (**Figure 1**).

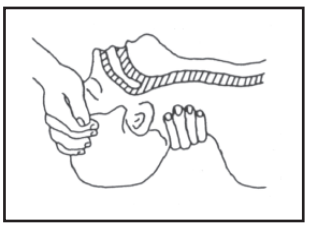


Figure 1

- clear out mouth if necessary and observe for breathing
- if not breathing, begin artificial breathing (**Figure 2**): tilt head, pinch nostrils, make airtight seal, four quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible.

Figure 2

- Check carotid pulse (**Figure 3**); if pulse is absent, begin artificial circulation (**Figure 4**) depressing sternum (**Figure 5**).

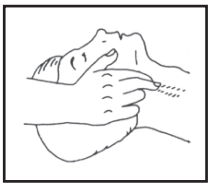


Figure 3

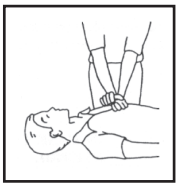


Figure 4

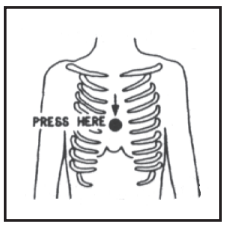


Figure 5

- In case of only one rescuer, 15 compressions alternated to two breaths.
- If there are two rescuers, the rythm shall be of one brath each 5 compressions.
- Do not interrupt the rythm of compressions when the second person is giving breath.
- Call for medical assistance as soon as possible.

3.1.2 If victim is responsive

- Keep them warm.
- Keep them as quiet as possible.
- Loosen their clothing (a reclining position is recommended).
- Call for medical help as soon as possible.

3.2 Treatment of electrical Burns

3.2.1 Extensive burned and broken skin

- Cover area with clean sheet or cloth.
- Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
- Treat victim for shock as required.
- Arrange transportation to a hospital as quickly as possible.
- If arms or legs are affected keep them elevated.

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot or cold).

Allow victim to sip slowly about 4 ounces (half a glass) over a period of 15 minutes.

Discontinue fluid if vomiting occurs.

DO NOT give alcohol.

3.2.2 Less severe burns

- Apply cool (not ice cold) compresses using the cleansed available cloth article.
- Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
- Apply clean dry dressing if necessary.
- Treat victim for shock as required.
- Arrange transportation to a hospital as quickly as possible.
- If arms or legs are affected keep them elevated.

4. Unpacking

The package contains:

- 1 **TEX1000LIGHT**
- 1 User Manual
- 1 Mains power cable

The following accessories are also available from Your R.V.R. Dealer:

- **Accessories, spare parts and cables**

4.1 General Description

The **TEX1000LIGHT**, made by **R.V.R. Elettronica SpA**, is an **audio broadcasting exciter** in frequency modulation able to transmit between 87.5 and 108 MHz range in 10kHz step, with an RF output power adjustable up to a maximum of 1000 W into a 50 Ohm standard load.

The **TEX1000LIGHT** has been designed for installation in a 19”x3HE box for rack.

The exciter incorporates a low-pass filter to keep harmonics below the limits provided for by international standards (CCIR, FCC or ETSI).

Two major features of **TEX1000LIGHT** are compact design and user-friendliness. Another key feature is its modular-concept design: the different functions are performed by modules with most connections achieved through male and female connectors or through flat cables terminated by connectors. This design facilitates maintenance and module replacement.

The RF power section used three MOSFET modules, each with 350 W output capacity.

An LCD on the front panel and a push-button panel provide for user interfacing with the microprocessor control system, which implements the following features:

- Output power setup
- Power output enable/disable
- User-selectable threshold settings for output power alarm (Power Good feature)
- Measurement and display of amplifier operating parameters
- Communication with external devices, as programming systems or telemetry systems through RS232 or I^2C serial interface

Four LEDs on the front panel provide for machine status indication (ON, LOCK, FOLDBACK, RF MUTE) and two yellow LEDs provide Power Supply fault indication.

The exciter management software is based on a menu system. User has four navigation buttons available to browse submenus: **ESC** (chap. 6.1 - [6]), ↵, ↓, and **ENTER** (chap. 6.1 - [9]).

The rear panel features the Mains input connectors,with a mains voltage selector (chap. 6.2 - [18]) to select the appropriate mains input voltage, audio input and RF output connectors, telemetry connector, protection fuses, two inputs for modulated signals on subcarriers from special external encoders normally used in Europe for RDS (Radio Data System) transmission.

5. Quick guide for installation and use

This section provides a step-by-step description of the machine installation and configuration procedure. Follow these procedures closely upon first power-on and each time any change is made to general configuration, such as when a new transmission station is added or the exciter is replaced.

Once the desired configuration has been set up, no more settings are required for normal operation; at each power-up (even after an accidental shutdown), the exciter defaults to the parameters set during the initial configuration procedure.

The topics covered in this section are discussed at greater length in the next sections, with detailed descriptions of all hardware and firmware features and capabilities. Please see the relevant sections for additional details.

IMPORTANT: *When configuring and testing the transmitter in which the exciter is integrated, be sure to have the Final Test Table supplied with the machine ready at hand throughout the whole procedure; the Final Test Table lists all operating parameters as set and tested at the factory.*

5.1 Preparation

5.1.1 Preliminary checks

Unpack the exciter and immediately inspect it for transport damage. Ensure that all connectors are in perfect condition.

Provide for the following (applicable to operating tests and putting into service):

√ Single-phase 230 VAC or 115 VAC (-15% / +10%) mains power supply with adequate ground connection

√ For operating tests only: dummy load with 50 Ohm impedance and adequate capacity (1000 W as a minimum)

√ Connection cable kit including:

- Mains power cable
- Coaxial cable with BNC connectors for interlock signal connection between exciter and amplifier
- RF cable for output to load / antenna (50 Ohm coaxial cable with 7/8” connectors as standard, or optional 7/16” connectors)
- Audio cables between exciter and audio signal sources.

5.1.2 Mains power supply

WARNING: Disconnect mains power supply before beginning these procedures.

Both power supply units (please see chapter 8.1 for a detailed description) are equipped with fuses and voltage selection blocks: **check all fuses and voltage selection blocks to ensure they are properly rated for the power mains and change them as required to match mains voltage**.

All mains power supply protection fuses are conveniently located on the rear panel and are easily accessed (see figure 6.2): to check or replace a fuse, **disconnect machine from power mains**, unscrew fuse cover and pull fuse out of socket.

The following fuses are used:

	@ 230 Vac	*@ 115 Vac*
Main Power Supply *(fig. 6.2 - item [7] e [20])*	**(2x) 25A type 10x38**	**(2x) 25A type 10x38**
Service power supply *(fig. 6.2 - item [19])*	**(1x) 2A type 5x20**	**(1x) 2A type 5x20**

Table 5.1: ***Fuses***

Ensure that machine is appropriately set for available mains voltage (supply voltage rating is reported in the Final Test Table) as follows: **disconnect machine from mains** and ensure that the voltage selection block of the power supply located on the rear panel (see fig. 6.2 - item [30]) is set to the appropriate voltage; change setting as required.

The main power supply unit is the full-range type and requires no voltage setup.

When supply voltage is other than 230 Vac and might cause erratic operation (say, less than 200 Vac), it may help to move jumper JP3 on the PFC controller board from position 2-3 to 1-2 (see PFCPSL1000 diagram, item [6] in figure 9.1 and detail in figure 5.1 below).

