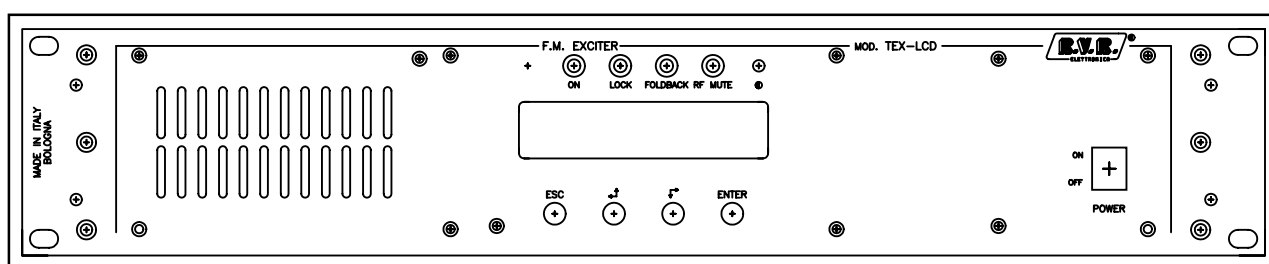

TEX-LCD



User Manual

Manufactured by



Italy



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06/09/02	1.1	Update Telemetry Card	J. Berti
29/07/03	2.0	New A4 version with A3 separated App. Tec.	G. De Donno
10/10/03	2.1	Power Good Menu added	G. De Donno

TEX LCD - User Manual

Version 2.1

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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 frequency, 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.



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Table of Contents

1. Preliminary Instructions	1
2. Warranty	3
3. First Aid	5
3.1 Treatment of electrical shocks	5
3.2 Treatment of electrical Burns	6
4. General Description	7
5. Quick guide for installation and use	9
5.1 Preparation	9
5.2 Use	9
5.3 Settings and calibration	10
5.4 Software	11
6 External Description	17
6.1 Front Panel	17
6.2 Rear Pannel (MONO version with telemetry)	18
6.3 Rear Pannel (STEREO version with telemetry)	19
6.4 Connectors description	20
6.5 Rear Pannel (Mono version)	21
6.6 Rear Pannel (Stereo version)	22
6.7 Connectors description	23
7. Technical specifications	25
7.1 Physical specifications	25
7.2 Electrical specifications	25
8. Working Principles	27
8.1 Power Supply	28
8.2 Panel board	28
8.3 Main board	29
8.4 Power amplifier	30
8.5 Telemetry board	30
9. Identification and Access to the Modules	31
9.1 Identification of the Modules	31
9.2 Removing the Modules	32

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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.

Use appropriate grounding procedures to short out capacitors and high voltage points before servicing.



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 should 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 back on a hard surface.
- Open airway: lift up neck, push forehead back (Fig. 3-1).
- clear out mouth if necessary and observe for breathing
- if not breathing, begin artificial breathing (Figure 3-2): tilt head, pinch nostrils, make airtight seal, four quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible



Figure 3-1



Figure 3-2

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



Figure 3-3



Figure 3-4

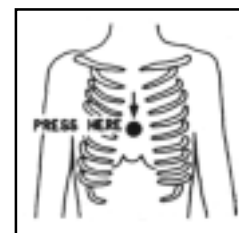


Figure 3-5

- In case of only one rescuer, 15 compressions alternated to two breaths.
- If there are two rescuers, the rhythm shall be of one breath each 5 compressions.
- Do not interrupt the rhythm 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. General Description

The TEX LCD is an exciter for Frequency Modulated audio broadcasting in a frequency modulation able to transmit in the band between 87.5 and 108 MHz with an output RF power adjustable up to a maximum of 30 W

Outstanding audio features this device has are low distortion and intermodulation values (typically 0.03%) and the high signal to noise ratio (typically 80 dB). Another important feature the TEX LCD has is its great simplicity of construction and use. For example, the mains power supply is universal type and allows any voltage between 90 V and 260 V to be used without having to select it manually.

The TEX LCD was designed to be modular. Its various functions are run from modules directly connected to each other with male and female connectors or with flat cables ending in connectors. This type of design makes maintenance operations and any required module replacement easier. All models are made with SMD technology.

This exciter contains a low-pass filter that reduces the harmonic emissions to below the limits allowed by international regulations, and can therefore be used as a transmitter connected directly to the antenna.

The machine is offered in two versions, one for Mono or MPX input (wideband input that is useful when you want to transmit in stereo using an external stereo encoder) and the other with an integrated stereo encoder. The TEX LCD stereo encoder guarantees excellent stereo separation together with a low harmonic distortion level. Also the stereo version of the exciter can be configured for operating in Mono/MPX mode (meaning excluding the stereophonic coder and using the "left" input as the "mono" input and the BNC as the "MPX").

The user can do the configuration through microswitches that are accessible from the outside.

Both versions have two inputs (SCA1 and SCA2) for modulated signals on subcarriers from special external encoders normally used in Europe for RDS (Radio Data System) transmission.

This exciter contains two types of control circuits, the "analogue" type made as hardware inside the power amplifier and the "digital" type made by the management software on a microcontroller. The analogue control maintains the RF output power at a constant level and limits it in case there is an excess of stationary waves.

The microprocessor system includes an LCD display and push-button panel for interaction with the user, and implements the following functions:

- Setting the output power
- Setting the operating frequency
- Activation and deactivation of power delivery
- Measurement and display of the working parameters of the exciter
- Communications with outside devices

The exciter's management software is based on a menu system. The user can navigate between the various submenus by using four push buttons: ESC, LEFT/UP, RIGHT/DOWN and ENTER.

Four LEDs indicate the machine status and are found on the front panel: ON, LOCK, FOLDBACK and RF MUTE.

The exciter has one input for external 24 VDC power supply. This source of auxiliary power supply, which the user can make through buffer batteries, is used automatically in the case of mains voltage failure.

5. Quick guide for installation and use

This chapter contains the necessary information for installing and using the machine. In the event any aspects are not completely clear, for example when using the machine for the first time, we recommend you carefully read the entire description contained in this manual.

5.1 Preparation

Unpack the exciter and before doing any other operation, be sure it has not been damaged during transport. In particular check that all the connectors are in perfect condition.

The main fuse can be accessed from the outside on the rear panel (see figures 6.2 and 6.3). Extract the fuse carrier with a screwdriver to check its integrity or for replacement, if necessary. The fuse to be used is this type:

3.15 A 5X20

Check that the TEX LCD switches are in the "off" position. The exciter has two switches: one is incorporated in the VDE base for the mains power supply cable and completely interrupts the machine's mains power supply, whereas the second one is on the front panel and inhibits the switching power supply of the machine.

Connect the RF output of the exciter to the antenna cable or to a fictitious load able to dissipate the power generated by the TEX LCD.

