BLUES 30

User Manual

Volume 1

Manufactures by R.V.R. ELETTRONICA **Italy**

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16/10/03	1.3	Update front and rear panels	G. De Donno

BLUES 30 - User Manual
Version 1.3

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R.V.R. Elettronica SpA
Via del Fonditore 2/2c - 40138 - Bologna (Italia)
Telefono: +39 051 6010506
Fax: +39 051 6011104
Email: info@rvr.it
Web: www.rvr.it

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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.

CE

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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.

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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 danni verificatisi durante la spedizione della macchina alla R.V.R. per eventuali riparazioni;

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 (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

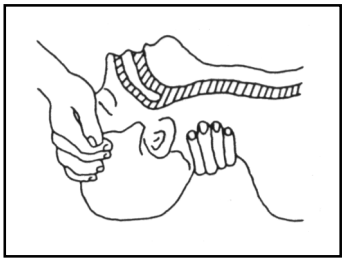

Figure 3-1

Figure 3-2

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

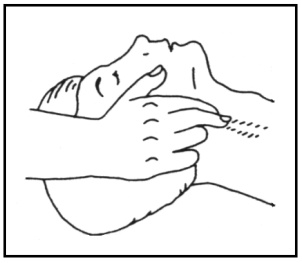

Figure 3-3

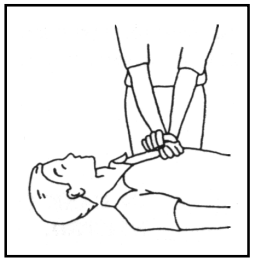

Figure 3-4

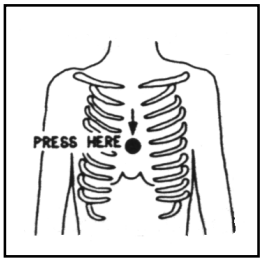

Figure 3-5

- In case of only one rescuer, 15 compressions alternated to two breaths.
- If there are two rescuers, the 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. General Description

The Blues30 is an **exciter** for audio broadcasting in frequency modulation capable to transmitting from 87.5 to 108 MHz band with a RF output power adjustable up until to 30 W max.

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

The most important feature of this equipment is that it is extremely compact (only 1HE high); another importat feature is the constructive and usable simplicity.

The Blues30 has a modular design: the various functions are performed by modules connected directly to male and female connectors or to flat cables that are fitted with connectors at the ends. This type of design facilitates maintenance and module-replacement operations.

The machine has got a built-in coder and therefore it is been setup for LEFT and RIGHT inputs or it can be configured to operate in Mono/MPX mode i.e. by disabling the stereo coder and using the "left" inputs as the "mono" input and a BNC connector as composite broad band input (MPX), useful when transmitting in stereophony using an external stereo coder.

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5. Installation and operation