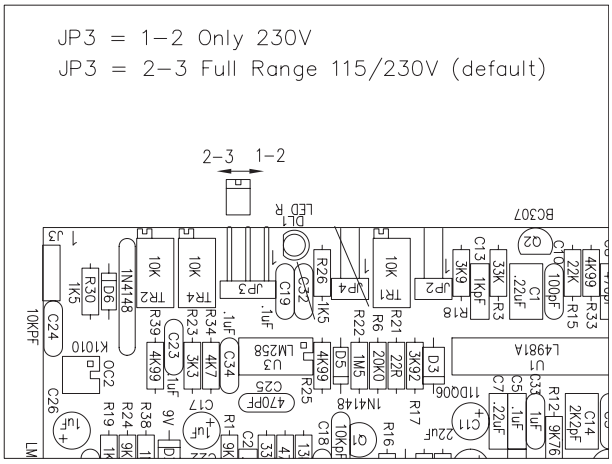


Figure 5.1: ***Voltage selection jumper on PFC***

5.1.3 Connections

Connect the RF output of the **TEX1000LIGHT** (see figure 6.2 - item [21]) to an adequately rated dummy load or to the antenna. To begin with, set exciter to minimum output power and switch if off.

Connect the exciter INTERLOCK IN input (figure 6.2 - item [24]) to the matching INTERLOCK OUT output fitted on all R.V.R. Elettronica equipments like standard amplifiers or hybrid couplers; if your equipment is a different brand, identify an equivalent output.

WARNING: Electric shock hazard. Never handle the RF output connector when the machine is powered on and no load is connected. Injury or death may result.

Ensure that the **POWER** switch on the front panel (see figure 6.1 - item [11]) is set to "**OFF**".

Connect the mains power cable to the MAINS terminal board on the rear panel (see figure 6.2 - item [19]).

Note : *The mains must be equipped with adequate ground connection properly connected to the machine. This is a pre-requisite for ensuring operator safety and correct operation.*

WARNING: The power supply connector is a terminal board. Ensure the wire is not live before performing the connection.

Connect the audio signals and RDS/SCA to the own signal sources to the input connector of the **TEX1000LIGHT**.

5.2 First power-on and setup

Follow this procedure upon first power-on and after making changes to the configuration of the transmitter in which the amplifier is integrated.

Note : *Standard factory settings are RF power output Off (**Pwr OFF**) and output power set to upper limit (unless otherwise specified by customer).*

5.2.1 Power-on

When you have performed all of the connections described in the previous paragraph, power on the exciter using the suitable power switch on the front panel (figure 6.1 - item [11]).

5.2.2 Power check

Ensure that the **ON** light turns on (see figure 6.1 - item [1]). Machine name should appear briefly on the display, quickly followed by forward and reflected power readings (figure 5.2 - menu 1). If RF output is disabled, these readings will be zero.

When PLL is locked to the working frequency, also the **LOCK** light turns on (see figure 6.1 - item [2]).

5.2.3 How to enable RF output

Check current **RF** output setting and enable output (if not already enabled) following menu path **Fnc** ⇒ **Pwr** ⇒ **ON** (figure 5.2 - menu 4)

Check output power level and set to maximum level (if not already set to maximum) from the Power Setup Menu, which you can call up by pressing these keys in the order: **ESC** (opens **Default Menu**) ⇒ **ENTER** (hold down for 2 seconds) ⇒ **SET** ⇒ use key to set bar to maximum limit (figure 5.2 - menu 2).

5.2.4 RF output power level control

IMPORTANT: *The exciter incorporates Automatic Gain Control and output power is modulated based on the power level set by the user and actual operating conditions, such as temperature, reflected power and other parameters. Please read section 5.3 for more details of RF power modulation.*

Open the **Power setup menu** (figure 5.2 - menu 2) pressing the following keys in the order:

ESC (opens **Default Menu**) ⇒ **ENTER** (hold down for 2 seconds)

Use **SET** menu ↵ and ↓ keys to set the desired exciter output power; the SET bar at the side provides a graphic display of set power, whereas the forward power value shown on the display (**Fwd: xxxx W**) gives actual output power reading, **and may be lower than set power if an Automatic Gain Control is in limited-power mode** (*please read section 5.3 concerning RF power modulation for more details"*.

☞ ***Note :*** *Output power can also be set in a **Pwr OFF** condition; in this condition, (**Fwd**) output power reading on the display will be 0 (zero), whereas the **SET** bar, which you can control using the keys, provides a graphic display of the amount of power that will be delivered the moment you switch back to **Pwr ON** state.*

5.2.5 Changing the Power Good alarm threshold

Change Forward Power Good alarm setting **PgD** from the **Fnc** menu as required (factory setting is 50%).

Please read section 5.4.1 for more details.

5.2.6 Changing machine I^2C address

Change the **IIC** address in the **Mix** menu as required (factory setting is 01).

Please read section 5.4.5 for more details.

5.2.7 How to enable Remote mode

If you wish to use the telemetry control feature, enable Remote control in the **Fnc** menu (see section 5.4.1 for details).

5.2.8 Settings and Calibration

The only adjustments to be manually made on the **TEX1000LIGHT** are those relating to the audio operation levels and modes.

A trimmer for each one of the exciter's inputs is on the rear panel of the device. The printing on the panel indicates which input each trimmer refers to. The sensitivity of the various inputs can be adjusted using the trimmers within the limits described in the following tables:

Input sensitivity in Mono condition:

Input	Figure 6.2	Trimmer	Sensitivity	Note
SCA1	[9]	[13]	- 8 ÷ +13 dBm	Input level for 7,5 kHz deviation (-20 dB)
SCA2	[8]	[11]	- 8 ÷ +13 dBm	
MPX	[10]	[12]	-13 ÷ +13 dBm	Input level for 75 kHz deviation (0 dB)
Mono	[33]	[30]	-13 ÷ +13 dBm	

Input sensitivity in Stereo condition:

Input	Figure 6.3	Trimmer	Sensivity	Note
RDS	[10]	[12]	-20 ÷ +13 dBm	Input level for 75 kHz deviation (0 dB)
SCA1	[9]	[13]	- 8 ÷ +13 dBm	Input level for 7,5 kHz deviation (-20 dB)
SCA2	[8]	[11]	- 8 ÷ +13 dBm	
Left	[33]	[30]	-13 ÷ +13 dBm	Input level for 75 kHz deviation (0 dB)
Right	[15]	[14]	-13 ÷ +13 dBm	

When adjusting the sensitivity level of the inputs, keep in mind that the instantaneous modulation level is given in the predefined menu and that an indicator signals the 75 kHz level. To get a proper adjustment, we recommend you put a level signal on the machine's output equivalent to the level of its own audio program and adjust the relative trimmer until the instantaneous deviation coincides with the indication of 75 kHz.

To adjust the levels of the inputs of the subcarriers, you can use a similar procedure while getting help from the "x10" option that can be selected from the "Fnc" menu. With this option, the modulation level indicated is multiplied by a factor 10 so the drawn indication of the predefined menu coincides with a deviation value of 7.5 kHz.

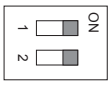
There is a special menu in which the levels of the Right and Left channels are indicated separately with the relative indicators of the nominal levels for the maximum deviation of 75 kHz.

- Preemphasis (switch [8] Figure 6.2):

50 μs 

75 μs

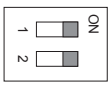
- L and R input impedance (type XLR) (switch [9] Figure 6.2):



Switch 1: R XLR input impedance, ON = 600 Ω, OFF = 10 kΩ

Switch 2: L XLR input impedance, ON = 600 Ω, OFF = 10 kΩ

- Operation mode/input impedance MPX ([18] Figure 6.2):



Switch 1: Operation mode ON = Mono, OFF = Stereo

Switch 2: MPX input impedance, ON = 50 Ω, OFF = 10 kΩ

5.3 Operation

1) Power on the exciter (chap. 6.1 - [11]) and ensure that the **ON** light turns on (chap. 6.1 - [1]). Machine name should appear briefly on the display, quickly followed by forward and reflected power readings (Menu 1), provided that the amplifier is delivering output power.