Connect the mains cable to the special VDE base.



NOTE: It is crucial that the mains system be provided with earthing to ensure both the operators' safety and correct operation of the device.

Connect the audio cables of the signal source to the proper connectors on the back of the exciter.

5.2 Use

Energize the exciter by putting the switch found on the rear panel in the "I" position (on) and turn it on with the switch found on the front panel.

Enter the "Set" menu and set the desired operating frequency. See chapter 5.4 for a description of the various menus..

By using the switches and trimmer found on the rear panel, set the characteristics (impedance, preemphasis and, if it's necessary, stereo/mono) and the levels of the audio and RDS inputs (if used).



NOTE: When the device leaves the factory, it is delivery with the output power adjustment at minimum and in the OFF position. It is however recommended that you always check the set level before activating power supply, especially if the machine is used as a modulator for a power amplifier.

Set the desired power level from the predefined menu.

Activate the RF power output from the "Fnc" menu.

5.3 Settings and calibration

The only adjustments to be manually made on the TEX LCD 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 - mono version

Input	Figure 6.2	Trimmer	Sensitivity	Notes
RDS	[5]	[6]	-20 ÷ +13 dBm	Input level for 2.0 kHz deviation
SCA1	[4]	[18]	- 8 ÷ +13 dBm	Input level for 7.5 kHz deviation
SCA2	[16]	[17]	- 8 ÷ +13 dBm	
MPX	[20]	[19]	-13 ÷ +13 dBm	Input level for 75 kHz deviation
Mono	[8]	[7]	-13 ÷ +13 dBm	

- Input sensitivity - stereo version

Input	Figure 6.3	Trimmer	Sensitivity	Notes
RDS	[8]	[9]	-20 ÷ +13 dBm	Input level for 2.0 kHz deviation
SCA1	[7]	[21]	- 8 ÷ +13 dBm	Input level for 7.5 kHz deviation
SCA2	[19]	[20]	- 8 ÷ +13 dBm	
Left	[23]	[22]	-13 ÷ +13 dBm	Input level for 75 kHz overall deviation
Right	[11]	[10]	-13 ÷ +13 dBm	(i.e. comprising channels + pilot tone)

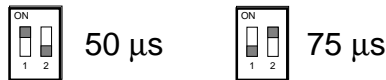
When adjusting the sensitivity level of the inputs, keep in mind that the instantaneous modulation level is given in the predefined menu and that an indicator signals the 75 kHz level. To get a proper adjustment, we recommend you put a level signal on the machine's output equivalent to the level of its 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.

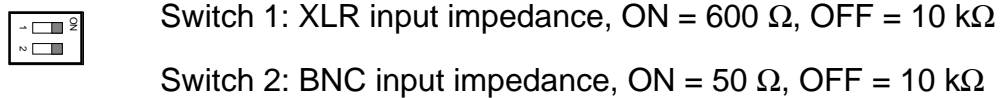
For the stereophonic version, there is a special menu in which the levels of the Right and Left channels are indicated separately with the relative indicators of the nominal levels for the maximum deviation of 75 kHz.

The positions of the DIP switches that are used to select the available options are indicated on the printing.

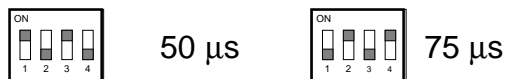
- Mono version preemphasis (switch [17] Figure 6.2):



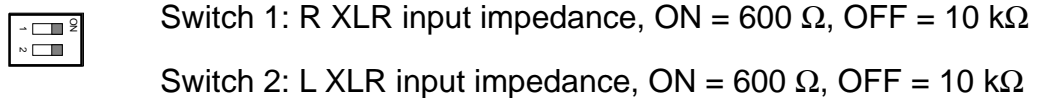
- Mono version impedances of input (switch [23] Figure 6.2):



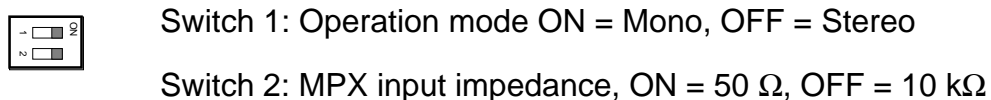
- Stereo version preemphasis (switch [7] Figure 6.3):



- L and R input impedance (type XLR) (switch [25] Figure 6.3):



- Operation mode/input impedance MPX ([8] Figure 6.3)
(switch [6] Figure 6.2):



5.4 Software

The machine is provided with a two-line LCD display where a set of menus is shown. An overall view of the machine's menus is given in figure 5-1.

One of the following symbols may be present on the left side of the display, depending on the case:

- ▣ The parameter highlighted by the arrow can be modified
- ▣ The arrow points out the current line, the parameter of which cannot be modified. This symbol is present in the menus made up of more than two lines to help scroll the menu.

When turned on, the LCD display shows the predefined screen with the graphic representation of the instantaneous modulation level and indication of the direct power supplied:

```

Mod:||||||||||| :
Fwd:  30.0  W
    
```

The vertical bars under "Mod" indicate the progress of the modulation in real time; the hatched bar signals the maximum nominal modulation level of 75 kHz (100%).

To change the set power level, select the line relating to the power with the DOWN push button and keep the ENTER push button pressed until it enters the modification mode. The screen that is shown in the modification mode is similar to the following:

```

|||||||||||||||||
▶Fwd:  30.0  W
    
```

The bottom line gives the instantaneous reading of the power (30W in this example), whereas the bar indicates the set level. To increase the level, press the RIGHT/DOWN push button and to reduce it, press LEFT/UP. As the set level increases or decreases, the bar becomes longer or shorter to display the current setting. When the desired level is reached, press ENTER to confirm and exit the predefined menu. Note that the set value is stored anyway, so if you press ESC or let the timeout go by without pressing a key, the power will remain at the last set level.

If you press the ESC push button while you are in the predefined menu, you will be shown the following selection screen from which you can access all the other menus:

```

Fnc Pwr P.A Set
Mix Ure L&R
    
```

To enter one of the submenus, select its name (which will be underlined by a blinking cursor) with the RIGHT or LEFT push buttons and then press the ENTER push button.

If you instead want to go back to the predefined menu, all you have to do is press the ESC push button again..

Figure 5.1 shows the complete set of the machine's menus.



NOTE: The "L&R" menu is active only in the stereo version. The writing "L&R" appear in the selection menu of the mono version, but doesn't have any meaning.

