R.V.R. ELETTRONICA

BLUES30NV

USER MANUAL

VOLUME1

BROADCAST EQUIPMENT

Manufactured by R.V.R ELETTRONICA S.p.A. Italy

File Name: BLUES30NV V2_ING_1.0.indb

Version: 1.0

Date: 29/10/2010

Revision History

Date	Version	Reason	Editor
29/10/2010	1.0	First Version (Version 2)	J. H. Berti

BLUES30NV - User Manual
Versione 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.

CE

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IMPORTANT

The symbol of lightning inside a triangle placed on the product, evidences the operations for which is necessary gave it full attention to avoid risk of electric shocks.

The symbol of exclamation mark inside a triangle placed on the product, informs the user about the presence of instructions inside the manual that accompanies the equipment, important for the efficacy and the maintenance (repairs).

1. Preliminary Instructions

• General foreword

The equipment in object is to considering for uses, installation and maintenance from “trained” or “qualified” staff, they conscious of the risks connected to operate on electronic and electrical circuits electrical.
The “trained” definition means staff with technical knowledge about the use of the equipment and with responsibility regarding the own safety and the other not qualified staff safety place under his directed surveillance in case of works on the equipment.
The “qualified” definition means staff with instruction and experience about the use of the equipment and with responsibility regarding the own safety and the other not qualified staff safety place under his directed surveillance in case of works on the equipment.

WARNING: The machine can be equipped with an ON/OFF switch which could not remove completely voltages inside the machine. It is necessary to have disconnected the feeding cord, or to have switched off the control panel, before to execute technical operations, making sure himself that the safety connection to ground is connected.
The technical interventions that expect the equipment inspection with circuits under voltage must be carry out from trained and qualified staff in presence of a second trained person that it is ready to intervene removing voltage in case of need.

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.

WARNING: The equipment is not water resistant and an infiltration could seriously compromise its correct operation. In order to prevent fires or electric shocks, do not expose the equipment to rain, infiltrations or humidity.

Please observe all local codes and fire protection standards during installation and use of this unit.

WARNING: The equipment has to its inside exposed parts to risk of electric shock, always disconnect power before opening covers or removing any part of this unit.

Fissures and holes are supplied for the ventilation in order to assure a reliable efficacy of the product that for protect itself from excessive heating, these fissures do not have to be obstructed or to be covered. The fissures doesn’t be obstructed in no case. The product must not be incorporated in a rack, unless it is supplied with a suitable ventilation or that the manufacturer’s instructions are been followed.

WARNING: This equipment can irradiate radio frequency energyand if it’s not installed following the instructions contained in the manual and local regulations it could generate interferences in radio communications.

WARNING: This device has a connection to ground on the power cord and on the chassis. Check that they are correctly connected.

Operate with this device in a residential ambient can cause radio disturbs; in this case, it can be demanded to the user to take adequate measures.

Specifications and informations contained in this manual are furnished for information only, and are subject to change at any time without notice, and should not be construed as a commitment by **R.V.R. Elettronica SpA**.
The **R.V.R. Elettronica SpA** assumes no responsability or liability for any errors or inaccuracies that may appear in this manual, including the products and software described in it;and it reserves the right to modify the design and/or the technical specifications of the product and this manual without notice.

• Warning regarding the use designated and the use limitations of the product.

This product is an transmitter radio indicated for the audio broadcasting service in frequency modulation. It uses working frequencies that are not harmonized in the states of designated user.
The user of this product must obtain from the Authority for spectrum management in the state of designated user the appropriate authorization to use the radio spectrum, before putting in exercise this equipment.
The working frequency, the transmitter power, let alone other specifications of the transmission system are subject to limitation and definited in the authorization obtained.

2. Warranty

R.V.R. Electronics S.P.A. guarantees absence of manufacturing defect and the good operation for the products, within the provided terms and conditions.

Please read the terms carefully, because the purchase of the product or acceptance of order confirmation, constitutes acceptance of the terms and conditions.

For the last legal terms and conditions, please visit our web site (WWW.RVR.IT) wich may also be changed, removed or updated for any reason without prior notice.

Warranty will be void in cases of opened products, physical damage, misuse, modification, repair by unauthorised persons, carelessness and using the product for other purpose than its intended use.

In case of defect, proceed like described in the following:

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**).

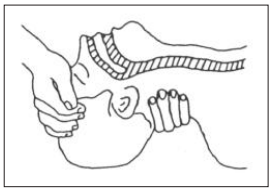


Figure 1

- 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**).

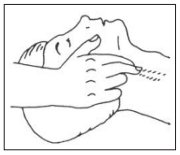


Figure 3

Figure 4

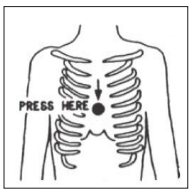


Figure 5

- 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. General Description

The **BLUES30NV** is an **exciter for** Frequency Modulated audio **broadcasting** in a frequency modulation able to transmit in the band between 87.5 and 108 MHz, in step of 10 KHz, with an RF output power adjustable up to a maximum of 30 W into a 50 Ohm standard load.

The **BLUES30NV** is designed to being contained into a 19" rack box of 1HE.

I **BLUES30NV**, prodotto dalla **R.V.R. Elettronica SpA**, è un **eccitatore per radiodiffusione** audio in modulazione di frequenza in grado di trasmettere nella banda fra 87.5 e 108 MHz in passi da 10kHz, con potenza RF di uscita regolabile fino ad un massimo di 30 W su un carico standard da 50Ohm.

Il **BLUES30NV** è progettato per essere contenuto in un box per rack 19" di 1HE.

4.1 Unpacking

The package contains:

- 1 **BLUES30NV**
- 1 User Manual
- 1 Cavo di Alimentazione da Rete

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

- **Accessories, spare parts and cables**

4.2 Features

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

Important features of the **BLUES30NV** are the extremely compactness, the great simplicity of construction and use, and the presence of built-in high-performance coder stereo. **BLUES30NV** futhermore was designed to be modular: its various functions are carried out 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.

The machine is ready for both LEFT and RIGHT inputs, thanks to the stereo coder; or can be configured to operate in Mono/MPX mode, i.e. excluding the stereo coder and using LEFT inputs such as MONO input and BNC, always-on, such as MPX broadband input, which is useful when you want to transmit in stereo using an external stereo coder.