Menu 1

1b) To **modify power level setting**, hold down the **ENTER** button until opening the **power setup menu**.

The edit screen will look like this:

Menu 2

Next to **SET** indication, a bar provides a graphic display of preset output power. The filled portion of the bar is proportional to set power level.

Example		
100% output power	**Full bar**	≅ **1000W in output**
50% output power	**Half bar**	≅ **500W in output**
25% output power	**1/4 bar**	≅ **250W in output**

The bottom line provides instantaneous power reading (997W in this instance); press button ↓ to increase level, press ↵ to decrease it. When you have achieved the desired level, press **ENTER** to confirm and exit the default menu. Please note that the setting is stored automatically; in other words, if you press **ESC** or do not press any keys before the preset time times out, the latest power level set will be retained.

NOTE: This feature prevents the machine from delivering maximum power as soon as output is enabled from menu 4, or in the event the machine is already set to **ON** and energised.

2) Ensure that power limiting is disabled. Press the **ESC** key (chap. 6.1 - [6]) to call up the selection screen (Menu 3). Highlight **Fnc** and press **ENTER** to confirm (chap. 6.1 - [9]) and access the appropriate menu (menu 4).

   If **PWR** is set to **OFF**, i.e. power output is disabled, move cursor to **PWR**. Press **ENTER** (chap. 6.1 - [9]) and label will switch to **ON**, i.e. power output enabled.

   Press **ESC** (chap. 6.1 - [6]) twice to go back to the **default menu** (menu 1).

3) Fine tune power setting from menu 2 (see description of item 1b) until achieving the desired value.

WARNING: Machine is capable of delivering more than rated output power (1000 W); however, never exceed the specified power rating.

NOTE: If power is set to 0 W in the **edit mode**, the INTERLOCK OUT contact (chap. 6.2 - [22]) trips and external equipment linked through interlock connection are immediately inhibited.

Next, you can review all operating parameters of the machine through the management firmware.

Normally, the machine can run unattended. Any alarm condition is handled automatically by the safety system or is signalled by the LED indicators on the panel or by display messages.

NOTE: Standard factory settings are: output power set to upper limit (unless otherwise specified by customer) and **OFF**.

5.4 Management Firmware

The machine features an LCD with two lines by 16 characters that displays a set of menus. Figure 5.2 below provides an overview of machine menus.

The symbols listed below appear in the left portion of the display as appropriate:

- _ (Cursor) - Highlights selected (i.e. accessible) menu.
- ▶ (Filled arrow) - Editable parameter marker. This symbol appears in menus that take up more than two lines to aid browsing.
- ▷▷▷ (Three empty arrows) - Parameter is being edited.
- ▷ (Empty arrow) - Current line marker; the parameter in this line cannot be edited. This symbol appears in menus that take up more than two lines to aid browsing.

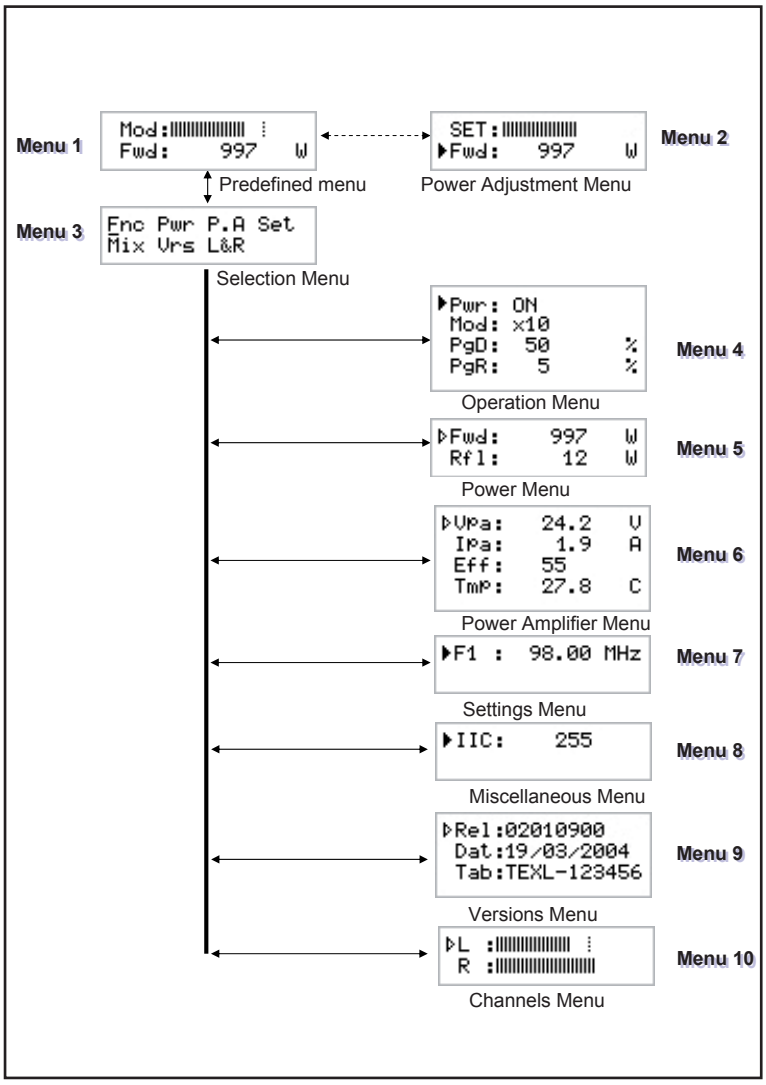


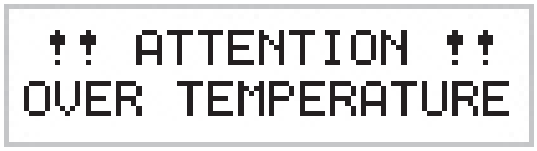
Figure 5.2

When the display is off, touching any key will turn on backlighting.

When the display is on, pressing the **ESC** button (chap. 6.1 - [6]) from the **default menu** (menu 1) calls up the **selection screen** (menu 3), which gives access to all other menus:

Menu 3

If the temperature alarm is enabled, the power supply will come inhibited in case of alarm threshold overcoming, and it will have displayed the following window only in case you are in the predefined screen:



Status 1

Once restored the normal operation conditions, the power supply will come rehabilitated with the same modalities antecedent the alarm.

If the modulation ran out, under 20 kHz, for a time of about 5 minutes (not modifiable) the NO AUDIO status comes displayed in the predefined screen, but the power does not comes inhibited:

Status 2

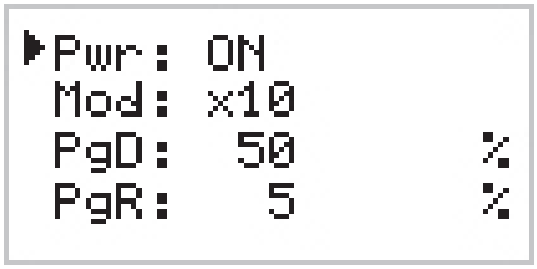
To gain access to a submenu, select menu name (name is highlighted by cursor) using button ↓ or ↵ and press the **ENTER** button (chap. 6.1 - [9]).

Press **ESC** again (chap. 6.1 - [6]) to return to the **default menu** (menu 1).

5.4.1 Operation Menu (Fnc)

From this menu the user can enable or disable the exciter power supply, set the deviation display modality and set up the percentage of Forward (**PgD**) or Reflected Power Good (**PgR**).