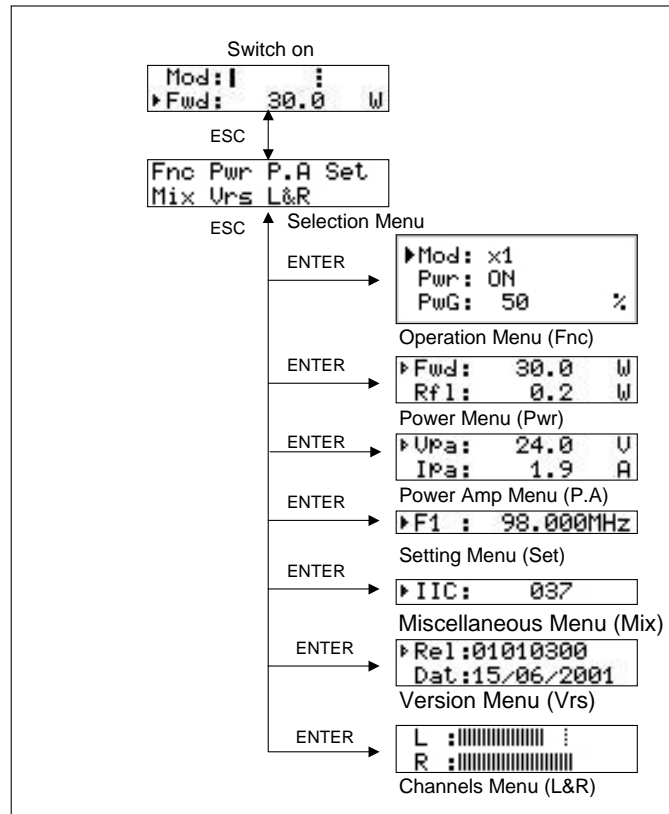
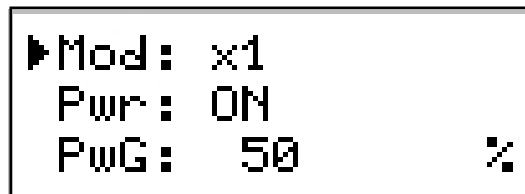


Figure 5.1

5.4.1 Operation Menu (Fnc)



The user can set the deviation display mode, activate or deactivate the supply of power from the exciter and set percentage power of Power Good from this menu.

To work with one of the two functions, select the relative line with the UP and DOWN push buttons and then press and continue pressing the ENTER push button until the command is accepted. So, the Pwr setting will become from On to Off or inverse and the Mod setting will become from "X1" to "X10" or inverse. To change the percentage value of Power Good, you must select PWG voice with ENTER push button and change its value with UP and DOWN push button.

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.

The Power Good function is a distributed power check and alarm function. When output power is under Power Good threshold value, machine changes DB15 "Remote" connector's pin state on rear panel. Percentage Power Good value is referred to nominal machine power, 30 W in TEX30 for example, and is not referred to distributed power. So, if you set 80% value, it will correspond to 24 W, indifferently from distributed power.

5.4.2 Power Menu (Pwr)

This screen shows the user the measures relating to the exciter's RF power output:

- Forward Power (Fwd)
- Reflected Power (Rfl)

▶ Fwd :	30.0	W
Rfl :	0.2	W

The values shown are "readings", and therefore cannot be modified (note the empty triangle). To modify the power setting, use the predefined menu as described above.

5.4.3 Power Amplifier Menu (P.A)

This screen, consisting of three lines that can be scrolled with the UP and DOWN push buttons, shows the user the measures relating to the device's final power amplifier:

- Voltage (VPA)
- Current consumption (IPA)
- Temperature (TMP)

▶ Vpa :	24.0	V
IPa :	1.9	A
Tmp :	27.8	C

5.4.4 Settings Menu (Set)

This menu lets you read and set the operating frequency.

▶ F1 :	98.000MHz
--------	-----------

By pressing the ENTER push button, you can modify the set frequency using the UP (the frequency increases) and DOWN push buttons.

After having set a new frequency value, press the ENTER push 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)

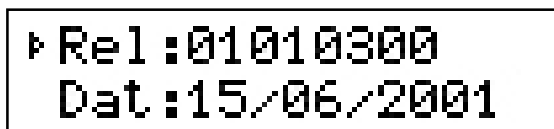
This menu allows you to set the machine's address in a o I²C type of serial bus connection:



The I²C network address is important when the exciter is connected to an RVR transmission system that envisages use of this protocol. We recommend you do not modify it without a good reason.

5.4.6 Versions Menu (Vrs)

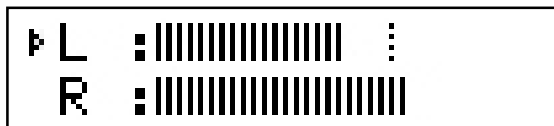
This screen shows the version and the release date of the software.



5.4.7 Channels Menu (L&R)

This menu is active in the stereo version of the machine and in the mono version, but in the mono version the menu doesn't have any meaning.

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



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

Please note that if you set a stereo TEX-LCD exciter for mono operation, this menu is still active, and it will only show the level of the mono input. Please remember that the modulation level is always shown by the default menu.

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6 External Description

This chapter reports the elements of the front and rear panels of the TEX-LCD with a brief description of each of them.

6.1 Front Panel

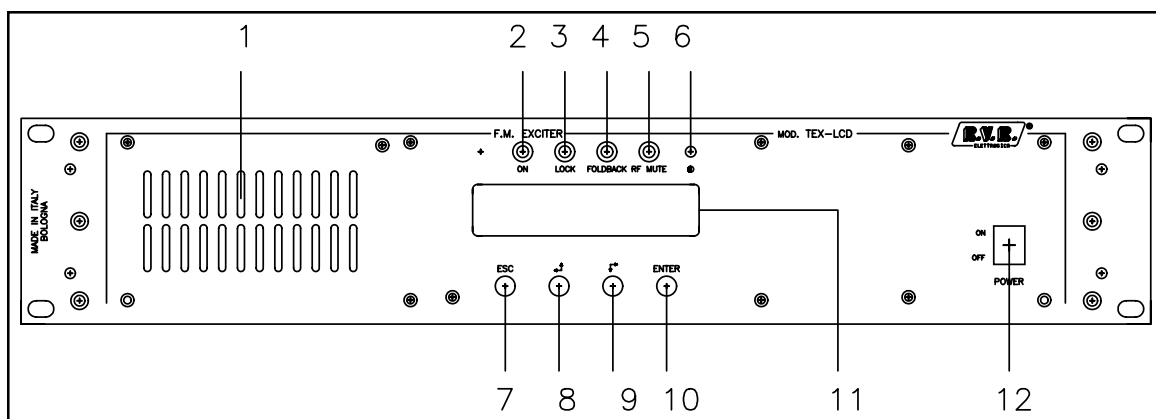


Figure 6.1

- | | |
|----------------|---|
| [1] AIR FLOW | Grid for the intake of the air flow of the forced ventilation |
| [2] ON | Green LED, lit when the exciter is working |
| [3] LOCK | Green led, lit when the PLL is locked on the working frequency |
| [4] FOLDBACK | Yellow LED, lit when the foldback function is operating (automatic reduction of the delivered RF power) |
| [5] R.F. MUTE | Yellow LED, lit when the exciter's power output is inhibited by an external interlock command |
| [6] CONTRAST | Display contrast adjusting trimmer |
| [7] ESC | Push button to exit from a menu |
| [8] LEFT/UP | Push button to move in the menu system and to modify the parameters |
| [9] RIGHT/DOWN | Push button to move in the menu system and to modify the parameters |
| [10] ENTER | Push button to confirm a parameter and to enter in a menu |
| [11] DISPLAY | Liquid crystals display |
| [12] POWER | ON/OFF switch. This switch disables the exciter without disconnecting the mains supply |