Optionally the machine can be furnished with AES\EBU digital inputs.

The RF power section uses one MOSFET module able to deliver 30 W.

The working frequency is assured by a thermally-compensated, reference oscillator working within a phase-locked loop (PLL). The **BLUES30NV** reaches frequency lock within a maximum of 30 seconds.

The **BLUES30NV** is able to work in all range frequency without calibration and setting operation.

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

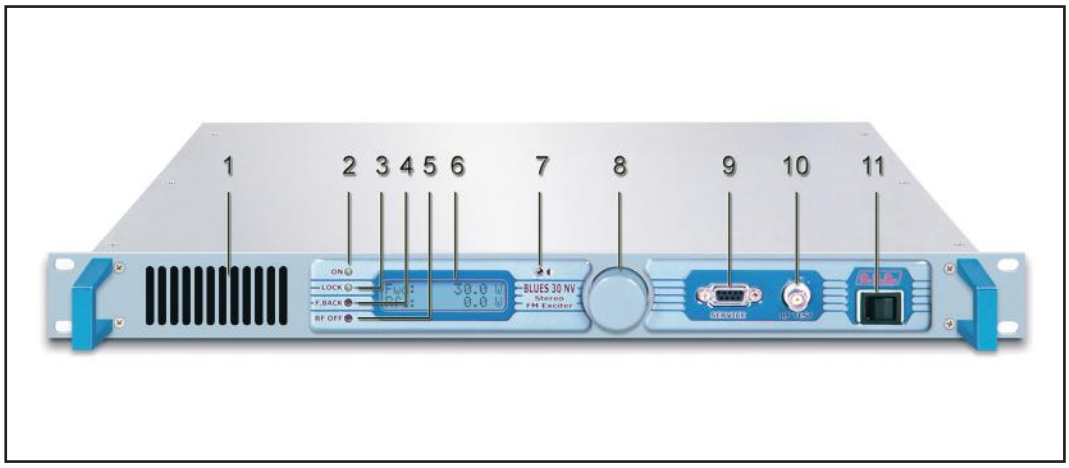
- Setting of output power
- Setting of working frequency
- Setting of Mono or Stereo operation
- Setting of preemphasis
- Setting of impedance on Left&Right and MPX channels.
- Activation and deactivation of power delivery
- Activation and deactivation of clipper operation
- Measurement and display of the working parameters of the exciter
- Communications with external devices

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

The exciter's management software is based on a menu system. The user can navigate between the various submenus by using the knob (encoder) placed on front panel.

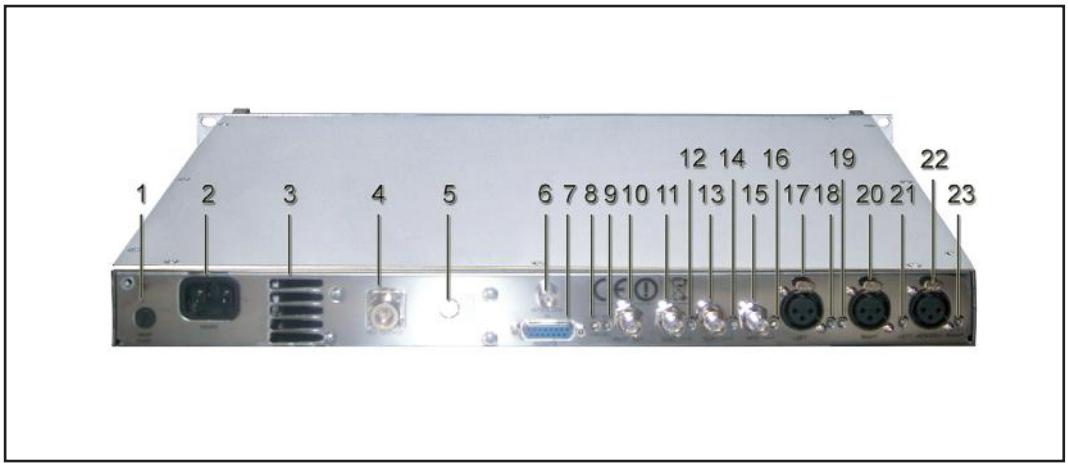
On rear panel there are Mains connector, audio input and RF output connectors, telemetry connector, protection fuse, two inputs for modulated signals on subcarriers from special external encoders normally used in Europe for RDS (Radio Data Systems) transmission.

4.3 Frontal Panel Description



[1]	AIR FLOW	Grid for the passage of the air flow of the forced ventilation.
[2]	ON	Green LED, lit when the exciter is working or that is ready in RF power.
[3]	LOCK	Green led, lit when the PLL is locked on the working frequency
[4]	F.BACK	Yellow LED, lit when the foldback function is operating (automatic reduction of the delivered RF power).
[5]	RF OFF	Yellow LED, lit when the exciter's power output is inhibited by an external interlock command.
[6]	DISPLAY	Liquid crystals display.
[7]	CONTRAST	Display contrast adjusting trimmer.
[8]	ENCODER	Knob and button in order to software control.
[9]	SERVICE	DB9 connector for factory parameters programming.
[10]	RF TEST	BNC connector for RF test output.
[11]	POWER	ON/OFF switch.

4.4 Rear Panel Description

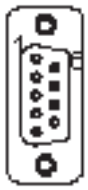


[1] MAIN FUSE	Fuse for mains supply.
[2] MAINS	Standard IEC connector for mains supply 110 ¸ 230 V, +10/-15%.
[3] AIR FLOW	Grid for the passage of the air flow of the forced ventilation.
[4] R.F. OUT	RF output connector, N-type.
[5] RF TEST	Not used.
[6] INTERLOCK IN	BNC input interlock connector: the exciter is forced in stand-by mode when the inner conductor is grounded.
[7] REMOTE	DB15 connector to telemetry the equipment.
[8] FWD EXT. AGC	Trimmer to control the limitation on delivered power in function of the FWD fold input (REMOTE connector).
[9] RFL EXT. AGC	Trimmer to control the limitation on delivered power in function of the RFL fold input (REMOTE connector).
[10] PILOT OUT	BNC output for the pilot tone. This can be used for external devices synchronization (e.g. RDS coders).
[11] SCA 2	BNC connector , for SCA2 input.
[12] SCA2 ADJ	Adjustment trimmer, for SCA2 input.
[13] SCA 1	BNC connector , for SCA1 input.
[14] SCA1 ADJ	Adjustment trimmer, for SCA1 input.
[15] MPX	BNCconnector , for MPX input.
[16] MPX ADJ	Adjustment trimmer, for MPX input.
[17] LEFT-MONO	XLR connector, for balanced LEFT-MONO channel input.
[18] LEFT-MONO ADJ	Adjustment trimmer for the LEFT-MONO channel input.
[19] RIGHT ADJ	Adjustment trimmer for the RIGHT channel input.
[20] RIGHT	XLR connector, for balanced RIGHT channel input.
[21] LEFT-MONO ADJ	Adjustment trimmer for the digital LEFT-MONO channel input.
[22] AES-EBU	Balanced XLR connector for input in AES/EBU digital audio format.
[23] RIGHT ADJ	Adjustment trimmer for the digital RIGHT channel input.