5.1 Preparation

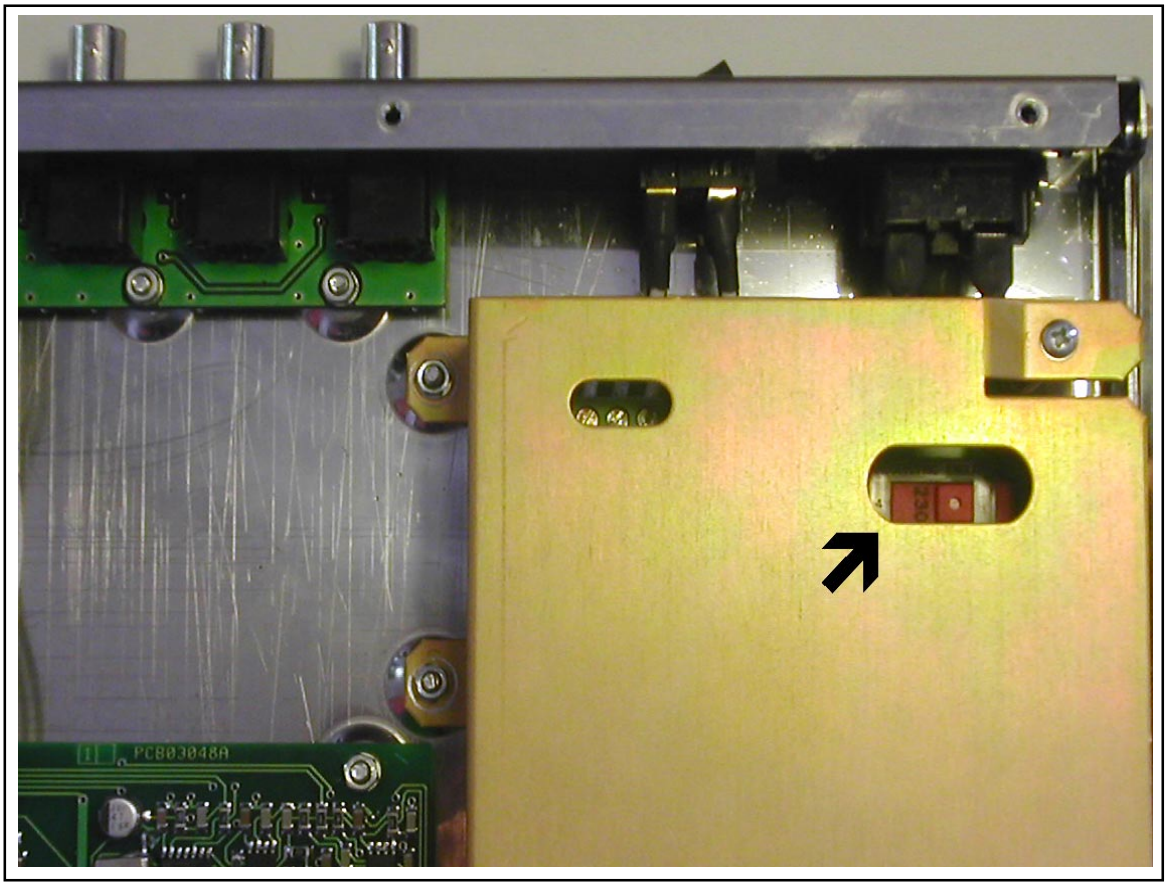
Unpack the exciter and before doing any other operation, be sure it has not been damaged during transport. In particular check that all the connectors are in perfect condition.

The exciter is fitted with a switch located on the machine's back panel that totally cuts out the machine's mains power supply. Check that the main switch of the BLUES30 is “0”.

The exciter is setup for a 230V mains power supply unless otherwise agreed upon with the customer at order placement.

In order to change the mains voltage setting, open the upper cover of the exciter and use a small screwdriver to adjust the selector located on the upper side of the power supply unit (as shown in the figure).

The value of the current operating voltage is shown on the selector.



Warning: The machine must be disconnected from the mains power supply when this operation is performed.

Connect the RF output of the exciter to the antenna cable or to a dummy load capable of dissipating the power generated by BLUES30.

Turn trimmer "Pwr Adj." counterclockwise to minimize the emitted power.

Plug the mains cable into the specific VDE base.

Note: The mains system must be grounded to assure operator safety and proper working efficiency of the equipment.

Connect the audio cables of your signal source to the respective connectors at the back of the exciter. The machine can run either in Stereo (Left and Right inputs), Mono or MPX mode (compound input). See chapter 7 for the description of the connectors.

5.2 Operation

Energize the exciter by putting the switch placed on the rear panel in the “I” position (on).

The following parameters should be set before deliver power:

- Operating frequency
- Input impedance
- Pre-emphasis
- Audio level
- Operating mode (Stereo, mono or MPX)

A few seconds after power-up, the exciter's PLL locks the operating frequency and this activates the exciter power distribution. The machine's routine operating status is indicated by the lighting up of the PLL LOCK LED.

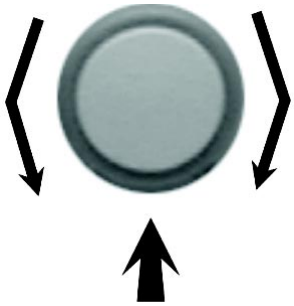
Turn trimmer "Pwr Adj" clockwise to increase delivered power up until the required level. Blues30 does not need to be supervised while working. However the user may monitor the main parameters and make changes to the configuration via the machine's control software.