To edit an item, highlight the appropriate line using the UP and DOWN buttons and then press and hold the **ENTER** button (chap. 6.1 - [9]) until the command is accepted. This way, Pwr setting is toggled between On and Off and Mod setting is toggled between “x1” and “x10”. To edit the Power Good rate, simply select item “PgD” and edit its value using buttons ↵ and ↓ ; finally, press **ENTER** to confirm (chap. 6.1 - [9]).



Menu 4

`Pwr` Enables (ON) or disables (OFF) amplifier power output.

`Mod` Display modality of the modulation selectable between “x1” and “x10”. The indication of the instantaneous deviation is multiplied by a factor 10 in the “X10” mode, so the hatched indicator on the predefined menu will coincide with the 7.5 kHz value instead of 75 kHz. This display mode is useful when you want to view low deviation levels such as, for example, those due to the pilot tone or to the subcarriers.

`PgD` Modifies Power Good (forward power) threshold. The Power Good rate is a percent of machine rated power (1000 W), not of forward output power. This means that this threshold set at 50% will give 500 W regardless of set power level. The Power Good feature enables output power control and reporting. When output power drops below set Power Good threshold, the machine changes the state of pin [7] of the DB15 “Remote” connector located on the rear panel (figure 6.2 - [28]).

`PgR` Regulation of the Power Good threshold relative to the forward power. The percentage value of Power Good is referred to the nominal power of the machine, that is 100 W, not to the supplied forward power.If a value equal to 5% is set, it will correspond to 5 W indifferently from the set up power.

NOTE: This alarm does not have effect on any output signal on the DB15 “Remote” connector, placed on the rear panel of the equipment, and it works only in presence of systems equipped of telemetry.

5.4.2 Power Menu (Pwr)

This screen holds all readings related to machine output power:

Menu 5

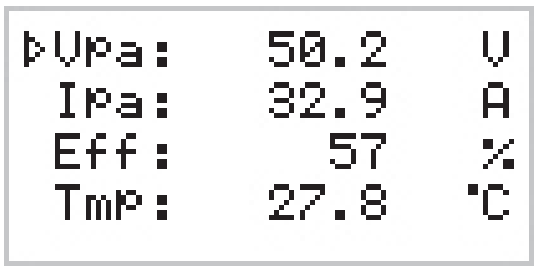
`Fwd` Forward power reading.

`Rfl` Reflected power reading.

Note that these are readings, rather than settings, and cannot be edited (note the empty arrow). To change power setting, go to the **default menu** (menu 1) as outlined earlier.

5.4.3 Power Amplifier (P.A) Menu

This screen is made up of four lines that can be scrolled using the buttons and , shows the readings relating to final power stage:



Menu 6

Note that these are readings, rather than settings, and cannot be edited (note the empty arrow).

`VPA` Voltage supplied to amplifier module.

`IPA` Current absorbed to amplifier module.

`Eff` Efficiency based on ratio of forward power to amplifier module power in percent (FWD PWR/(Vpa x Ipa) %).

`Tmp` Machine internal temperature.

5.4.4 Settings Menu (Set)

This menu lets you read and set the operating frequency.

Menu 7

`F1` After having set a new frequency value, press the ENTER button to confirm the choice. The exciter will release from the current frequency (the LOCK LED turns off) and it will latch onto the new operating frequency (LOCK turns back on). Instead, if you press ESC or let the timeout go by, the frequency will remain set at the previous value.

5.4.5 Miscellaneous Menu (Mix)

This menu lets you set machine address in an I^2C bus serial connection:

Menu 8

IIC — I^2C address setting. The I^2C network address becomes significant when the exciter is connected in an RVR transmission system that uses this protocol. Do not change it unless strictly required.

5.4.6 Version Menu (Vrs)

This screen holds machine version/release information:

Menu 9

Note that these are readings, rather than settings, and cannot be edited (note the empty arrow).

Rel — Firmware release information.

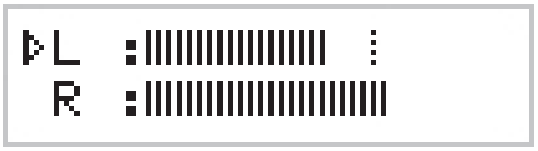
Dat — Release date.

Tab — Shows table loaded in the memory.

5.4.7 Channels Menu (L&R)

The right and left channel input levels are depicted with horizontal bars, as shown in the following figure.

The hatched pointer indicates the level that corresponds with the total deviation at 100%, and is useful to regulate the input levels of the audio channels.



Menu 10

L — Visualization of the Left channel Vmeter.

R — Visualization of the Left channel Vmeter.

5.5 Optional Functions

Optional functions can be added and/or modified for the equipment described in this manual. The available functions are carried in the continuation and can be requested to R.V.R. Elettronica at the moment of the order.

5.5.1 FSK Option

The FSK function, generates periodic shifts of the transmission carrier frequency, realizes in way to generate a Morse code that carried the Radio Identification Code.

NOTE: ***This function is tipically used in the United States.***

By factory the amplitude of the frequency shifts is +10 KHz and the time lag of the code repeat is 60 minutes (for values different from these parameters, please contact R.V.R. Elettronica SpA). As regards the Radio code, it can be set by the user following the indications described in chapter 5.5.1.1.

The **selection screen**, in presence on FSK option, adds the indication to FSK submenu.

Menu 11

The pressure of **ENTER** button, on FSK entry in the **selection screen**, serves in order to access to all the relative submenu:

Menu 12

`FSK` Enable or disable the transmission of the FSK code.

`Cod` Visualization of the code normally transmitted.

5.5.1.1 Code Modification

In every moment the user is able to make changes to the Radio code transmitted in FSK.

In order to make the operation is necessaryto have:

- 1 RS232 male - female cable;
- Hyper Terminal Interface (verify that it has been installed together to the own copy of Windows®) or equivalent serial communication sofware.

The procedure to execute comes shortly described in the following:

- Connect a standard serial cable (DB9 Male - DB9 Female) the COM serial port place on PC to SERVICE connectorplaced on the rear panel of the **TEX1000LIGHT**.
- Turn on the exciter;
- Start up the serial communication software;
- Set up the following parameters for the communication:

  Baud Rate: 19200

  Data Bit: 8

  Parity: None

  Stop Bit: 1

  Flow control: None;
- Through the communication software activate the Caps-Lock key (capital), send the CODE string followed from the 6 characters of the station code and then confirm pressing Enter.

NOTE: The code is considered only if is complete of 6 characters (alphanumeric and without spaces). In case the code is accepted, it comes repeated in echo towards the program, in contrary case the echo of the code does not come made.

5.5.2 UP/DOWN Power Option

The UP/DOWN Power modifies the function to receive signals present on the telemetry connector (see chap. 6.3.5).

In this particular situation the control signals uses to enable or to disable the RF section, become control signals of the RF power level, allowing one regulation of UP/DOWN type.

The UP or DOWN command is supplied connecting the relative signal on the Remote connector to the ground, at least for 500mS (the pin has an inner pull-up towards feeding).

NOTE: ***This function is tipically used in the United States.***

Configuration of the telemetry DB15F connector (Remote):

Pin	Standard Function	UP/DOWN Power Function
14	On cmd	Up cmd
	Enables RF power supply	Increases RFthe Power supply
15	Off cmd	Down cmd
	Disables RF power supply	Reduces RFthe Power supply

6. Front and Rear Panel Description

This section describes the components found on the front and rear panel of **TEX1000LIGHT**.