4.5 Connectors Description

4.5.1 Service (**to program of factory parameters**)

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

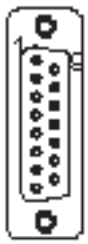
4.5.2 Left (MONO) / Right / AES-EBU

Type: XLR Female

1	GND
2	Positive
3	Negative

4.5.3 Remote

Type: DB15 Female



Pin	Name	Type	Meaning
1	Interlock	IN	By passes power if closed to GND
2	Ext AGC FWD	IN	Ext. signal,1÷12V, for power limitation (AGC)
3	GND		GND
4	SDA IIC	I/O	IIC communication serial data
5	VPA Tlm	OUT anal.	PA power supply voltage: 5V @ 50V
6	FWD tlm	OUT anal.	Forward power: 3,9V @ 30W
7	Power Good	OUT digit.	Open collector, enabled when power exceeds the set threshold.
8	GND		GND
9	GND		GND
10	Ext AGC RFL	IN	Ext. signal, 1÷12V, for power limitation (AGC)
11	SCL IIC	I/O	IIC communication clock
12	IPA Tlm	OUT anal.	PA power supply current: 5V @ 5A
13	RFL Tlm	OUT anal.	Reflected power: 3,9V @ 10W
14	On cmd	IN digit.	One grounded pulse (500 ms) enables power supply
15	OFF cmd	IN digit.	One grounded pulse (500 ms) disables power supply

Optionally:

14	On cmd	IN digit.	a grounded pulse (500 ms) increases the delivered power
15	OFF cmd	IN digit.	a grounded pulse (500 ms) increases the delivered power

4.6 Technical Description

	BLUES 30 NV
Paramaters	***Values***
GENERALS	
Rated output power	30W
Frequency range	FCC -CCIR - OIRT - JPN
Operational Mode	Mono, Stereo, Multiplex
Modulation type	F3E
Primary Power	80 ÷ 260 Vac or 24 Vdc
AC Power Consumption	120 VA / 70W
Phisical Dimensions (W x H x D)	483 x 88 x 394 mm
Weight	5 kg
Environmental Working Conditions	-10 ÷ +50 °C / 95% relative Humidity non condensing
Cooling	Forced, with internal fan
Frequency programmability	From software, with 10 kHz steps
Frequency stability	±1 ppm
Pre-emphasis mode	0/50 (CCIR) µS, 75 (FCC) µS
Spurious & harmonic suppression	<75 dBc (80 typical)
Asynchronous AM S/N ratio	≥65 dB (typical 70)
Synchronous AM S/N ratio	≥50 dB (typical 60)
MONO OPERATION	
S/N FM Ratio	> 80 dB RMS (typical 83 dB)
Frequency Response	< ± 0.5 dB 30Hz ÷ 15kHz (typical ± 0.2 dB)
Total Harmonic Distortion	< 0.1 % 30 Hz ÷ 15 kHz (typical 0.07 %)
Intermodulation distortion	< 0.02 % with 1 kHz and 1,3 kHz tones
MPX OPERATION	
S/N FM Ratio	> 80 dB RMS (typical 83 dB)
Frequency Response	± 0.2 dB 30Hz ÷ 53kHz / ± 0.5 dB 53kHz ÷ 100 kHz
Total Harmonic Distortion	< 0.1% 30Hz ÷ 53kHz
Intermodulation distortion	< 0.05% with 1 kHz and 1,3 kHz tones
INTERNAL STEREO CODER OPERATION	
S/N FM Ratio	> 75 dB RMS (typical 77dB)
Frequency Response	± 0.5 dB 30 Hz ÷ 15 kHz
Total Harmonic Distortion	< 0.05% 30 Hz ÷ 15 kHz
Intermodulation distortion	≤ 0.03% with 1 kHz and 1,3 kHz tones
Stereo separation	> 50 dB 30 Hz ÷ 15 kHz (typical 55 dB)
AUDIO INPUT CONNECTORS	
Left / Right	XLR balanced; Impedance: 10 k or 600 ohm; Level: -13 to +13 dBu
MPX unbalanced/RDS	BNC unbalanced; Impedance: 10 k or 50 ohm; Level: -13 to +13 dBu
SCA/RDS	2 x BNC unbalanced; Impedance: 10 k; Level: -8 to +13 dBu
OTHER CONNECTORS	
RF Output	N (50 ohm)
RF Monitor	BNC (- 30dBr referred to RF output)
Pilot output	BNC (1Vpp)
Interlock Input	BNC
STANDARD COMPLIANCE	
Safety	EN 60215:1989 Safety EN60215/A1:1992-07 EN60215/A2:1994-09
EMC	EN 301 489-1 V1.4.1 (2002-08) EN 301 489-11 V1.2.1 (2002-11)
Radio	EN 302 018-2 V1.2.1 (2005-06)
OPTIONS	
/CW	Morse-coded station ID code generated through FSK (Frequency Shift Keying) function (Please specify station name on order)

5. Quick guide for installation and use

This section provides a step-by-step description of equipment 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 equipment 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 equipment 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 equipment is integrated, be sure to have the Final Test Table supplied with the equipment ready at hand throughout the whole procedure; the Final Test Table lists all operating parameters as set and tested at the factory.*

5.1 Prepation

5.1.1 Preliminary checks

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

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

	Mains Fuse
BLUES30NV @ 90÷260 Vac	**(1x) 3.15A type 5x20**

Table 5.1: ***Fuse***

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

√ 90 VAC÷130 VAC or 180÷250 VAC mains power supply, with adequate earth connection.