5.3 Encoder

The control system of the Blues30 is made up of a LCD and a knob (the encoder) by means of which to set and check all configurations.

The interaction between the user and exciter’s control software is performed using the encoder as you can see in next figure:

Turn the encoder counterclockwise to move the cursor left, to decrease the value of a parameter or to choose an element from a list of possibilities.



Turn the encoder counterclockwise to move the cursor right, to decrease the value of a parameter or to choose an element from a list of possibilities.

Push the button once to enter in the desired menu, to enter in modification mode or to confirm a choise.

The following operations may be performed on the encoder:

- **rotation:** to scroll through the menus or change the selected values.
- **pressing:** to select the parameter to be changed and accept the new set value.

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6. Software

The machine is fitted with a 2-line LCD that displays a set of menus. Some menus have written "Push to Program": in this case press the encoder to change the parameter.

Next chapter describes, in sequence, all the menus.

6.1 Menu

6.1.1 Default menu

The default menu, which appears on turning on the machine, shows the exciter's most important parameters, namely:

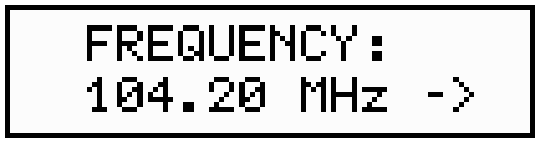
- Set frequency
- Forward power in Watts (FWD)
- Reflected power in Watts (REF)

All menus are accessed from this menu by turning the encoder clockwise or counterclockwise. For simplicity's sake we have described the sequence of menus with the knob turned clockwise.

6.1.2 Frequency setting

The frequency selection can be set up from a minimum of 87.50MHz to 108MHz in step of 10kHz.

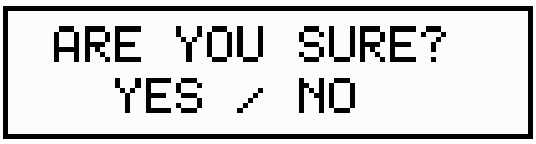
Through this menu, pressing encoder button, you can approach to frequency work setting:



On accessing this screenful, the cursor blinks on the MHz frequency value: turn the knob for selecting the required frequency from 87 to 108 MHz and then press the encoder to confirm.

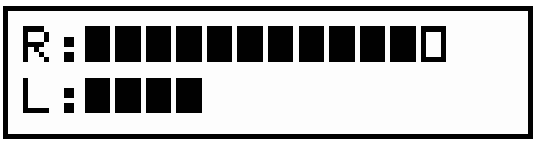
Now the cursor blinks on the order of kHz: repeat the same operation previously described to execute fine frequency selection .

On completing settings, the cursor blinks on the arrow. Press arrow to access the menu for confirming or not new frequency:



Select "Yes" to confirm, the "LOCK" LED on the front panel will go off for a few seconds until the VCO does not lock the new set up frequency.

6.1.3 Channels menu



The instantaneous levels of the inputs of the right and left channels are shown by means of horizontal bars as shown in the figure.

The empty rectangle indicates level that it corresponds to the total variation of 100% reported to every channel.

6.1.4 Unclipped Menu

This menu shows, through an horizontal bar, the modulation level with limiter of modulating signal disable.

The empty rectangle in the bar corresponds to the 75 kHz deviation level.

6.1.5 Clipped Menu

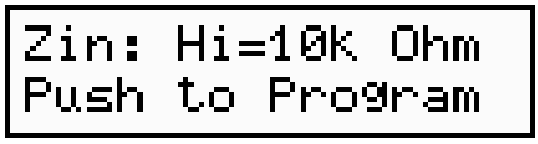
This menu shows, through an horizontal bar, the modulation level with limiter of modulating signal enable.

The empty rectangle in the bar corresponds to the 75 kHz deviation level.