6.1 Front Panel

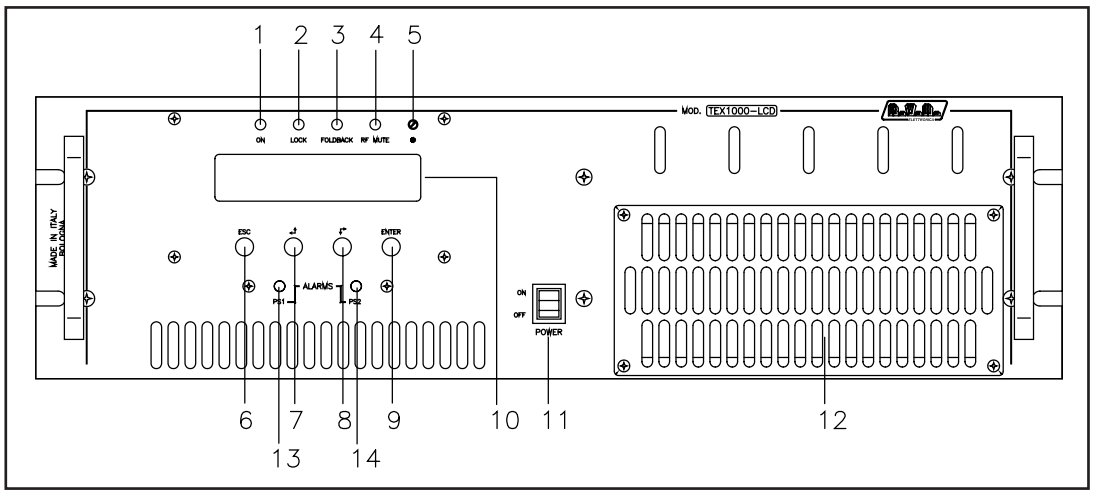


Figure 6.1

[1]	ON	Green LED - Turns on when amplifier is powered on.
[2]	LOCK	Green LED - Turns on when the PLL is locked on the working frequency.
[3]	FOLDBACK	Yellow LED - Turns on when foldback current limiting (Automatic Gain Control) is intervened.
[4]	R.F. MUTE	Yellow LED - Turns on when exciter power output is inhibited by an external interlock signal.
[5]	CONTRAST	Display contrast trimmer.
[6]	ESC	Press this button to exit a menu.
[7]		Navigation button used to browse menu system and edit parameters.
[8]		Navigation button used to browse menu system and edit parameters.
[9]	ENTER	Press this button to confirm a modified parameter and open a menu.
[10]	DISPLAY	Liquid Crystal Display
[11]	POWER	AC mains ON/OFF switch.
[12]	AIR FLOW	Air grille.
[13]	ALARMS PS1	Yellow LED - Turns on when Power Supply unit is not fed either because “PWR OFF” was selected via software, or power is set to 0 W, or due to Power Supply malfunction (when this LED turns on, it causes the ALARM PS2 LED to come on as well, because the two LEDs are connected internally).
[14]	ALARMS PS2	Yellow LED, see item [13]

6.2 Rear Panel

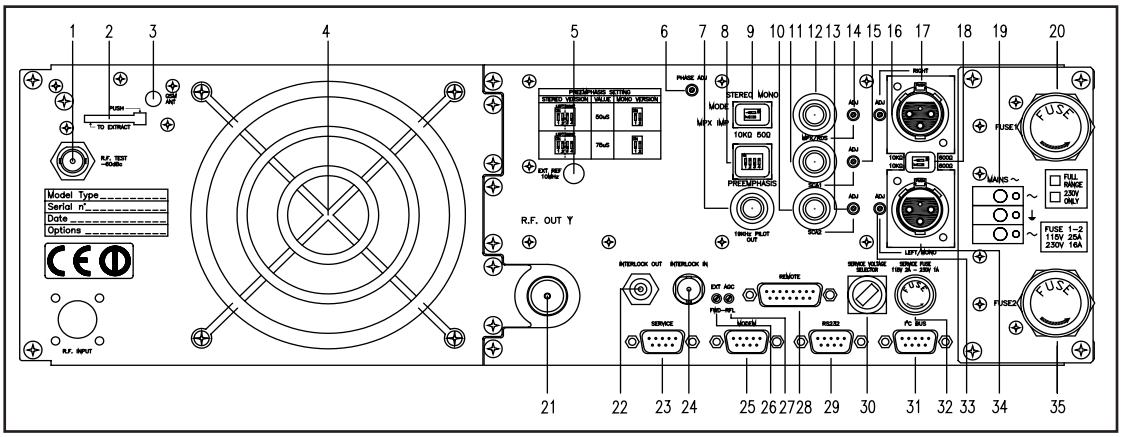


Figure 6.2

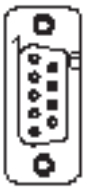
[1] R.F. TEST	Output with level -60 dB lower than output power level, suitable for modulation monitoring. Not suitable for spectrum analysis.
[2] GSM SLOT-IN	Reserved for future implementations
[3] GSM ANT	Reserved for future implementations
[4] AIR FLOW	Air grille.
[5] 10MHz	Reserved for future implementations
[6] PHASE ADJ	Pilot tone phase adjustment trimmer
[7] 19 kHz PILOT OUT	BNC output for the 19 kHz pilot tone. This can be used for external devices (e.g. RDS coder) synchronization.
[8] PREEMPHASIS	Dip-switch to set the preenphasys at 50 or 75 ms. The preenphasys setting is only relevant for the Left and Right inputs in stereo mode and for the mono input in mono mode, while MPX input is unaffected by this setting.
[9] MODE/MPX IMP	Dip-switch to set the operation mode (STEREO or MONO) and the MPX input impedance, 50 Ω or 10 kΩ.
[10] SCA2	BNC connector, SCA2 input
[11] SCA1	BNC connector, SCA1 input
[12] RDS	Adjustment trimmer for RDS input
[13] SCA2 ADJ	Adjustment trimmer for SCA2 input
[14] RDS ADJ	Adjustment trimmer for RDS input
[15] SCA1 ADJ	Adjustment trimmer for SCA1 input
[16] RIGHT ADJ	Adjustment trimmer for the Right channel input
[17] RIGHT	XLR connector, Right channel audio input
[18] IMPEDANCE	Dip-switch to set the balanced input impedance, 600 Ω or 10 kΩ
[19] MAINS	Terminal board for 115-230 V 50-60 Hz mains power supply.
[20] FUSE 1	Mains power supply fuse (FUS10X38RP25) [chap. 5.1 - Table 1].
[21] R.F. OUTPUT	7/8” RF output connector (7/16” connector available on request).
[22] INTERLOCK OUT	Interlock output BNC connector: when the transmitter goes into stand-by mode, the (normally floating) central connector is connected to ground.
[23] SERVICE	DB9 connector for factory setting
[24] INTERLOCK IN	Interlock input BNC connector: when central conductor is connected to ground, the transmitter is placed into forced standby mode.
[25] MODEM	Reserved for future implementations
[26] FWD EXT. AGC	Trimmer to set output power limitation according to FWD fold input (chap.6.3.3 - Pin [2]).
[27] RFL EXT. AGC	Trimmer to set output power limitation according to RFL fold input (chap.6.3.3 - Pin [10]).

[28] REMOTE	Telemetry DB15 connector.
[29] RS232	Reserved for future implementations
[30] SERVICE VOLTAGE SEL.	115-230V mains voltage selector.
[31] I²C BUS	DB9 connector for I²C bus networking.
[32] SERVICE FUSE	Service fuse FUS5X20RP2.
[33] LEFT ADJ	Adjustment trimmer for the Left channel input
[34] LEFT	XLR connector, Left channel audio input
[35] FUSE 2	Mains power supply fuse (FUS10X38RP25) [chap. 5.1 - Table 1].