√ For operating tests only: dummy load with 50 Ohm impedance and adequate capacity (30W minimum).

√ Connection cable kit including:

- Mains power cable
- Coaxial cable with BNC connectors for interlock signal connection
- RF cable for output to load / antenna (50 Ohm coaxial cable with N-type connector)
- Audio cables between transmitter and audio sources.

5.1.2 Connections

Connect the RF output of the transmitter to the antenna cable or a dummy load capable of dissipating amplifier output power. To begin with, set exciter to minimum output power and switch it off.

Connect the transmitter INTERLOCK IN input to the matching INTERLOCK OUT output fitted on R.V.R. Elettronica equipment to act as hybrid couplers. If your equipment is a different brand, identify an equivalent output.

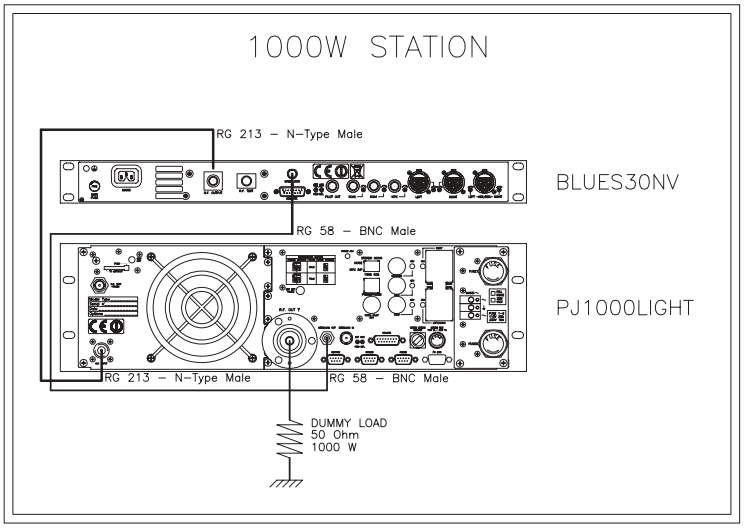


Figure 5.2: ***connections with amplifier***

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

Ensure that the POWER switch on the front panel is set to “**OFF**”.

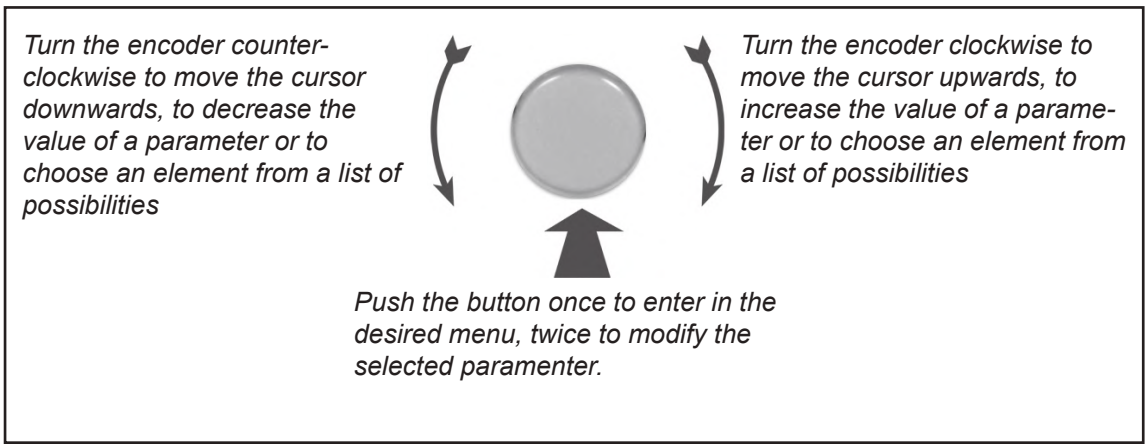
Connect the mains power cable to the MAINS connector on the rear panel.

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

Connect the audio and RDS/SCA signals from user's sources to the transmitter input connectors.

5.1.3 Encoder

The interaction between the user and the exciter control software is performed using the encoder.



The operations that you can perform on the encoder are:

- **rotation**: moves the cursor shown on the display; if you turn the encoder to the left (counterclockwise), the cursor moves downwards, if you turn it right the cursor moves upwards; it also permits to increase or diminish the parameters (turning the encoder left diminishes the paramete.
- **pression**: push the button once when the cursor is on the name of a menu to enter in that menu, push it when the corsor is on the name of a parameter to enter in modification mode (the cursor starts blinking); after the modification of a parameter, push the button to save the new value.

After having modified the value of a parameter, the cursor goes on blinking for approximately 15 seconds, waiting for confirmation from the user. If the user doesn't confirm the new value (i.e., the button is not pressed), the parameter has not saved and remains on the selected parameter.

The first pressure of the encoder when the display is light out, or its rotation, serves in order to activate the retroillumination.

5.2 First power-on and setup

Perform this procedure upon first power-up and each time you make changes to the configuration of the transmitter this component is integrated into.

Note : *Standard factory settings are RF output power off (**Pwr OFF**) and regulated 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.

5.2.2 Power check

Ensure that the **ON** LED turns on. Equipment name should appear briefly on the display, followed by forward power and modulation readings. If the RF output is disabled, those readings will be zero.

When the PLL locks to operating frequency, the LOCK LED will turn on.

5.2.3 How to enable the RF output

Check output power level and set it to maximum level (unless it has already been set) from the Power Setup menu that you will have accessed by pressing the following sequence of key: ESC (opens Default Menu) ⇒ ENTER (hold down for 5 seconds) ⇒ SET ⇒ use keys to set bar to upper limit.

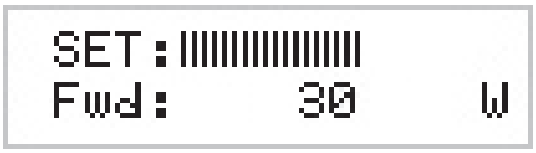
Check the state of the **Pwr** output power by the **Fnc** menu. If it is set to **OFF**, press **ENTER** to bring the selection to **ON**.

5.2.4 Output power level control

NOTE: *The exciter incorporates Automatic Gain Control (AGC) 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.*

To change the power level set, hold for about 5 seconds the ENCODER until to you can get into edit mode.

