TRDS4001

User Manual
Volume 1

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

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TRDS 4001 - User Manual
Version 5.2

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R.V.R. Elettronica SpA
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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.

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. 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.
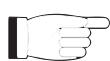
WARNING: always disconnect power before opening covers or removing any part of this unit.
Use appropriate grounding procedures to short out capacitors and high voltage points before servicing.
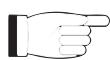
WARNING: This is a "CLASS A" equipment. In a residential place this equipment can cause hash. In this case can be requested to user to take the necessary measures.

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 (twentyfour) month warranty.

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

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

R.V.R.'s 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

Warranty shall come into force from invoice date and for the period of the manufactures warranty.

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. within five (5) days from its receipt.

To claim your rights under this warranty:

a. Contact the dealer or distributor where you purchased the unit. Describe the problem and ask if he has an easy solution. 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.

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

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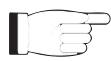
DO NOT RETURN UNITS WITHOUT OUR AUTHORIZATION AS THEY WILL BE REFUSED.

a   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 order 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 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

*   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
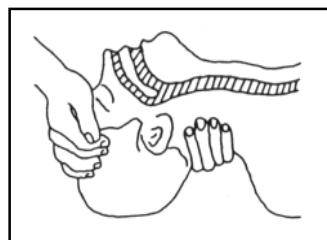

Figure 1   Figure 2

*   Check carotid pulse (**Figura 3**); if pulse is absent, begin artificial circulation (**Figura 4**) depressing sternum 1 1/2" TO 2" (**Figure 5**).
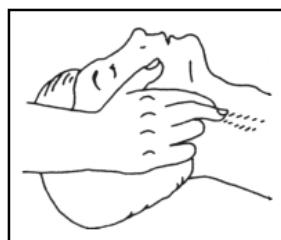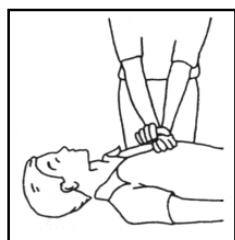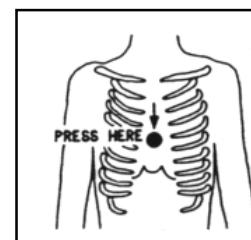

Figura 3   Figura 4   Figura 5

*   APPROX. 80 SEC. : ONE RESCUER, 15 COMPRESSIONS

*   APPROX. 60 SEC.: TWO RESCUERS, 5 COMPRESSIONS, 1 BREATH

*   DO NOT INTERRUPT RHYTHM OF COMPRESSIONS WHEN 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 (Cleansed available cloth article).

- 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
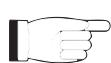
Do not give alcohol

3.2.2   Less severe burns (1st and 2nd degree)

- 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

4.1 Introduction

The necessity to immediately know the working parameters of several device in a system or to transmit with all the several units which have to manage a firm, is a more and more greater need in all circles.

The cordless broadcasting , for its simple installation and its great pliability, appears as the more suitable solution in many circles.

In the broadcasting field too, the need to transmit not only the radio signals, but also data package of different kinds, is already strongly felt for many years, because it allows to better the quality and the reliability of the available services and at the end to implement the new ones.

This necessity is also felt in the international field, so much that a proper research team has constituted itself to identify the different necessities and to determine a broadcasting standard which would appear more proper for the sector.

The team has reached the "RADIO-DATA-SYSTEM (RDS)", which appears todays the data broadcasting system more used in the radio field.

The TRDS4001 system allows to transmit, with the radio signal (mono or stereo), a data channel as specified in the paper "Specification of the radio data system (RDS)", which is issued by the European Committee for Electrotechnical Standardization (CENELEC) Ref. N° EN 50067.

4.2 RDS System Description

The RADIO-DATA-SYSTEM is proper for the transmission of information in mono/stereo programs of VHF/MF (87.5-108 Mhz).

It satisfies the requested requirements to the transmission of supplementary data on radio programs:

1) Compatibility with the current mono/stereo transmissions;

2) Absence of interferences towards the adjacent programs;

3) Compatibility with other identification systems which are already working.

The system, selected by an international specialistic team, allows the data transmission at a speed of 1187.5 bit/sec with phase modulation at two levels , carrier wave 57 Mhz and range ±2 Khz.

The broadcasted binary signal is in advance put out on a differential codification.

The registry of transmission is at packages of lenght 104 bits (87.6 ms) named GROUPS, each of them composed of 4 blocks of 26 bits.

Every block is composed of 16 bits of information and of 10 bits of protection, which are properly studied to allow the recovery of an erroneous word with a maximum of 5 wrong bits.

They are provided with 16 separete blocks of which 6 are still not defined; every group begins with a PI identification code (Program Identification) which has the double intent to synchronize the receiver and to identify the channel which transmits the signal.