6.3 Connectors description

6.3.1 RS232

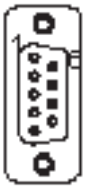
Type: Male DB9



1 NC
2 TX_D
3 RX_D
4 Internally connected to 6
5 GND
6 Internally connected to 4
7 Internally connected to 8
8 Internally connected to 7
9 NC

6.3.2 Service (**for factory setting purposes only**)

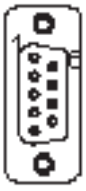
Type: Female DB9



1 NC
2 TX_D
3 RX_D
4 Internally connected to 6
5 GND
6 Internally connected to 4
7 Internally connected to 8
8 Internally connected to 7
9 NC

6.3.3 I²C Bus

Type: Male DB9



1 NC
2 TX_D
3 RX_D
4 Internally connected to 6
5 GND
6 Internally connected to 4
7 Internally connected to 8
8 Internally connected to 7
9 NC

6.3.4 Left (MONO) / Right

Type: Female XLR

1	GND
2	Positive
3	Negative

6.3.5 Remote

Type: Female DB15

Pin	Name	Type	Purpose
1	Interlock	IN	Inhibits power if closed to GND
2	Ext AGC FWD	IN	Ext. signal,1-12V, for power limitation (AGC)
3	GND		Ground
4	SDA IIC	I/O	Serial for IIC communication
5	VPA Tlm	ANL OUT	PA supply voltage: 3.9V F.S.
6	FWD Tlm	ANL OUT	Forward power: 3.9V F.S.
7	Power Good	DIG OUT	Signalling of the activation by the grounding of the contact normally open (chap. 5.4.1)
8	GND		Ground
9	GND		Ground
10	Ext AGC RFL	IN	Ext. signal,1-12V, for power limitation (AGC)
11	SCL IIC	I/O	Clock for IIC communication
12	IPA Tlm	ANL OUT	PA power supply: 3.9V F.S.
13	RFL Tlm	ANL OUT	Forward power: 3.9V F.S.
14	On cmd	DIG IN	A pulse towards ground (500 ms) triggers power output
15	OFF cmd	DIG IN	A pulse to ground (500 ms) inhibits power output

7. Technical Specifications

7.1 Mechanical characteristics

Panel Size	483 mm (19”) x 132.5 mm (3 HE)
Depth	550 mm
Weight	approx. 32 Kg
Working Temperature	-10 °C ÷ 50 °C, without condensing

7.2 Electrical characteristics

General

RF output power	0-1000 W adjustable with continuity
Frequency Range	87.5 - 108.0 MHz, step 10kHz (you can require different step at the order)
Frequency setting	Direct software programming
Frequency stability	±1ppm from -10°C to 50°C
Modulation type	Direct carrier modulation
Display	LCD alphnanumeric (2 rows x 16 charcaters)
System control	4 push buttons
Signal Device	4 LED
A.C. supply	230 - 115 Vac ±15%
Power supply type	Monophase
Power factor	> 0.98
AC Apparent Power Consumption	1650 VA
Active Power Consumption	1630 W
Spurious & harmonic suppression	Meets or exceeds all FCC, CCIR and ETSI rules < 75 dBc (80 dBc typical)
Modulation capability	Respects relevant FCC and CCIR standards (typical 180kHz MPX o Mono, 150 kHz Stereo)
Asyncronous residual AM	> 65 dB (70 dB Typ.) wrt. 100% peak AM, without deemphasis
Syncronous residual AM	> 50 dB (60 dB Typ.) wrt. 100% peak AM, with 75 kHz molation at 400Hz, without deemphasis

Inputs

Left - Mono/MPX Input	XLR female balanced or unbalanced type
Right/Mono Input	XLR female balanced or unbalanced type
MPX/SCA/RDS input	BNC unbalanced type
Input impedance	10 kOhm or 600 Ohm, XLR Left/Right/Mono 10 kOhm or 50 Ohm BNC MPX selectable with DIP-switch
Input level	-20 dBm ÷ +13 dBm, continuosly adjustable with trimmer
Preemphasys	Selectable: 0 50 μs (CCIR) 75 μs (FCC)
SCA1 and SCA2 input	2 BNC unbal connectors
SCA1 and SCA2 input impedance	10 kOhm
SCA1 and SCA2 input level	-20 dBm ÷ +13 dBm for 2.0 kHz continuosly adjustable

Outputs

RF output	7/8"flange type connector (7/16" on demand)
Rf output impedance	50 Ohm
RF Test	BNC connector
output impedamce	50 Ohm
Output level	-60 dB referred to the RF output
19 kHz pilot tone	1 Vpp minimum load 4.7 kOhm

MONO Operation

S/N FM	> 75dB wrt. 75 kHz, measured in the band 20 Hz ÷ 20 kHz, 50 μs deemph., RMS detect
Amplitude/frequency response	± 0.3 dB, 20Hz ÷ 15Khz (with preemphasis)
Total harmonic distortion (THD)	< 0.08%

MPX Operation

Composite S/N FM	> 75dB wrt. 75 kHz, measured in the band 20 Hz ÷ 100 kHz, 50 μs deemphasis, RMS detect
MPX amplitude/frequency response	± 0.1 dB, 20 Hz ÷ 53 KHz ± 0.3 dB, 53 KHz ÷ 100 KHz
MPX Total harmonic distortion (THD)	< 0.05 %
Stereo separation	> 55 dB (typical 60dB)

STEREO Operation

S/N FM Stereo	> 72 dB wrt. 75 kHz, measured on decoded channels, in the band 20 Hz ¸ 20 KHz, 50 μs deemphasis, RMS detector
Audio amplitude/frequency response	± 0.5 dB, 20 Hz ÷ 15 KHz (with preemphasis)
Total harmonic distortion (THD)	< 0.05 %
Stereo separation	> 50 dB (typical 55 dB)

Remote Connections

Interlock IN	BNC type female: by grounding the central conductor the transmitter is forced to stand-by mode.
Interlock OUT	BNC type female: in case the transmitter goes on stand-by mode, the central conductor, normally floated, comes grounding
Service	DB9 female, reserved to the firmware programming
I^2Cbus	DB9 female, I^2C communication bus for optional telemetry
Remote Interface	DB15 female, IIC + 4 analogic output for the measuring of parameters, 2 analogic input for the limitation of foldback power, 3 digital input for the management of the protection and switch on/ switch off

Options

/7-16	Optional output connector, 7/16" flange type, with impedance value of 50 Ohm

7.3 Spare Parts

Subset for the Maintenance

Bias Board	SLBIAS1K3U-2
Low Pass FIlter Board	SLLPFTEX1KL
Pass-through Filter Board	SLFILPJ1KM
Filter Board	SLFILPSPJ1KC
Panel Board	SL007PC2001B
Power Factor Correction	PFCPSL1000
50V 34A Power Supply	PSL5034
Pulse Protection Board	SLSRGPRPJ1KM
Main Board	SLMBDTEXLC05
Stereo Coder Card	SLCTC30V03
Driver Card	SLDRVTEX1KL
Splitter Board	SLSPLTEX1KL1
RF Module	SL010RF2001
Combiner Board	SLCMBTEX1KL1
Fuse Board	SLFURFPJ1KLG
Telemetry Board	SLTLMTXLCD03
Interface Board	SL010IN2001
PS LED Board	SLLEDPSTEX1K

Use Parts

Frontal cooling fan	VTL4184
Rear cooling fan	9GL1224J102
Transformer	TRFTEX1000T
“SERVICE” Fuse	FUS5X20RP2
“1” e “2” Fuse	FUS10X38RP25

8. Operating principles

Figure 8.1 below provides an overview of **TEX1000LIGHT** modules and connections.