6.2 Rear Pannel (MONO version with telemetry)

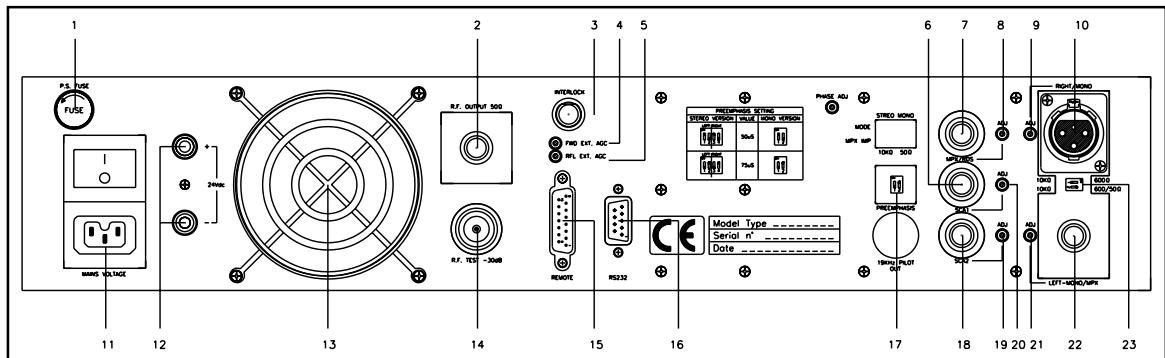


Figure 6.2

- | | |
|------------------------|--|
| [1] FUSE | Fuse holder. Use a screwdriver to access the fuse
Contains the general protection fuse rated 3.15 A |
| [2] R.F. OUTPUT | RF output connector, N-type, 50Ω. |
| [3] INTERLOCK | BNC interlock connector: the exciter is forced in stand-by mode when the inner conductor is grounded. |
| [4] FWD EXT. AGC | Trimmer for the control of the delivered power in function of the income FWD fold (see cap. 6.4.2) |
| [5] RFL EXT. AGC | Trimmer for the control of the delivered power in function of the income RFL fold (see cap. 6.4.2) |
| [6] SCA 1 | BNC connector, SCA1 unbalanced input |
| [7] MPX/RDS | BNC connector, MPX unbalanced input |
| [8] MPX/RDS ADJ | Adjustment trimmer for MPX input |
| [9] RIGHT/MONO ADJ | Adjustment trimmer for the Mono input |
| [10] RIGHT/MONO | XLR connector for balanced Mono audio input |
| [11] PLUG | Mains supply plug, 90 - 260V 50-60 Hz |
| [12] 24 VDC IN | External 24Vdc supply input. Positive (red) and negative (black) |
| [13] FAN | Fan for the forced ventilation of the exciter |
| [14] R.F. TEST POINT | RF test output, approx. -30 dB wrt the RF output power level |
| [15] REMOTE | DB9 connector for telemetry of the machine |
| [16] RS232 | DB9 connector for interconnection with other devices and for factory parameters programming |
| [17] PREENPHASIS | Dip-switch to set the preemphasis at 50 or 75 μs. The preemphasis setting is only relevant for the mono input, while MPX input is unaffected by this setting |
| [18] SCA 2 | BNC connector, SCA2 unbalanced input |
| [19] SCA2 ADJ | Adjustment trimmer for SCA2 input |
| [20] SCA1 ADJ | Adjustment trimmer for SCA1 input |
| [21] LEFT-MONO/MPX ADJ | Adjustment trimmer for MPX input |
| [22] LEFT-MONO/MPX | BNC connector, MPX unbalanced input |
| [23] IMPEDANCE | Dip-switch to set the input impedance
600Ω or 10kΩ for the mono input
50Ω or 10kΩ for the MPX input |