The pourpose of the encoder TRDS4001 is to manage the principal services defined by the standard CENELEC EN 50067 as: PI, PS, PTY, TP, AF, TA, DI, M/S, PIN, RT, EON, TDC, IH, CT.

As follows, we'll mention a short description about the function of each of these services.

PI - PROGRAM IDENTIFICATION: it's the identification code of the radio. Its more important application is to allow the receiver, in case of bad reception, to implement the "Automatic Frequency Change"; this happens when there is a signal with the same PI and of better level than the syntonized one.

PS - PROGRAM SERVICE: it's the visualized text on the receiver display, which has to be of maximum 8 characters, as this is the standard dimension of receivers displays. The TRDS4001 characteristic is to store up to 8 messages and the time of transmission of each of them. Every message can be composed from 1 to 16 words of 8 characters, and it's possible to select the permanence time on the display of each of the 16 separate words.

PTY - PROGRAM TYPE: it's the identification of the "Program Type" which is on air (example News, Sport, Rock, etc.) It's used to qualify on the receiver the automatical research of the program type desired.

TP - TRAFFIC PROGRAM IDENTIFICATION: this service indicates with a signal on the receiver display that the program we're receiving includes traffic news.

AF - ALTERNATIVE FREQUENCIES: it's the frequencies list of different transmitters which transmit the same program in the adjacent receiving areas. The list is memorized by the receiver and used to reduce the commutation time beetwen the different transmitters of the same program.

TA - TRAFFIC-ANNOUNCEMENT IDENTIFICATION: it' used to indicate to the car-driver that the traffic news are on air. The receiver could use the signal in one of the following modes:

a)   To switch automatically from the Tape (or from the Compact Disk) to the radio;

b)   To automatically switch on the radio when the traffic news begin;

c)   To automatically change over from a station which doesn't transmit traffic news;

M/S - MUSIC/SPEECH SWITCH: it's used to modify the music and the spoken volume one by one.

PIN - PROGRAM- ITEM NUMBER: it's used to plan the receiver to receive certain programs at preselected date and hour.

RT - RADIOTEXT: it's used to transmit the text trasmission; this function is mainly for the domestic application (house receivers).

EON - ENHANCED OTHER NETWORKS: it's used to transmit the PI,PS,AF,PTY to the PIN of other radios.

TDC - TRANSPARENTE DATA CHANNEL: it's used for the data transmission and it could be free used, for example, to send messages on a brighltly sign.

IH - IN HOUSE APPLICATION: it's used to transmit data of exclusive use of the broadcaster and it can be utilized , for example, to send telemetry data, software, etc.

4.3   Encoder External Description

The coder TRDS4001 is composed of a 19'', 1HE and 250 mm depth rack.

4.3.1   Front Panel
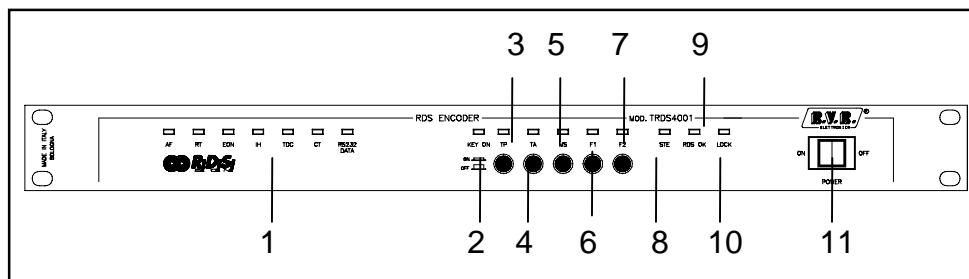
1   LEDS 7 green leds indicating some functions of the RDS encoder
2   KEY ON
          Led indicating that one of the keys is pressed
3   TP   Switch and led to insert/remove and see the status of the TP bit
4   TA   Switch and led to insert/remove and see the status of the TA bit
5   M/S   Switch and led to insert/remove and see the status of the M/S bit
6   F1   Switch and led to insert/remove and see the status of the F1 bit (reserved for future use)
7   F2   Switch and led to insert/remove and see the status of the F2 bit (reserved for future use)
8   STE   green LED, when lit it indicates the detection of the 19 kHz tone in the MPX input

9 RDS OK

> green LED, when lit it indicates the correct generation of the RDS signal with additional RDS DECODER FILTER card (reserved for future uses, normally turn off)