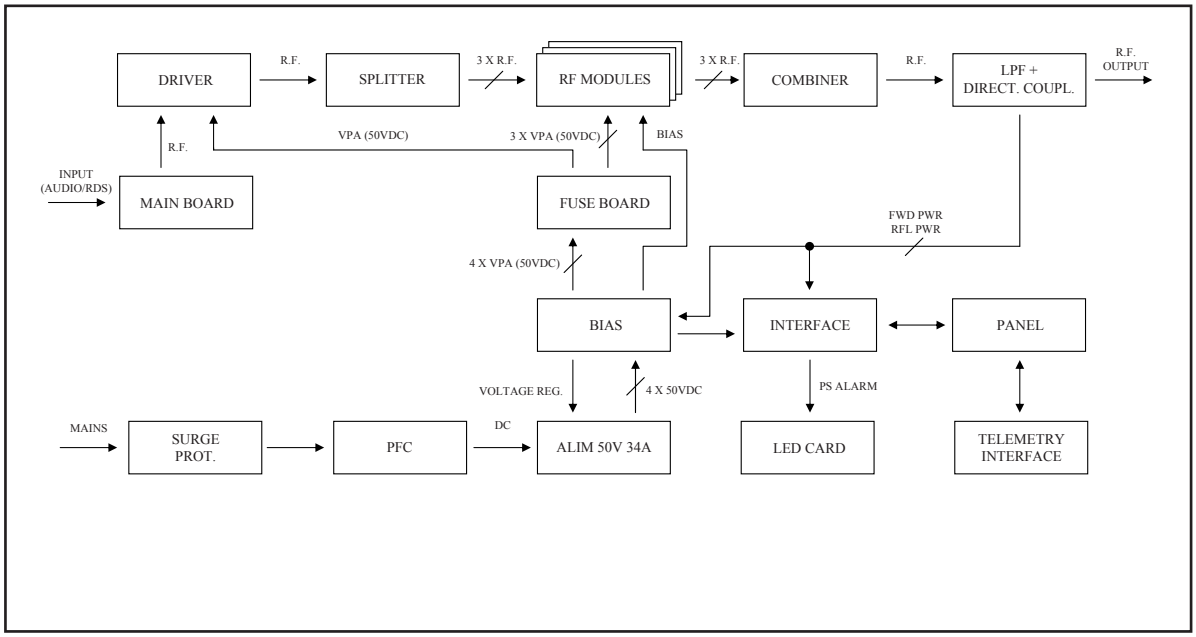


Figure 8.1

Following is a brief description of the different module functions; all diagrams and board layout diagrams are included in the “Technical Schedule” Vol.2.

8.1 Power supply

The **TEX1000LIGHT** power supply section is made up of a surge protection module and two power supply units:

1. **Surge Protection module** (see description in chap. 8.1.1): protects the machine from possible voltage surge events and electric discharges in the power mains.
2. **Power amplifier supply unit:** provides adequate power supply for RF power amplifier modules. It is a switching power supply unit with PFC full range; for details of the PFC and converter modules, please see chapters 8.1.2 and 8.1.3, respectively.
3. **Service power supply unit:** provides adequate power supply for all modules except RF power modules. Major components of this 50-Hz transformer-based power supply unit are:
   - Power switch
   - Service fuse
   - Mains voltage selector
   - Service transformer

NOTE: Please see chapter 5.2 for power supply unit settings.

8.1.1 Mains power supply pulse protection (SLSRGPRPJ1KM)

This module is enclosed in a sealed metal case (see figure 9.1 - item [8]); it features two externally mounted mains fuses (figure 6.2 - [20] and [35]) and accommodates a bank of surge arresters that protect the machine from any surge events in the power mains.

Mains voltage is brought from this module to the main Power switch on the front panel (figure 6.1 - [11]), which relays it to the service transformer TR1 (figure 9.2 - [4]).

Inside the surge protection module, a suitable 24VDC relay controlled via the interface board isolates (single line) mains voltage to be fed to the power amplifier power supply unit (PFC module). This way, mains power supply to PFC is enabled when these requirements are met:

- POWER switch on front panel (figure 6.1 - [11]) set to ON;
- No alarm or fault events present (see chapter 5.4);
- Power output enabled (set to ON) in FNC operation menu (menu 4, see chapter 5.4.1);
- RF output power set to over 0W using the edit mode (menu 2, see chapter 5.3).

8.1.2 PFC unit (PFCPSL1000)

The PFC unit is a rectifier that modulates absorbed current to ensure that the wave is sinusoidal as much as possible and achieve a 99% power factor.

The PFC unit can operate on 115 VAC or 230 VAC input voltage. It features a voltage selection block that normally does not require setting: see chapter 5.1.2 for a detailed description.

8.1.3 Switching power supply (PSL5034)

The switching power supply incorporated in the amplifier feeds 50 VDC to the RF power modules with 34 A maximum current.

This module has a control input that enables output voltage reduction when needed (for instance, in the event of RF output power reduction). Another input signal is used to shut down the power supply (0V output voltage) when any one of the following conditions is verified:

- Power output disabled (set to OFF) by user in FNC operation menu (menu 4, see chapter 5.3.1);

- Regulated power set to 0 Watt using the edit mode (menu 2, see chapter 5.3);
- An alarm or fault condition has occurred (see chapter 5.4).

8.2 Interface board (SL010IN2001)

This board performs the following tasks:

- It uses AC voltage from transformer TR1 to generate and distribute service power supply over the panel board;
- It controls and provides interfacing of the mains surge protection module (SLSRGPRPJ1KM);
- It controls and provides interfacing of the power amplifier power supply module (PSL5034);
- It processes and provides interfacing of the control signals to/from the Bias Board (SLBIAS1K3U-2);
- It processes and provides interfacing of the control signals to/from the Panel Board (SL007PC2001);
- It acquires and processes the input signals from the main board (SLMBDTEXLC05);
- It feeds and operates the cooling fans;
- It feeds and controls the LED indicator board.

8.3 Panel board - CPU (SL007PC2001B)

The panel board accommodates the microcontroller that runs the machine control software and all user interface elements (display, LED's, keys, …).

This board is interfaced with other machine modules via *flat cables* and provides for power supply, control signals and measurement distribution.

8.4 Main Board (SLMBDTEXLC05)

The main card carries out the following functions:

- Audio and SCA input handling;
- Generation of carrying frequency;
- Modulation.

Both measurements are adequately processed and sent to the interface board that controls the protection modules and relays the signals to the CPU board to enable readings to be displayed.

8.4.1 Audio input section

The audio input section contains the circuits that perform the following functions:

- Input impedance selection
- 15 kHz filtering of the R and L channel
- Stereo coder
- Preemphasis
- Mixing of the mono, MPX and SCA channels
- Clipper (limits the level of the modulating signal so that the frequency deviation does not go past the 75 kHz level)
- Measurement of the modulating signal

8.4.2 PLL/VCO section

This section of the card generates the signal in modulated radiofrequency. It is based on a PLL diagram that uses an MB15E06 type of integrated PLL.

8.5 Driver Board

Before going to the final power amplifier, the RF signal is pre-amplified in this section through a BFR 540 transistor. When the exciter is put in stand-by, the driver is inhibited.

8.6 Power amplifier

The RF power amplification section consists in three power modules coupled through a Wilkinson splitter and combiner using strip-line technology.

Each RF module (code SL010RF2001) provides 350 W rated power using a single active element built using MOS technology. RF modules are fed by the switching power supply via the Bias board.

The splitter (Splitter Board code SLSPLTEX1KL1) splits power input signal supplied to machine equally to the three RF modules. The combiner (Combiner Board code SLCMBTEX1KL1) combines the power output signals at module outputs to obtain total amplifier power.

Splitter, amplifiers and combiner have been designed to sum amplifier output power signals in phase, so as to keep unbalance and power dissipation to a minimum.