6.1.6 Clipper Action Menu

This screenful shows, through an horizontal bar, limited modulation levels of the Blues30. When the audio source has been well adapted to the input level of the exciter (or vice versa), the bar should be empty.

6.1.7 Impedance Menu



The menu shows the value currently set for input impedance of the XLR audio connectors.

Press the encoder to access the screenful for setting the impedance:

Turn the encoder and choose between 600Ω inputs or high-impedance inputs (greater than 10 kΩ). On having accepted (or denied) the selection, you will come back to previous menu.

6.1.8 Sensitivity Menu

Through this menu you enter in the section to modify the input level sensitivity (report to right “R” and left “L” inputs placed on rear panel). You can change its value from -6 to +6 dBm with 3dBm step. Fine regulation of level is made through trimmer placed on rear panel (figure 7.2 note [12] and [13]).

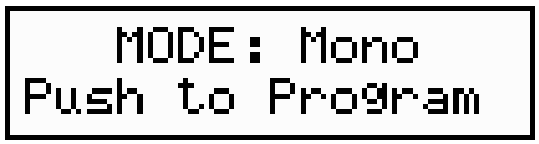
Turn the encoder in this screenful until the cursor reaches the required interval and then press the encoder to make the selection. On having accepted (or denied) the selection, you will come back to previous menu.

6.1.9 Pre-emphasis Menu

This screenful shows the currently entered pre-emphasis value. Press the encoder to go to the screenful for changing setting choising between no pre-emphasis (lin), 50 or 75µs:

Turn the encoder to select the required option and press the encoder to confirm the selection. On having accepted (or denied) selection, you will come back to previous menu.

6.1.10 Mode Menu



With this menu, user can modify the type of emitted modulation by the machine and at the same time select input from which it comes the modulating audio signal. Setting up the "Mode" parameter on "Mono" the machine will select the signal present on connector XLR "Left/mono"; selecting the "MPX-ext" value it will come used the signal present on connector BNC "MPX" coming from a remote stereo coder.

Finally, selecting the "MPX-int" value the integrated stereo coder will be activated, that it guarantees the best separation and a low level of harmonic distortion; then will come uses the right and left signals presents on connectors XLR “Left” and “Right”.

Turn the encoder to select the required mode with the cursor and press the encoder to make the selection. On having accepted (or denied) the selection, you will come back to previous menu.

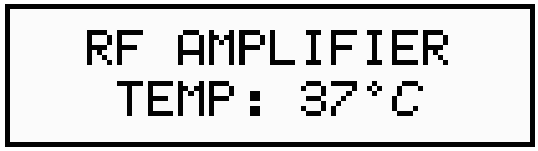
6.1.11 Limiter Menu

This menu indicates the current status (ON or OFF) of the Blues30 built-in limiter. The task of the limiter is to keep modulation within the limits set forth in certain countries even if at one point the level of the audio or MPX signal at input will exceed the set one for achieving 100% modulation. Press the encoder to go to the setting screenful:

Turn the encoder to select the activation or the deactivation of the limiter and press it to make the selection. On having accepted (or denied) the selection, you will come back to previous menu.

6.1.12 Temperature Menu

This menu indicates the RF amplifier temperature.



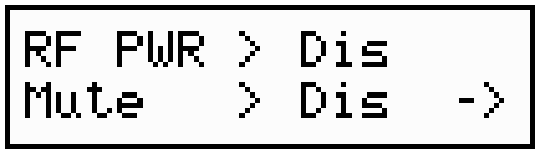
6.1.13 Power Good Menu

From this menu, user can set up Power Good value and the time with mute audio input, in seconds, before an alarm signal comes activated on “STATUS CTRL” connector placed on rear panel (see figure 7.2 note [16]).

The Power Good function is a distributed power check and an alarm function. When output power is under Power Good threshold value, machine closes “STATUS CTRL” connector state.

You can set machine so that, after a time interval with mute audio input, an alarm signal comes activated.