The screen in edit mode will look like this:



The bottom line gives the instantaneous power (30W in this example), to increase the level, turn to the right to turn to the left. Once you reach the desired level, press the ENCODER to confirm and exit to the default menu. Note that the set value is stored anyway, so if you leave the timeout without pressing any key, the power will be the last level set.

The setting bar at the side of **SET** provides a graphic indication of power setting; please consider that the forward power readout provided on the display (**FWD: xxxx W**) reflects actual output power reading, **which may be lower than regulated power supply when Automatic Gain Control is running in power supply limitation mode** (please read section 5.3 about RF power supply modulation for more details).

Note: *La potenza di uscita può essere regolata attraverso il comando* **Pwr OFF***; in questa condizione, la lettura sul display della potenza di uscita (***Fwd***) sarà 0 (zero), mentre la barra* **SET***, che potete controllare utilizzando i tasti, fornisce un indicazione grafica dell'ammontare di alimentazione che sarà rilasciata nel momento che commuterete nuovamente nello stato a* **Pwr On***.*

5.2.5 Changing the *Power Good* alarm threshold

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

5.2.6 Setting equipment I^2C address

Change the **IIC** address in the **MIX** (Miscellaneous) menu as desired (factory setting is 01).

5.2.7 Adjustments and calibration

The only manual adjustments are the level adjustments and the audio mode adjustment.

The rear panel holds the trimmers for all transmitter inputs. Trimmer identification is printed on the rear panel. Input sensitivity can be set within the limits set out in the tables below through the trimmers:

Input sensitivity:

Input	Figure 6.2	Trimmer	Sensitivity	Notes
SCA1	[13]	[14]	- 8 ÷ +13 dBu	Input level for 7,5 kHz overall deviation (- 20 dB)
SCA2	[11]	[12]	- 8 ÷ +13 dBu	
MPX	[15]	[16]	-13 ÷ +13 dBu	Input level for 75 kHz overall deviation (0 dB)
Left/ Mono	[17]	[18]	-13 ÷ +13 dBu	
Right	[20]	[19]	-13 ÷ +13 dBu	
AES/EBU	[22]	[21] e [23]	-13 ÷ +13 dBu	

When setting input sensitivity, please consider that the default menu reports instantaneous modulation level and an indicator provides a 75 kHz reading. To ensure correct adjustment, apply a signal with the same level as user's audio broadcast maximum level and then adjust using the trimmer until instantaneous deviation matches the 75 kHz reading.

To set subcarrier input levels, you may use the same procedure and option "x10" available in the **Fnc** menu. With this option, modulation level is multiplied by a factor of 10, which means that default menu bar meter reflects a 7.5 kHz deviation.

A special menu with separate indications of Left and Right channel levels and relating indicators of nominal levels for maximum deviation (75 kHz) is provided.

The settings of pre-emphasis, the impedance inputs of L & R, MPX and AES/EBU, and the operation mode of the machine are operation that you can perform through the **Set** menu.

5.3 Operation

1) Power on the exciter and ensure that the **ON** light turns on. Equipment name should appear briefly on the display, quickly followed by modulation and forward power readings (Menu 1), provided that the transmitter is delivering output power.

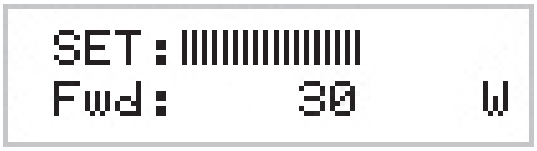
Menu 1: x10 is Off

Menu 1: x10 is On

NOTE: **xMod** identifies that the modulation display mode is selected in **x10** through **Fnc menu.**

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**	≅ **30W output**
50% output power	**1/2 bar**	≅ **15W output**
25% output power	**1/4 bar**	≅ **7,5W output**

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 rotate towards right, to reduce it rotate towards left. When the desired level is reached, press the encoder to confirm and exit to the predefined menu. Note that the set value is stored anyway, so if you pass the time-out without pressing a key, the power will remain at the last set level.

NOTE: This feature prevents the equipment from delivering maximum power as soon as output is enabled from menu 4, or in the event the equipment is already set to **ON** when you energise it.

2) Ensure that the equipment is not in a locked-out state. Push the encoder to call up the selection screen (menu 3). Highlight Fnc and then confirm by pushing the encoder and access the selected menu (menu 4).

   Nel caso che la voce **PWR** sia impostata su OFF, ossia disabilitazione dell'erogazione di potenza, posizionarsi tramite il cursore su tale voce. Premendo l'encoder verrà modificata la voce in ON, ossia attivazione dell'erogazione.

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

WARNING: Equipment is capable of delivering more than rated output power of 30 W; however, never exceed the specified power rating.

NOTE: If power is set to 0 W in the **Power Setup Menu**, the INTERLOCK OUT contact is activated and any external appliances connected to it are immediately inhibited.

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

Normally, the equipment 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 equipment features an LCD with two lines by 16 characters that displays a set of menus. The figure below provides an overview of equipment 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.