The whole RF section is mounted on a cooling fin that ensure the cooling of the machine through forced ventilation.

8.7 LPF Board (SLLPFTEX1KL)

This board incorporates a low-pass filter to keep amplifier harmonics within permissible limits as specified by international standards.

A directional coupler is provided at filter output to measure forward and reflected RF output power; power readings are relayed to the Interface and Bias boards to enable processing and display.

The LPF board incorporates an RF output (having a level about -60 dB lower than output level) which is brought to a BNC connector (figure 6.2 - [1]). This provides a convenient test point to check carrier characteristics, **but does not ensure an accurate assessment of higher harmonics**.

8.8 BIAS board (SLBIAS1K3U-2)

The main purpose of this board is to control and correct the bias voltage of the RF amplification section MOSFETs.

It also provides a measure of the total current absorbed by the RF modules and incorporates a dedicated circuit for power supply fault reporting.

Under normal conditions, bias voltage is adjusted according to set output power using feedback based on actual output power reading (AGC).

Abnormal conditions affecting bias voltage so as to trigger foldback current limiting are:

- Exceeding reflected power at output
- External AGC signals (Ext. AGC FWD, Ext. AGC RFL)
- Temperature too high
- Any one RF module drawing too much current.

8.9 External Telemetry Interface Board (SLTLMTXLCD03)

This board provides an I/O interface for the CPU with the outside environment. All available machine input and output signals are brought to the REMOTE DB15 connector (chap. 6.3.5).

Also mounted on this board is the INTERLOCK IN BNC connector (figure 6.2 - [24]) which can disable device power output. When the central pin is closed to ground, output power is limited to zero until ground connection is removed.

The INTERLOCK OUT BNC connector (figure 6.2 - [22]), when used in combination with an R.V.R. amplifier, is connected to the exciter REMOTE or INTERLOCK IN connectors using a BNC-BNC connector. In the event of an amplifier fault, the central conductor is connected to ground and the transmitter is placed into forced standby mode.

9. Identification and Access to the Modules

The **TEX1000LIGHT** is made up of various modules linked to each other through connectors so as to make maintenance and any required module replacement easier.

9.1 Top View

The figure below shows the equipment top view with the various components pointed out.

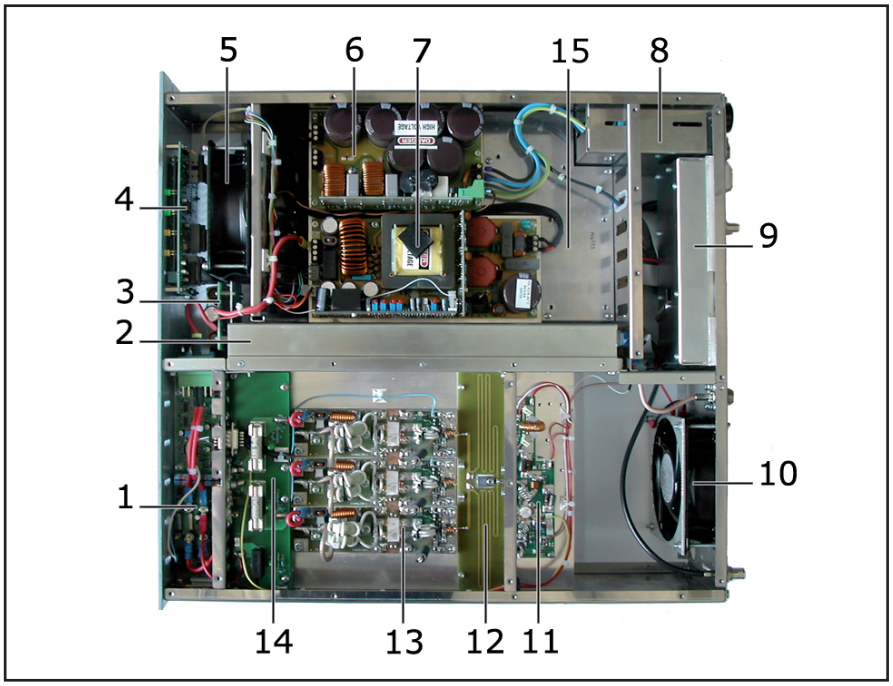


Figure 9.1

[1] Bias Board (SLBIAS1K3U-2)
[2] Low Pass Filter Board (SLLPFTEX1KL)
[3] Filter PS Board (SLFILPSPJ1KC)
[4] Panel Board (SL007PC2001B)
[5] FAN1 Cooling Fan (VTL4184)
[6] Power Factor Correction Board (PFCPSL1000)
[7] 50V 34A Power Supply (PSL5034)
[8] Pulse Protection Board (SLSRGPRPJ1KM)
[9] Main Board (SLMBDTEXLC05)
[10] FAN2 Cooling Fan (VTLG1E120)
[11] Driver Board (SLDRVTEX1KL)
[12] Splitter Board (SLSPLTEX1KL1)
[13] RF module (SL010RF1001)
[14] Fuse Board (SLFURFPJ1KLG)

9.2 Bottom View

The figure 9.2 shows the equipment bottom view with the various components pointed out.

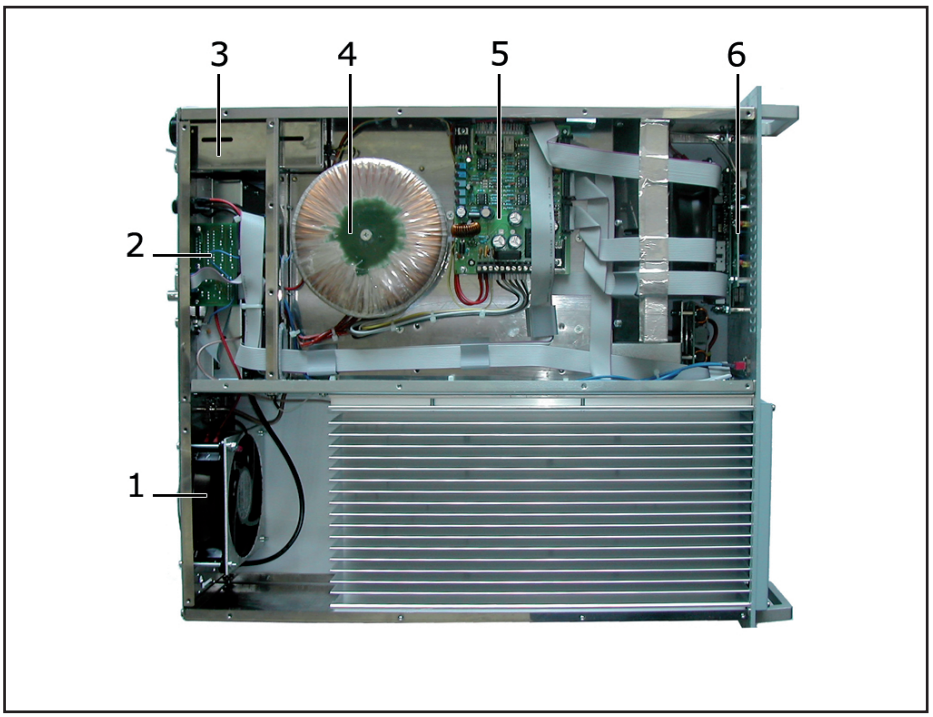


figure 9.2

[1] FAN2 Cooling Fan (VTLG1E120)
[2] Telemetry Board (SLTLMTXLCD03)
[3] Pulse Protection Board (SLSRGPRPJ1KM)
[4] TR1 Transformer (TRFTEX1000T)
[5] Interface Board (SL012IN1001)
[6] PS LED Board (SLLEDPSTEX1K)

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