To change parameters value, enter in modify menu pressing the encoder and modify “RF PWR” voice choosing the threshold power you want, or modify “MUTE” voice choosing interval time in seconds. In this moment this function is disable “T:Dis”.



6.1.14 About Menu

This menu indicates software version.

6.1.15 Firmware Menu

From this menu you can load data to update software. Pushing encoder (Push to Program) the software, through RS232 connection, receives data for upload.

This operation can be made from qualified staff only, following the appropriate instructions supplied from R.V.R. Electronica.

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7. Panels Description

This chapter describes the items located in the front and rear panels of the Blues30 and a brief description of each.

7.1 Front Panel

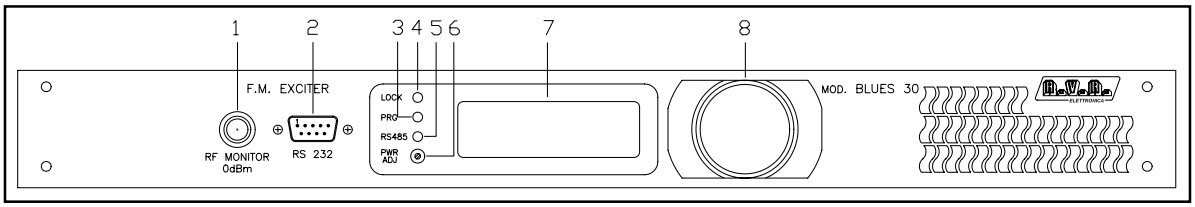


Figura 7.1

[1]	R.F. Monitor 0dBm	Output at max 0 dBm , adapted to modulation monitoring. Do not use it for spectral analysis.
[2]	RS232	DB9 connector for interconnection with other devices and for factory parameters programming.
[3]	PRG	Yellow LED, lit during machine programming
[4]	LOCK	Green LED, lit when the PLL is locked on the working frequency
[5]	RS485	Yellow LED, it indicates activity on the seriale door
[6]	PWR ADJ	Trimmer for power regulation - "A.G.C" control
[7]	DISPLAY	LCD Display
[8]	CONTRAST	Encoder and push-button for software control

7.2 Rear Panel

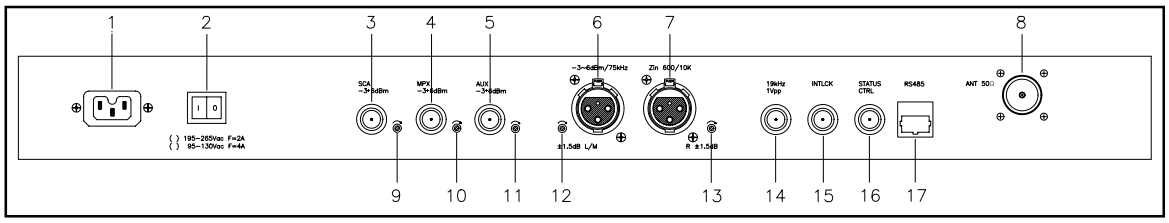


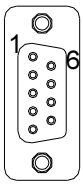
Figura 7.2

[1] PLUG	Mains supply connector
[2] SWITCH	Main switch
[3] SCA	BNC connector for SCA/RDS input
[4] MPX	BNC connector for MPX input
[5] AUX	BNC connector for AUX input
[6] LEFT	XLR balanced connector for Left or Mono channel audio input
[7] RIGHT	XLR balanced connector for Right channel audio input
[8] ANT 50Ω	RF output connector, type N 50Ω
[9] SCA ADJ.	Adjustment trimmer for SCA1 input level
[10] MPX ADJ.	Adjustment trimmer for MPX input level
[11] AUX ADJ.	Adjustment trimmer for AUX input level
[12] L/M ±1.5dB	Adjustment trimmer for Left or Mono channel audio input
[13] R ±1.5dB	Adjustment trimmer for Right channel audio input
[14] 19 kHz 1Vpp	BNC output for the 19 kHz pilot tone. This can be used for external devices synchronization.
[15] INTLCK	BNC interlock in connector: the exciter is forced in stand-by mode when the inner conductor is grounded.
[16] STATUS CTRL	BNC Power Good connector: it is conductor when power is under Power Good threshold value
[17] RS485	Not used (Classified to future uses)