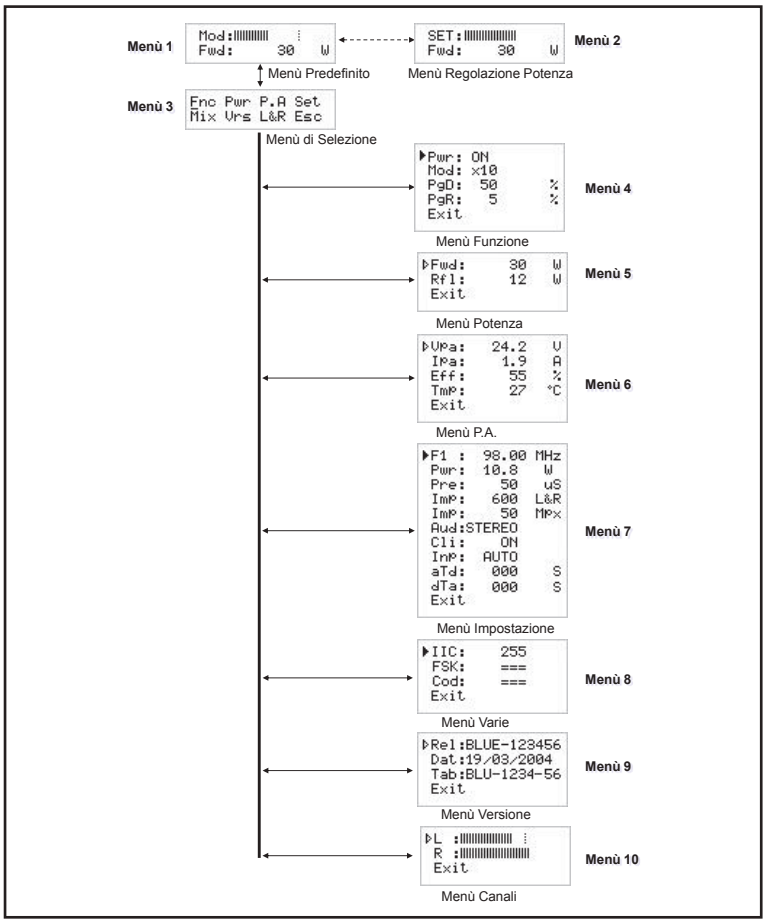


Figure 5.2

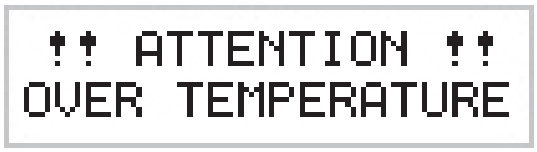
The first pressure of the ENCODER when the display is light out, or its rotation, serves in order to activate the retroillumination.

The pressure of encoder when the display is switched on, while you are in the predefined menu (menu 1), serves in order to shown the following **selection screen** (menu 3) from which you can access to all the other menus:

Menu 3

If you instead want to go back to the predefined menu, is sufficient select the **ESC** entry then push the encoder.

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:



State 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.

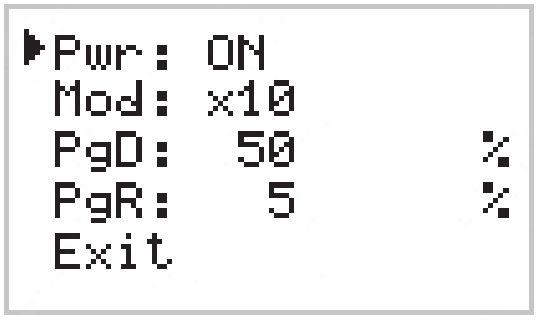
State 2

To gain access to a submenu, select menu name (name is highlighted by cursor) using button or and press the encoder.

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 and then press and hold the encoder 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” or “PgR” and edit its value and press the ecnoder to confirm.



Menù 4

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

`Mod` Modifies modulation display (toggles between “x1” and “x10”). In “x10” mode, instantaneous deviation indication is multiplied by a factor of 10, and the bar meter on the default menu will reflect 7.5 kHz instead of 75 kHz. This display mode is convenient when you wish to display low deviation levels, such as those caused by pilot tone or subcarriers.

`PgD` 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 30 W, not to the supplied forward power. If a value equal to 50% is setted, it will correspond indifferently to 15 W from the set up power. The Power Good function is a control and alarm function on the supplied power. When the output power fall under the threshold value of Power Good set, the machine modifies the pin state [7] of “Remote” DB15 connector on the rear panel.

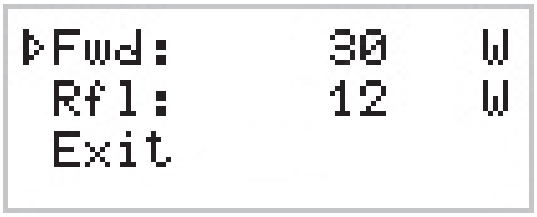
`PgR` Regulation of the Power Good threshold relative to the forward power. The percentage value of Power Good is referred to the nominal power of the machine, that is 3W, not to the supplied forward power.If a value equal to 5% is set, it will correspond to 1,5 mW indifferently from the set up power.

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.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

5.4.2 Power menu(Pwr)

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



Menu 5

`Fwd` Visualization of the Forward Power.

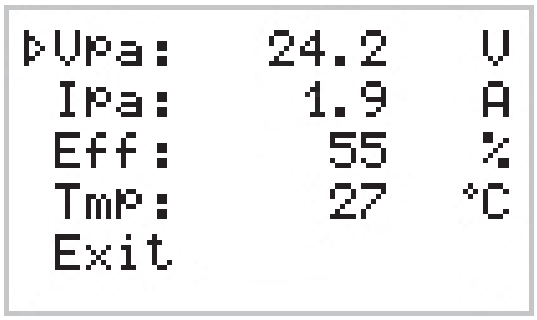
`Rfl` Visualization of the Reflected Power.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

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

5.4.3 Power Amplifier Menu (P.A)

This screen, consisting of four lines that can be scrolled, shows to the user the measures relating to the final power amplifier of the equipment:



Menu 6

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

`VPA` Visualization of the amplifier module voltages.

`IPA` Visualization of the amplifier module current.

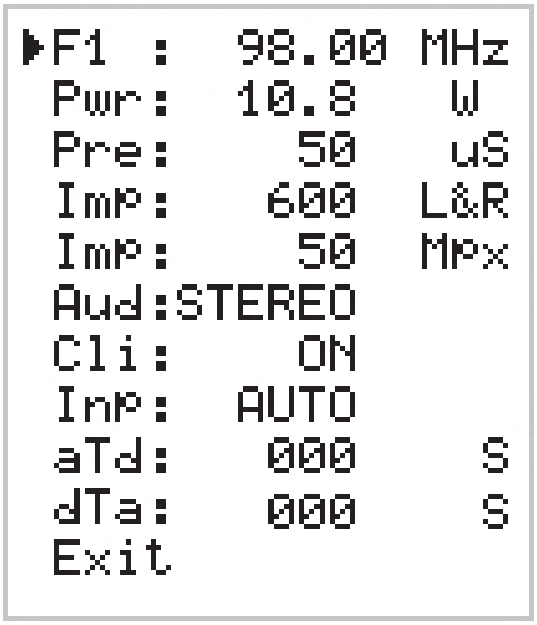
`Eff` Visualization of the efficiency as ratio between the forward and reflected power of the amplifier module, expressed in percentage (FWD Pwr/(Vpa x Ipa) %).