6.3 Rear Pannel (STEREO version with telemetry)

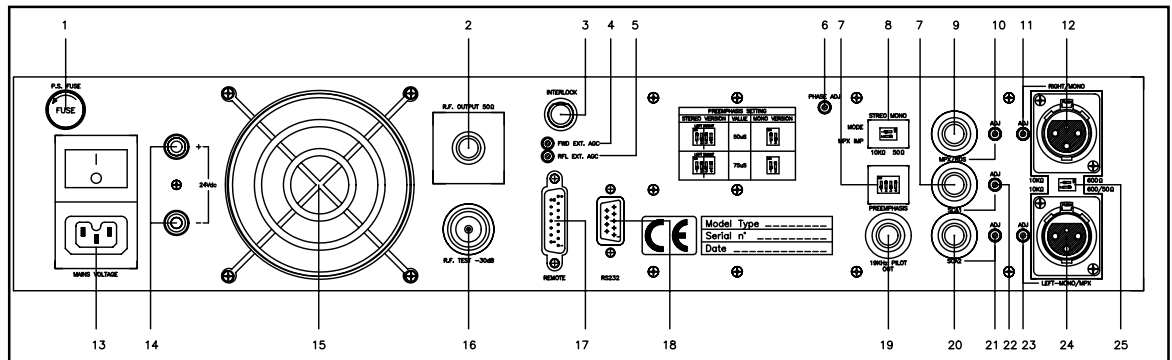


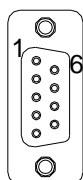
figure 6.3

- | | |
|------------------------|--|
| [1] FUSE | Fuse holder. Use a screwdriver to access the fuse
Contains the general protection fuse rated 3.15 A |
| [2] R.F. OUTPUT | RF output connector, N-type, 50Ω. |
| [3] INTERLOCK | BNC interlock connector: the exciter is forced in stand-by mode when the inner conductor is grounded. |
| [4] FWD EXT. AGC | Trimmer for the control of the delivered power in function of the income FWD fold (see cap. 6.4.2) |
| [5] RFL EXT. AGC | Trimmer for the control of the delivered power in function of the income RFL fold (see cap. 6.4.2) |
| [6] PHASE ADJ | Pilot tone phase adjustment trimmer |
| [7] PREENPHASIS | Dip-switch to set the prephasys at 50 or 75 μs. The prephasys 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 |
| [8] MODE/MPX IMP | Dip-switch to set the operation mode (STEREO or MONO) and the MPX input impedance, 50Ω or 10kΩ. |
| [9] SCA 1 | BNC connector, SCA1 unbalanced input |
| [10] MPX/RDS | BNC connector, MPX unbalanced input |
| [11] MPX/RDS ADJ | Adjustment trimmer for MPX input |
| [12] RIGHT/MONO ADJ | Adjustment trimmer for the Right channel input |
| [13] RIGHT/MONO | XLR connector, balanced Right channel input |
| [14] PLUG | Mains supply plug, 90 - 260V 50-60 Hz |
| [15] 24VDC IN | External 24Vdc supply input. Positive (red) and negative (black) |
| [16] FAN | Fan for the forced ventilation of the exciter |
| [17] R.F. TEST POINT | RF test output, approx. -30 dB wrt the RF output power level |
| [18] REMOTE | DB9 connector for telemetry of the machine |
| [19] RS232 | DB9 connector for interconnection with other devices and for factory parameters programming |
| [20] 19 KHZ PILOT | BNC output for the 19 kHz pilot tone. This can be used for external devices (e.g. RDS coders) synchronization |
| [21] SCA 2 | BNC connector, SCA2 unbalanced input |
| [22] SCA2 ADJ | Adjustment trimmer for SCA2 input |
| [23] SCA1 ADJ | Adjustment trimmer for SCA1 input |
| [24] LEFT-MONO/MPX ADJ | Adjustment trimmer for Left-Mono channel input |
| [25] LEFT-MONO/MPX | XLR connector, balanced Left-Mono channel input |
| [26] IMPEDANCE | Dip-switch to set the balanced input impedance, 600Ω or 10kΩ |

6.4 Connectors description

6.4.1 RS232

Type: DB9 female

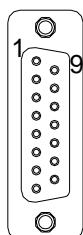


- | | |
|---|-----------------------------|
| 1 | NC |
| 2 | TX_D |
| 3 | RX_D |
| 4 | Internally connected with 6 |
| 5 | GND |
| 6 | Internally connected with 4 |
| 7 | Internally connected with 8 |
| 8 | Internally connected with 7 |
| 9 | NC |

Note: pins 6, 7 and 8 are for factory programming and should not be connected

6.4.2 Remote

Type: DB15 female



- | | |
|----|-------------|
| 1 | Interlock |
| 2 | FWD fold |
| 3 | GND |
| 4 | SDA IIC Bus |
| 5 | VPA TIm |
| 6 | FWD tIm |
| 7 | Power Good |
| 8 | GND |
| 9 | GND |
| 10 | RFL fold |
| 11 | SCL IIC Bus |
| 12 | IPA TIm |
| 13 | RFL TIm |
| 14 | On cmd |
| 15 | OFF cmd |

6.4.3 Left (MONO) / Right (MPX)

Type: XLR female



- | | |
|---|----------|
| 1 | GND |
| 2 | Positive |
| 3 | Negative |

6.5 Rear Pannel (Mono version)

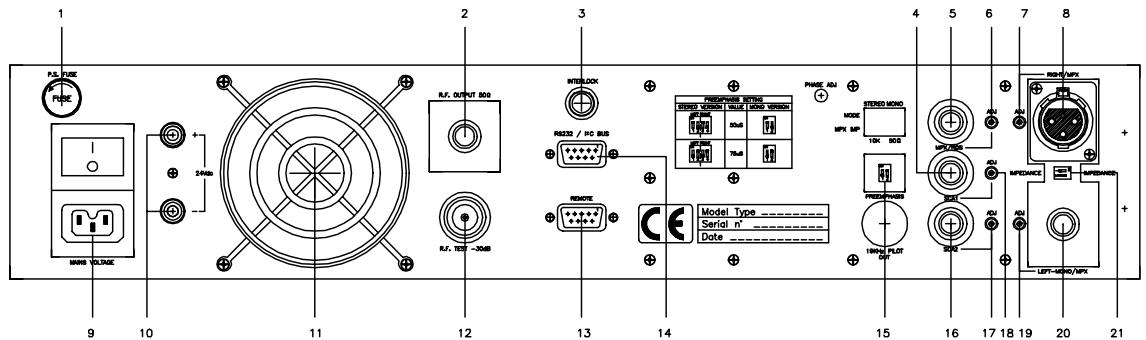


Figure 6.5

- | | |
|---------------------------------|--|
| [1] FUSE | Fuse holder. Use a screwdriver to access the fuse
Contains the general protection fuse rated 3.15 A |
| [2] R.F. OUTPUT | RF output connector, N-type, 50Ω. |
| [3] INTERLOCK | BNC interlockconnector: the exciter is forced in stand-by mode when the inner conductor is grounded. |
| [4] SCA 1 | BNC connector, SCA1 unbalanced input |
| [5] MPX/RDS | BNC connector, MPX unbalanced input |
| [6] MPX/RDS ADJ | Adjustment trimmer for MPX input |
| [7] RIGHT/MPX ADJ | Adjustment trimmer for the Mono input |
| [8] RIGHT/MPX | XLR connector for balanced mono audio input |
| [9] PLUG | Mains supply plug, 90 - 260V 50-60 Hz |
| [10] 24 VDC IN | External 24Vdc supply input. Positive (red) and negative (black) |
| [11] FAN | Fan for the forced ventilation of the exciter |
| [12] R.F. TEST POINT | RF test output, approx. -30 dB wrt the RF output power level |
| [13] REMOTE | DB9 connector for serial communications and via modem |
| [14] RS232/I ² C BUS | DB9 connector for I ² C standard communication |
| [15] PREENPHASIS | Dip-switch to set the preenphasys at 50 or 75 μs. The preenphasys setting is only relevant for the mono input, while MPX input is unaffected by this setting |
| [16] SCA 2 | BNC connector, SCA2 unbalanced input |
| [17] SCA2 ADJ | Adjustment trimmer for SCA2 input |
| [18] SCA1 ADJ | Adjustment trimmer for SCA1 input |
| [19] LEFT-MONO/MPX ADJ | Adjustment trimmer for MPX input |
| [20] LEFT-MONO/MPX | BNC connector, MPX unbalanced input |
| [21] IMPEDANCE | Dip-switch to set the input impedance
600Ω or 10kΩ for the mono input
50Ω or 10kΩ for the MPX input |