7.3 Connectors Description

7.3.1 RS232

Type: DB9 female



1	Not connected
2	RX
3	TX
4	Not connected
5	GND
6	Not connected
7	Not connected
8	Not connected
9	Not connected

7.3.2 Balanced input XLR

Tipo: XLR female

1	GND
2	Positive
3	Negative

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8. Technical specifications

8.1 Physical specifications

Panel Dimension	483 mm (19”) x 44 mm (1 3/4”) (1 HE)
Depth	344 mm (13 1/2”)
Weight	5 Kg
Temperature range	-10 °C ÷ 50 °C

8.2 Electrical specifications

Frequency	87.50 ÷ 108.00 MHz (60.00 ÷ 87.50 MHz special version available)
Stability	±1 ppm from -10°C to +50°C
Power	0 ÷ 30 W continuously adjustable
Audio Input	L/R (Bal & Unbal), SCA, AUX/RDS, Z10k/ 600Ω/-6..+6dBm
Audio BW	30Hz ÷ 15KHz ±0.25dB in 20kHz < -50dB
Distorsion	< 0.1% under all condition
Stereo separation	65 dB typical from 30 to 15000 Hz
S/N	< -85 dB in 20 kHz band not de-emphasized
Spurious and harmonic emissions	Better than -75 dB and -100 dB

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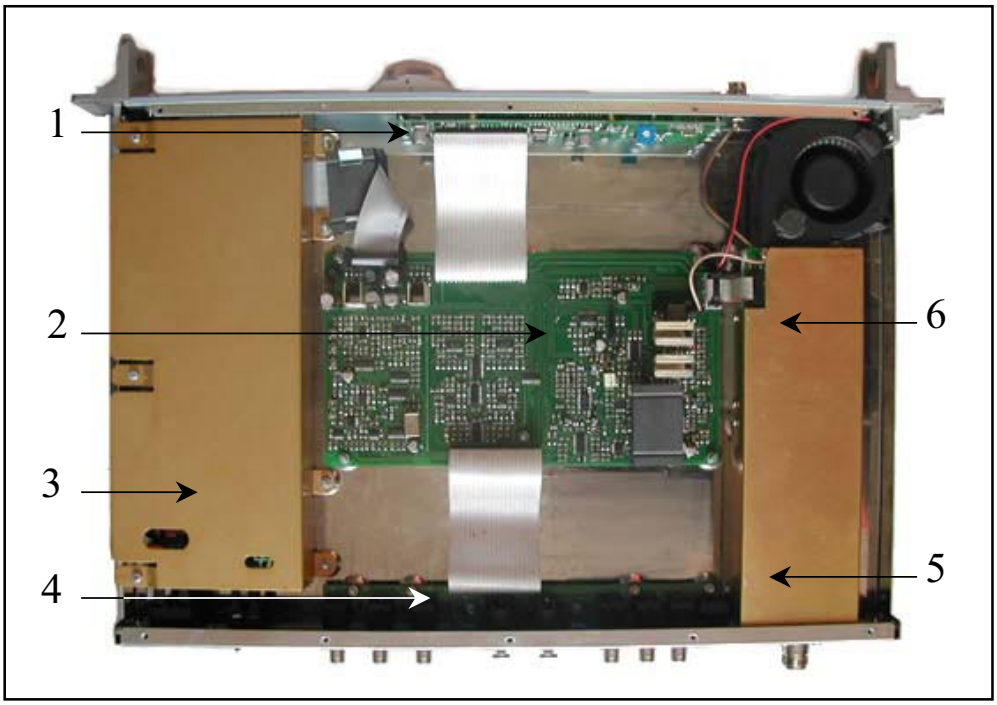
9. Modules Identifications



[1] Logic Board
[2] Main Board
[3] Switching Power Supply
[4] Input Board
[5] Directional Coupler
[6] R.F. Amplifier

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