`Tmp` Equipment internal temperature reading.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

5.4.4 Settings Menu (Set)

This menu lets to read the working power to read and set the working frequency.



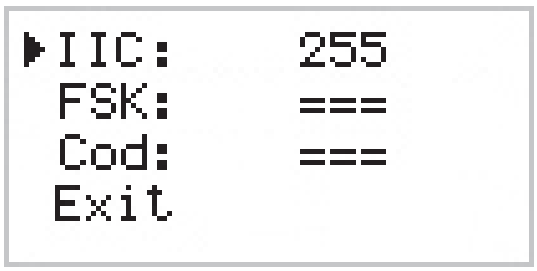
Menu 7

F1	Regulation of set up frequency. After having set a new frequency value, press the encoder 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 let the timeout go by, the frequency will remain set at the previous value.
Pwr	Visualization of the set up power. In order to modify the power regulation, use the **predefined menu** like previously described or the **Set** menu.
Pre	Regulation of the preemphasis, selectable between 0 µs, 50 µs and 75 µs.
Imp	Regulation of the Left and Right channel input impedance, selectable between 10 kΩ or 600 Ω.
Imp	Regulation of the MPX channel input impedance, selectable between 10 kΩ or 50 Ω.
Aud	Regulation of audio modality selectable between STEREO and MONO.
Cli	Enable or disable the clipper operation.
Inp	Regulation of input mode selectable between AUTO (automatic mode), digital or analogic.
aTd	Regulation of exchange time between analog and digital.
dTa	Regulation of exchange time between digital and analog.
Exit	The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

5.4.5 Miscellaneous Menu (Mix)

This menu allows you to set the machine's address in a serial bus connection (I^2C type).

The exciter normally does not come supplied with FSK option inserted. For this reason the parameters to it connect are not modifiable and come represent to by means ===. In case the option FSK were present in the supplied version, carefully read how much brought back in chapter 5.5.1.



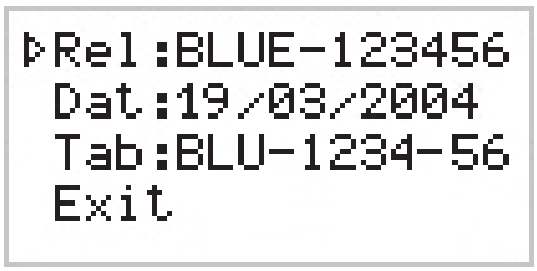
Menu 8

`IIC` Regulation of the I^2C address. The I2C network address is important when the exciter is connected to a company's transmission system that envisages use of this protocol. We recommend you do not modify it without a good reason.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

5.4.6 Version Menu (Vrs)

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



Menu 9

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

`Rel` Visualization of the software release.

`Dat` Visualization of the date release.

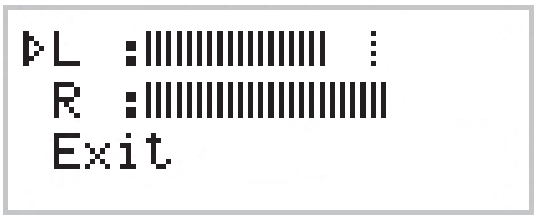
`Tab` Visualization of the release of the configurations table loaded in memory.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

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 Right channel Vmeter.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

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.***

The factory setting for frequency shift is +10KHz and code repetition period is 60 minutes (please contact R.V.R. Elettronica if you need different settings), whereas station identified may be programmed by the user following the indications provided in section below.

When the FSK option is fitted, an FSK submenu is added to the **selection menu**.

Menu 11

Press the encoder when FSK is highlighted in the selection menu to access the FSK submenu:

Menù 12

`IIC` Regulation of the I²C address. The I2C network address is important when the exciter is connected to a company's transmission system that envisages use of this protocol. We recommend you do not modify it without a good reason.

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

`Cod` Visualization of the code normally transmitted.

`Exit` The entry allows to the user the prompt exit from current submenu and goes back to the **predefined menu**.

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.
- 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.

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).

Configuration of the telemetry DB15F connector (Remote):

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

6. Identification of the Modules

The **BLUES30NV** is made up of various modules linked to each other through connectors so as to make maintenance and any required module replacement easier.

6.1 Upper view

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

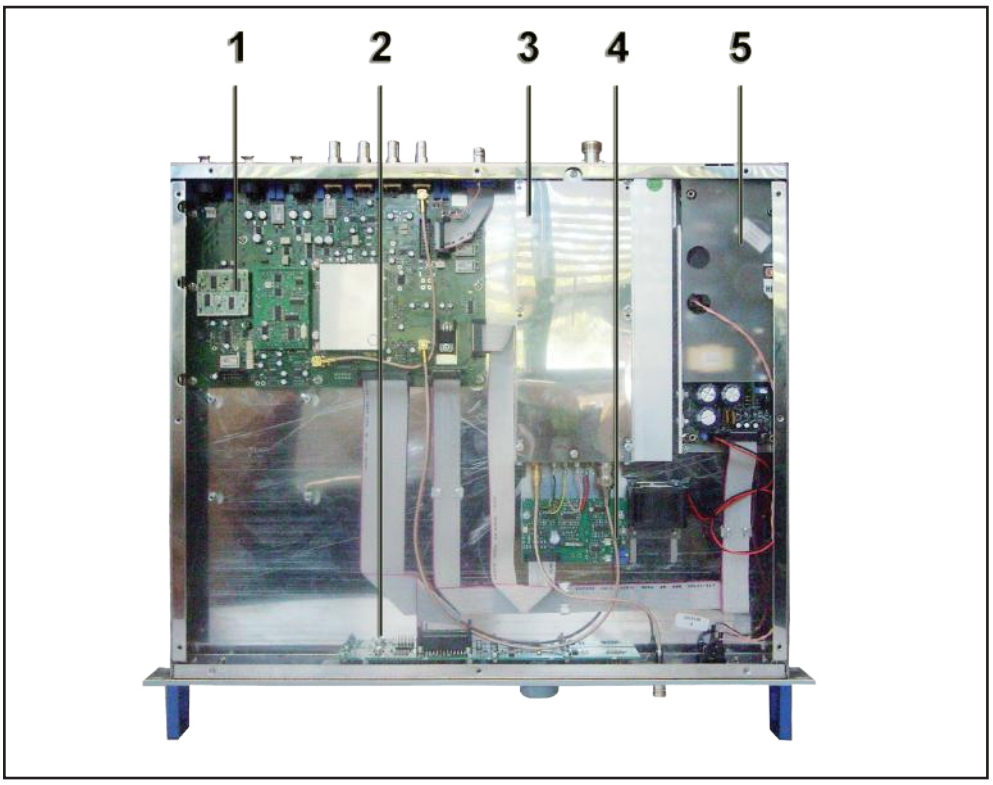


figure 8.1

[1] Main Board, Stereo Coder & VCO Section (**SL158MA1003**, **SLCTC30V03** & **SLPTXVC1002**)
[2] Panel Card (**SL040PC1001**)
[3] RF Board (**SLPA30WMOS02**)
[4] Control Card (**SL037BI1004**)
[5] Power Supply (**PS24185UIBL2**)

7. Working Principles

A schematic view of the modules and connections making up the BLUES30NV with the telemetry board is shown in figure 7.1.