6.6 Rear Panel (Stereo version)

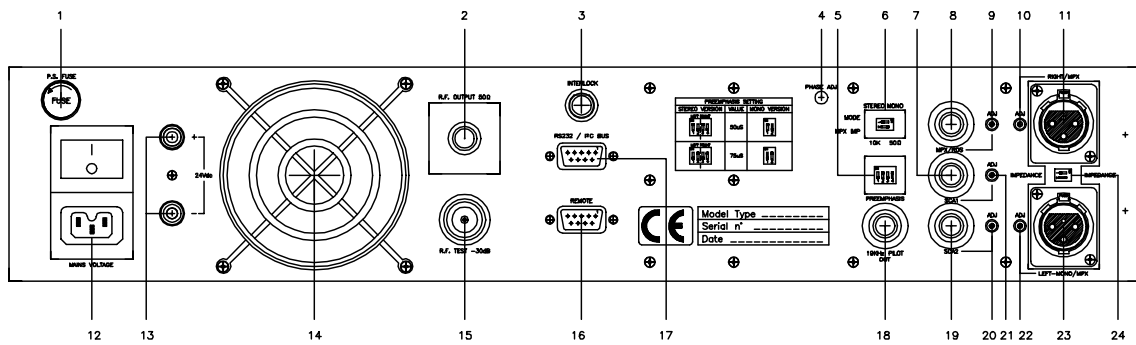


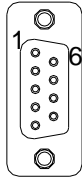
figure 6.6

- | | |
|------------------------|--|
| [1] FUSE BLOCK | Fuse holder. Use a screwdriver to access the fuse
Contains the general protection fuse rated 3.15 A |
| [2] R.F. OUTPUT | RF output connector, N-type, 50Ω. |
| [3] INTERLOCK | BNC interlockconnector: the exciter is forced in stand-by mode when the inner conductor is grounded. |
| [4] PHASE ADJ | Pilot tone phase adjustment trimmer |
| [5] PREENPHASIS | Dip-switch to set the preenphasys at 50 or 75 μs. 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 |
| [6] MODE/MPX IMP | Dip-switch to set the operation mode (STEREO or MONO) and the MPX input impedance, 50Ω or 10kΩ. |
| [7] SCA 1 | BNC connector, SCA1 unbalanced input |
| [8] MPX/RDS | BNC connector, MPX unbalanced input |
| [9] MPX/RDS ADJ | Adjustment trimmer for MPX input |
| [10] RIGHT/MPX ADJ | Adjustment trimmer for the Right channel input |
| [11] RIGHT/MPX | XLR connector, balanced Right channel input |
| [12] PLUG | Mains supply plug, 90 - 260V 50-60 Hz |
| [13] 24VDC IN | External 24Vdc supply input. Positive (red) and negative (black) |
| [14] FAN | Fan for the forced ventilation of the exciter |
| [15] R.F. TEST POINT | RF test output, approx. -30 dB wrt the RF output power level |
| [16] REMOTE | DB9 connector for serial communications and via modem |
| [17] RS232/I2C BUS | DB9 connector for I2C standard communiacion |
| [18] 19 KHZ PILOT | BNC output for the 19 kHz pilot tone. This can be used for external devices (e.g. RDS coders) synchronization |
| [19] SCA 2 | BNC connector, SCA2 unbalanced input |
| [20] SCA2 ADJ | Adjustment trimmer for SCA2 input |
| [21] SCA1 ADJ | Adjustment trimmer for SCA1 input |
| [22] LEFT-MONO/MPX ADJ | Adjustment trimmer for Left/Mono channel input |
| [23] LEFT-MONO/MPX | XLR connector, balanced Left/Mono channel input |
| [24] IMPEDANCE | Dip-switch to set the balanced input impedance, 600Ω or 10kΩ |

6.7 Connectors description

6.7.1 RS232 / I²C Bus (USED ONLY FOR PROGRAMMATION)

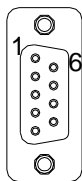
Type: DB9 female



1	GND
2	SDA
3	SCL
4	NC
5	GND
6	Internally used (NOT CONNECTED)
7	Internally used (NOT CONNECTED)
8	Internally used (NOT CONNECTED)
9	GND

6.7.2 Remote (USED FOR RS232 COMMUNICATION)

Type: DB9 female



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

6.7.3 Left (MONO) / Right (MPX)

Type: XLR female



1	GND
2	Positive
3	Negative

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7. Technical specifications

7.1 Physical specifications

Panel size	483 mm (19") x 88 mm (3 1/2") (2 HE)
Depth	344 mm (26 1/2")
Weight	Circa 6 Kg
Working Temperature	-10 °C ÷ 50 °C

7.2 Electrical specifications

General

RF output power	0 to 30 W, adjustable
RF output connector	"N"-type
RF output impedance	50 Ohm
Frequency range	87.5 MHz ÷ 108 MHz
Frequency setting	Direct software programming
Frequency stability	±1ppm from -10°C to 50°C
Modulation type	Direct carrier modulation
Spurious and Harmonics suppression	Respects relevant FCC and CCIR standards (typical -75 dBc)
Modulation capability	Respects relevant FCC and CCIR standards (typical 240kHz MPX/Mono, 210 KHz Stereo)
Asynchronous residual AM	< -70 dB wrt. 100% peak AM
Synchronous residual AM	< -50 dB wrt. 100% peak AM, with 75 kHz deviation @ 400Hz
C.A. power supply	≅ 80 V ÷ 260 V, full-range
C.C. power supply	24 V
Power consumption	120 VA ca.

Input

Left, Right and Mono Input	Type: XLR female balanced or unbalanced
MPX input	Type: BNC, unbalanced
Input impedance	balanced input: 600 or 10 k Ohm selectable unbalanced input: 50 or 10 k Ohm selectable
Input level	-13 dBm ÷ +13 dBm, continuously adjustable
Preemphasys	Selectable: 0 50 us (CCIR) 75 us (FCC)
SCA/RDS input	3 BNC unbal (2 in the stereo version)
SCA/RDS input impedance	10 kOhm
SCA/RDS input level	-20 dBm ÷ +13 dBm for 2.0 kHz continuously adjustable
SCA/RDS amplitude/frequency response	± 0.2 dB, 40 kHz to 100 kHz

Output

RF Out:	"N"-type, 50 Ohm
RF Test	BNC connector, -30 dB wrt. carrier level 50 Ohm
19 kHz pilot tone output	BNC connector, 1 Vpp minimum load 4.7 kOhm

MONO operation

S/N	> 80dB wrt. 75 kHz, measured in the band 20 Hz ÷ 20 kHz, 50 us deemph., RMS detect
Amplitude frequency response	± 0.5 dB, 20Hz ÷ 15Khz
Total harmonic distortion (THD)	< 0.05%

MPX operation

composite S/N	> 80dB wrt. 75 kHz, measured in the band 20 Hz ÷ 20 kHz, 50 us deemph., RMS detect
MPX amplitude frequency response	± 0.05 dB, 20 Hz ÷ 53 KHz ± 0.2 dB, 53 KHz ÷ 100 KHz
MPX Total harmonic distortion (THD)	< 0.02 %
Stereo separation	> 55 dB (typ. 60dB, with external stereo coder)

Stereo operation

S/N FM Stereo	> 74 dB wrt. 75 kHz, measured on decoded channels, in the band 20 Hz ÷ 20 KHz, 50 us deemph, RMS detector
Risposta ampiezza/frequenza audio	± 0.5 dB, 20 Hz ÷ 15 KHz
Total harmonic distortion (THD)	≤ 0.05 %
Stereo separation	> 50 dB

Connections

Interlock connector	BNC, inhibits RF power output when shorted
Serial interface	DB9 female RS232
Remote	DB15 female, give indications on the state of the device

8. Working Principles

A schematic view of the modules and connections making up the TEX-LCD with the telemetry board is shown in figure 8.1.