10 LOCK   green LED, when lit it indicates that the inner PLL is locked on the RDS carrier

11 ON   mains switch

4.3.2   Rear panel
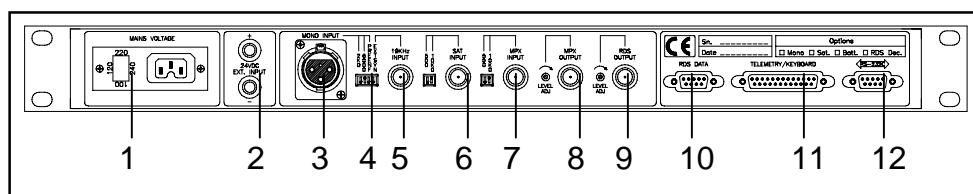
1   Mains   Mains plug and valtage changer

2   Vdc   24 V dc in

3   Mono   Mono XLR input (activated only with /M "Mono input option")

4   Dip Sw Dip switch to select the impedance of MONO and the synchronism of pilot tone from the BNC input at side or MPX line

5   19kHz   Pilot tone input

6   SAT   optional auxiliary input

7   MPX IN

> BNC connector for MPX input

8   MPX OUT

> BNC connector for MPX+RDS output

9   RDS   BNC connector for RDS output

10 RDS   DB9 connector for RDS data (not implemented)

11 TELEMETRY

> DB25 connector for auxiliary I/O

12 RS232 DB9 connector for serial programming of the encoder

4.4   Software

The software in kit in italian and english language, on a CD-Rom supplied, allows actually to set eight different RDS messages, each of 16 words and a maximum of 25 alternative frequencies; every message automatically starts at the hour of the day specifically preselected from the user. Moreover, it allows to manage all the services, which are listed in the foregoing section.

All the ENCODER management applications are configurable with a IBM-compatible personal computer, which has to be connected with a serial cable to the encoder.

After having configured the encoder, the PC can be disconnected.
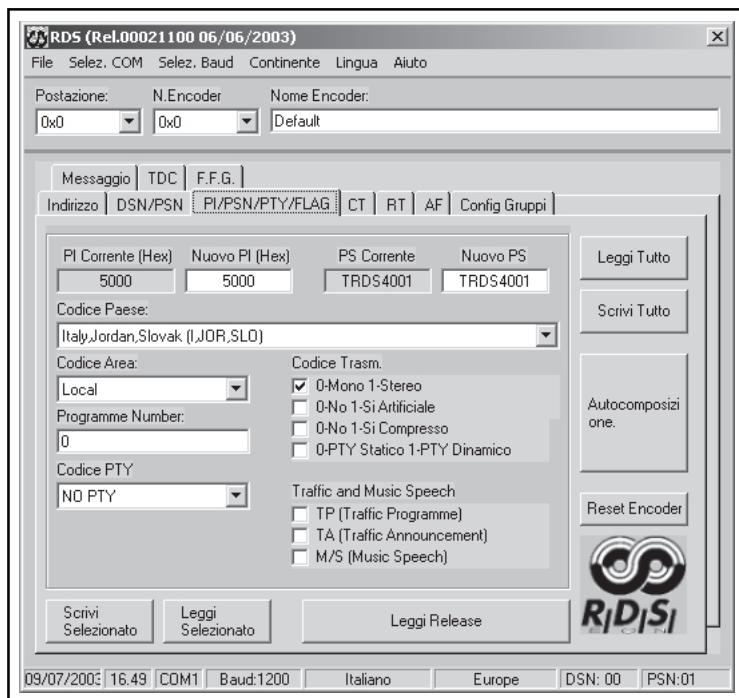
The software and the new version can be download directly from the R.V.R. web site.

For more info you can see WINRDS User Manual.

4.5 Technical Specifications

Electrical Specifications

RDS Signal	as in CENELEC EN 50067 specs
Codification	Differential at two levels
Modulation	DSB with suppressed carrier
Frequency	57 kHz
Range	±2.4 kHz
MPX INPUT	0/12 dBu
OUTPUT	MPX + RDS
MPX output level	Inp MPX
RDS output level	20-1000 mVpp
Output impedance	100 Ohm
RDS user messages	16 words of 8 characters, whose 2 with data and transmission time
Alternative frequencies	25
Message change	with IMB-compatible PC
Connection	RS232-C standard
Speed	1200 baud by factory, up to 19200 baud
RS232-C connector	9 Pin D-Sub Female
Message management	checked with a microchecker
Data preservation	10 years (in absence of power supply)
A.C. supply	115-125 V, 50-60 Hz
	230-250 V, 50-60 Hz
D.C. supply	24V
Power consumption	15 VA

Physical Specifications

Rack dimensions	44.0mm (1.7") H
	360.0mm (14.15")W
	245.0mm (9.7")D
Panel dimensions	483.0mm (19") W
	44.0mm (1.7") H
Operating temperature	- 10°C to 50°C
Humidity	90% max, non condensing
Weight	3.5 Kg

5. Electrical Description

5.1 Introduction

This chapter describes the TRDS4001 ENCODER function . For utility, the device is divided in subassemblies which will be deeply discussed in the following paragraph.