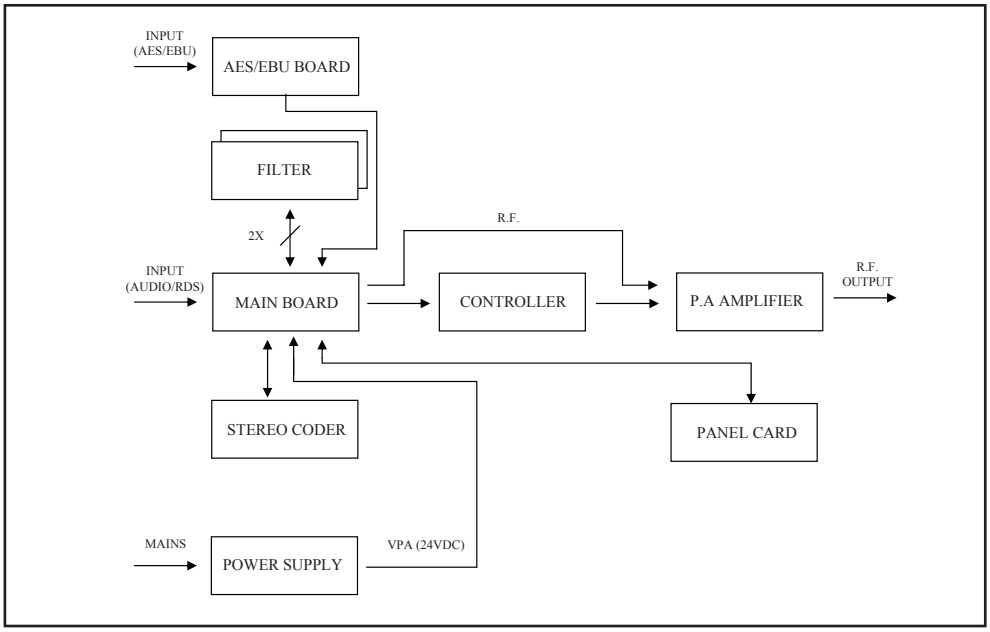


Figure 7.1

A brief description of each module's functions is given below, whereas the complete diagrams and layout of the cards are given in the "Technical Appendix" Vol.2.

7.1 Power Supply

The BLUES30NV power supply unit is a switching-type unit whose 28,5 V main output powers the machine's RF amplifier. The power supply also features stabilizers for generating continuous 5 V and 18 V voltages for supplying the other equipment circuits. Note that the power supply is a "direct from mains" type, or rather it is without a transformer, and it can be connected to any voltage between 95 and 250 V without any adjustments or manual settings.

7.2 Panel board - CPU

The panel board contains the microcontroller (PIC18F452) that implements the equipment control software, the display and the other components needed to interface with the user.

The board is connected with the other machine modules, both for power supply distribution and for the control and measures.

7.3 Main Board

The main board carries out the following functions:

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

7.3.1 Audio input section

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

- 15 kHz filtering of the left and right channel
- Stereophonic Coding
- Preemphasis
- Mono, MPX and SCA channel mixing
- Clipper (limits the modulating signal level so that the frequency deviation does not exceed 75 kHz)
- Modulating signal measurement

7.3.2 PLL/VCO section

This board section generates the modulated radiofrequency signal. It is based on a PLL scheme that uses an integrated MB15E06 type.

The digital PLL section is composed of an high-stability oscillator controlled in temperature and of a digital circuit that carries out the division and the comparison of the working frequency. The oscillator generates a frequency of 10 Mhz that comes divided in order to generate a fixed signal at 1 kHz.

This signal comes sended to the comparator/divisor digital circuit who confront it with the signal generated from VCO, divided in base of exciter working frequency.

The AFC signal, in output of comparator, comes sended to the varicap diodes places on VCO card and added to audio signal coming from from the Coder card.

The Voltage Controlled Oscillator (VCO) generates the signal on the exciter working frequency, than in its turn it comes amplified to a level nearly 3/5mW (5/8dBm), necessary for being able to pilot the R.F. Power Amplifier block.

7.4 Power amplifier

The final power stage is enclosed in a totally shielded metal container fixed to the central part of the device.

The RF signal coming from the main board reached the pilot, it come amplified and sent to the final stage which takes care of final amplification up to 30W.

The amplifier is made in three stages. The first is made with one BFG35, the second with three BFG35 in parallel, and the last with one BLF245.

In addiction 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 delivered in case of presence of high-level reflected power
- Measures of the forward and reflected power by means of directional couplers
- Measures of the current absorbed by the power amplifier
- Measures of the temperature
- Low-pass filtering of the RF signal in output

This board also features an RF sampling of approximately 7dBm at 30W with respect to the output, which is available on a BNC connector below the transmitter output connector. This sample is is useful for verifying the characteristics of the carrier, but not for verifying those of upper harmonics.

7.5 Control board

The main function of this board is to check and correct the MOSFET polarization voltage of the RF amplifier section.

It also provides the measurement of the absorbed current and contains a circuit for signaling power supply unit faults.

If no alarms are present, the voltage is adjusted only depending on the set output power, with a feedback mechanism based on the reading of the power really delivered (AGC).

The voltage is also affected by other factors, such as:

- Excess of reflected power.
- External AGC signals (Ext. AGC FWD, Ext. AGC RFL).
- Excess of temperature.
- Excess of absorbed current from the RF module.

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