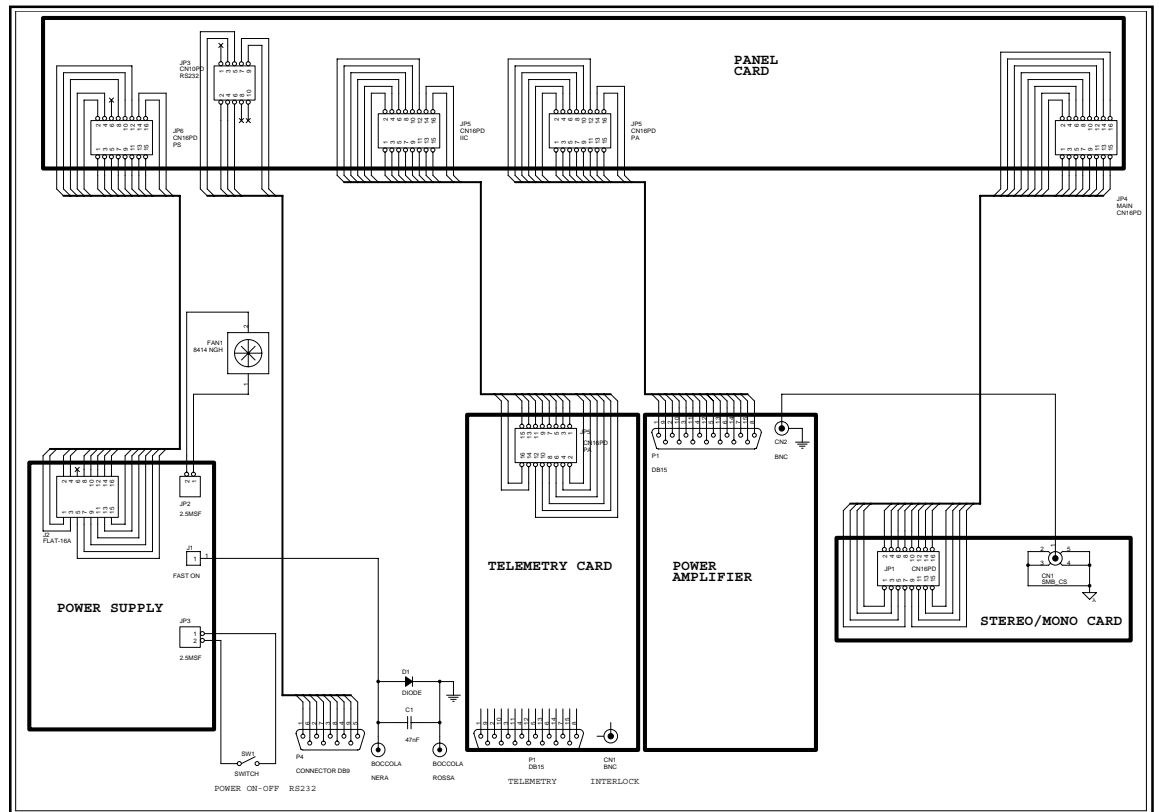


Figure 8.1

In figure 8.2 is shown a schematic view of the modules and connections making up the TEX LCD without telemetry board.

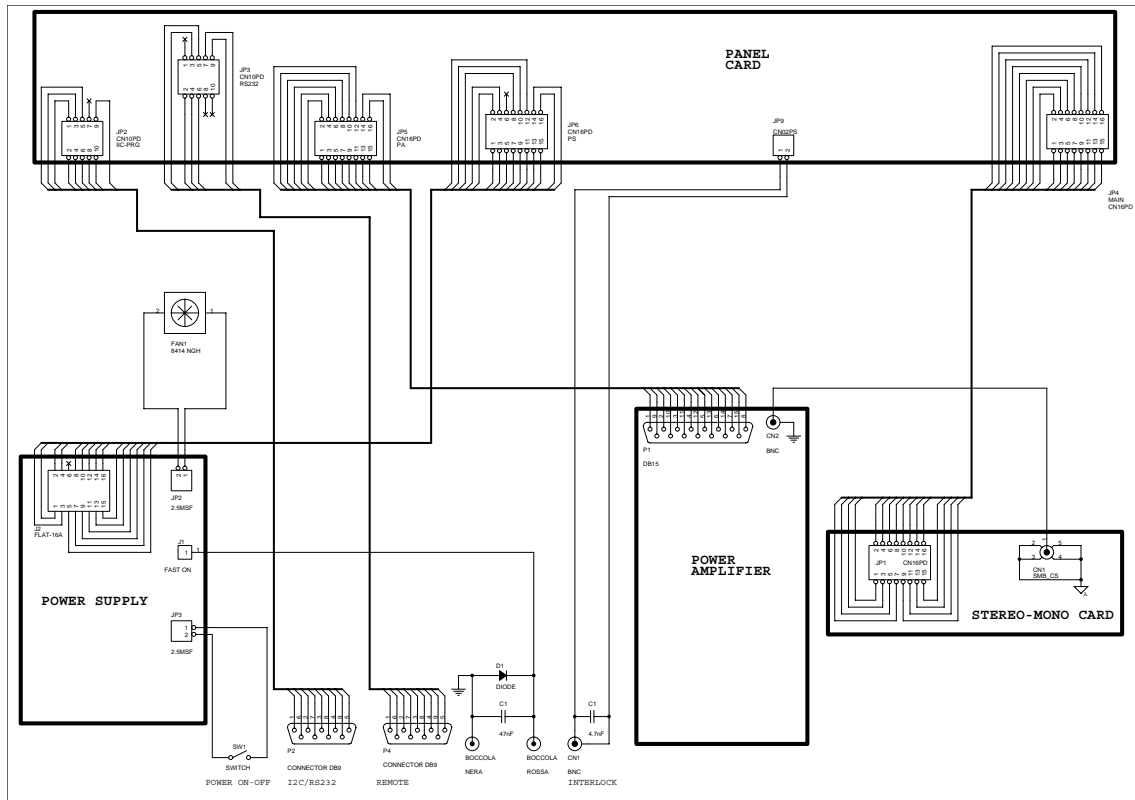


Figure 8.2

Below a brief description of each module's functions is given, whereas the complete diagrams and layout of the cards are given in the appendix.

8.1 Power Supply

TEX-LCD's power supply is a switching type of unit, and its main 26 V output feeds the RF amplifier of the machine. Also the stabilizers for generating continuous 5 V and 18 V voltages for powering the other circuits on the device are present on the power supply. Note that the power supply is the "direct from mains" type, meaning without a transformer, and can be connected to any voltage between 80 and 260 V without having to make adjustments or manual settings. The 24 V auxiliary continuous current inputs are connected on the power supply, and it is used automatically to buffer any absence of mains power supply.

8.2 Panel board

The panel card contains the microcontroller (PIC16F877) that implements the machine's control software, the display and the other components needed to interface the user.

The card interfaces with the other machine modules, both for power supply distribution and for the control and measures.

8.3 Main board

The main card carries out the following functions:

- Audio and SCA input handling
- Generation of carrying frequency
- Modulation
- R.F. amplification (Driver)

The Mono and Stereo versions of this card differ from each other in the audio portion, which contains a stereophonic coded in the stereo version.

8.3.1 Audio input section (mono version)

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

- Input impedance selection
- 15 kHz filtering of the mono channel
- Preemphasis of the mono channel
- 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

8.3.2 Audio input section (stereo version)

In the board are present two filters at 15kHz for the filtering of both the channels L and R, and an integrated stereophonic generator. The others functionalities are the same of the mono version.

8.3.3 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.

8.3.4 Driver section

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.

8.4 Power amplifier

The final power stage is enclosed in a totally shielded metal container fastened in the centre of the device.

The RF signal coming from the "main" card reaches the pilot, is amplified and is then sent to the final stage that sees to its final amplifications up to 30W.

The amplifier is made in three stages. The first is made with two BFR540s in parallel, the second with one BLF244, and the last with one BLW86.

In addition to the actual RF amplification, this circuit carries out the following functions:

- Control of the power level in output, depending on the setting
- Reduction of the power supplied when there are high levels of reflected power
- Measures direct and reflected power through directional couplers
- Measures current absorbed by the power amplifier
- Measures temperature
- Low-pass filtering of the RF signal in output

On this card is an RF sample approximately -30dB compared with the output that is available on a BNC connector underneath the output connector of the transmitter. This sample is useful for checking the characteristics of the carrier, but not of the higher order harmonics.

8.5 Telemetry board

This device is designed to furnish to the user the the state of operation of the machine. All the available input and output signals are replied on the DB15 connector.

On the same board there is also the BNC connector of interlock for disable the device. Closing the central pin to ground, the exit power has reduced to zero until the connection it doesn't come removed.

When it is used with a R.V.R. amplifier, this connector comes connected through a BNC-BNC connector to the REMOTE or INTERLOCK of the power amplifier. In case of breakdowns of the amplifier, the central conductor is place to ground forcing the device to enter in stand-by mode.

9. Identification and Access to the Modules

9.1 Identification of the Modules

The TEX LCD is made up of various modules connected to each other with connectors so as to make maintenance and any required module replacement easy.

9.1.1 Seen from above

The figure below shows the view from above the machine with the various components pointed out.

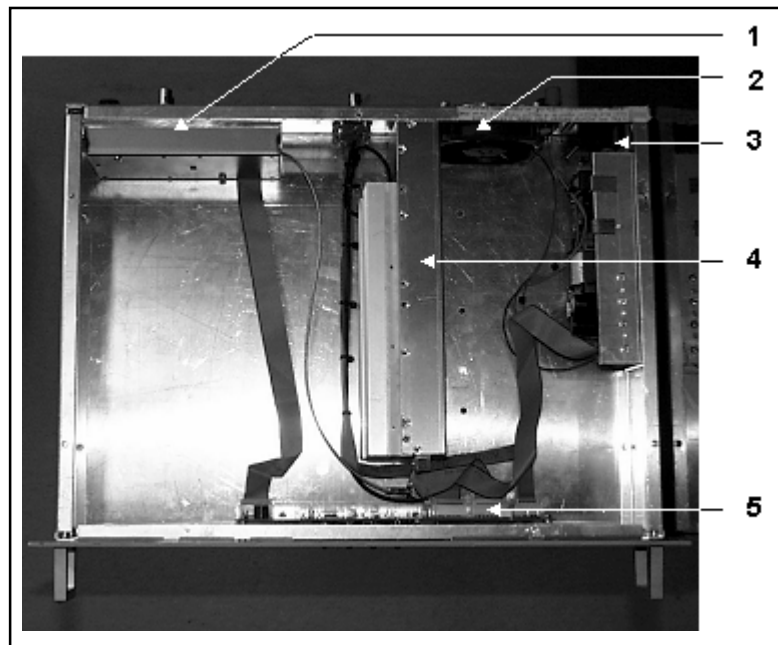


Figure 9.1

- [1] Cooling fan
- [2] Main card (stereo or mono)
- [3] Power supply
- [4] Amplifier
- [5] Panel card

9.2 Removing the Modules



NOTE: When the exciter is operating with the cover removed, spots subject to dangerous voltage become accessible. Be sure to disconnect the exciter's power supply before starting any maintenance operation.

To reassemble the modules, just follow the operations described in reverse order.

9.2.1 Replacing the main card (both stereo and mono)

- Open the top cover of the machine
- Disconnect the connectors CN1, JP1
- Unscrew the screws that fasten the metal box to the outside chassis
- Extract the module while being careful with the connectors on the rear panel
- Unscrew the four screws that fasten the card to the metal box
- Replace the card

9.2.2 Replacing the power supply

- Open the top cover of the machine
- Disconnect the connector JP2 and J2 of the power supply card
- Unscrew the screws fastening the module to the right side panel
- Extract the module

9.2.3 Replacing the fan

- Open the top cover of the machine.
- Disconnect the connector JP2 of the power supply card
- Unscrew the four screws that fasten the fan to the rear panel
- Remove the fan.

9.2.4 Replacing the panel card

- Open the top cover of the machine
- Disconnect the connectors JP3, JP2, JP4, JP5 and JP6 of the panel card
- Unscrew the front panel fastening screws
- Remove the card.

9.2.5 Replacing the amplifier

- Open the top cover of the machine
- Disconnect the connectors CN2 and P1 from the module
- Remove the screws that fasten the module to the bottom of the exciter
- To gain access to the card, remove the cover of the module by removing the fastening screws on the sides.