5.2 Power Supply

The power supply section is composed from a transformer (115-125-230-250 V) which supplies the voltages of 11-0-11 V, afterwards they are reduced from the power supply to +5, +8 and -8 V necessary to feed the cards of analogic section and digital logic, included on the RDS encoder.

The 24V input section (now it is standard), in case of mains absence, automatically commutes the feeding on the external battery, therefore guaranteeing the continuity of the service.

5.3 RDS Circuit

It presents a microchecker which manages the production of RDS message. The setted RDS message is preserved also in absence of primary power supply.

The RDS carrier wave at 57 Khz is produced on locking at the 19 Khz one of MPX signal in input for the stereo transmission systems, or with an internal quartz oscillator for the mono transmission systems. In the stereo systems the stereo led lights. The into codifier microchecker could immediately modify the transmitted message; that guarantees the system very much fexible and adattable at the different custumers necessities.

5.4 Mono PB Filter Card (Only For TRDS4001/M)

The /M option (*Mono Input Option*), enables the Mono input (XLR connector) placed on the rear of the encoder (chap. 4.3.2 - [3]), in conjunction with the shifting of JP8 jumper present on RDS Coder card that must be place in 2-3 position (see the figure below). This card have the only function of filtering at 15 kHz of Mono input.
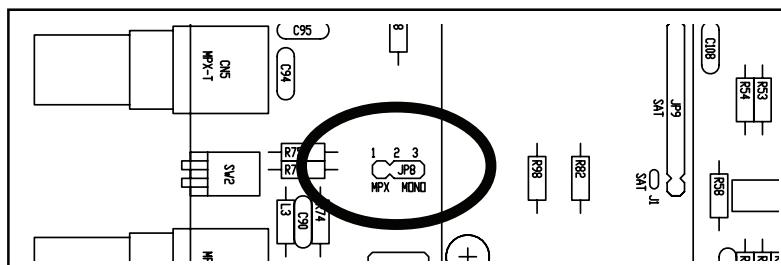
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6. Installation Procedures

6.1   Introduction

This chapter contains the useful information for the TRDS4001 installation and preliminary check-in.

The R.V.R. ELETTRONICA S.p.A. supplies the following equipment:

1. N. 1 19" 1U rack, which contains the TRDS4001 RDS codifier;

2. N. 1 VDE cable for the A.C. supply of the system;

3. N. 1 CD-Rom with WinRDS software;

4. N. 1 pin to pin DB9 serial connection cable, male and female;

5. Manual.

In case of the personal computer is not equipped of a DB9 type serial gate, but of a DB25 type one, the cable has to be realized as showed in the following screen:
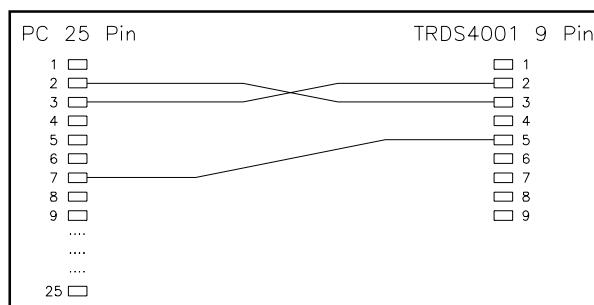
6.2   Unpacking

Unpack the equipment and, before any other operation, check the unity for any shipping damage and check that all controls placed on the front and the rear panel are useable.

6.3   Installation Instructions

For the installation and the use of the system are necessary the following not supplied accessories:

1. Cables for the mono and stereo signals entrance to the TRDS4001 (BNC side TRDS4001);

2. Cables for the connection between codifier and transmitter (BNC side TRDS4001);

For a right TRDS4001 codifier working, it's important to observe with attention as follows:

1) The TRDS4001 coder has to be installed immediately before the transmitter, either for stereo transmissions or the mono ones.

2) The connections has to be realized with most possible short screened cables. We recommend cables not longer than 3 meters.

3) Realize with care the input and output connections in order to reduce drones and background noises.

4) Place the codifier far from heat sources and in not directely sun radiations facing areas.

5) Check that the range voltage which will supply the system is as desired.

6) Make a backup copy of the CD supplied with the equipment before use it.

7) Do not open the rack containing the system.

8) Clean the system only with a dry and soft cloth in order to avoid finishings damages.

9) In case of damages, switch off the system and contact directely the firm R.V.R. ELETTRONICA s.p.a.

6.4 Hardware Installation

The TRDS4001 RDS encoder can be connected to an exciter basically in two ways:

- it can add the RDS signal to a MPX input signal and then supply the resulting baseband signal to an exciter accepting MPX input or,

- it can just generate the RDS signal synchronized with an external 19 kHz pilot tone

The following figure gives a schematic example of the two ways of installing the encoder.
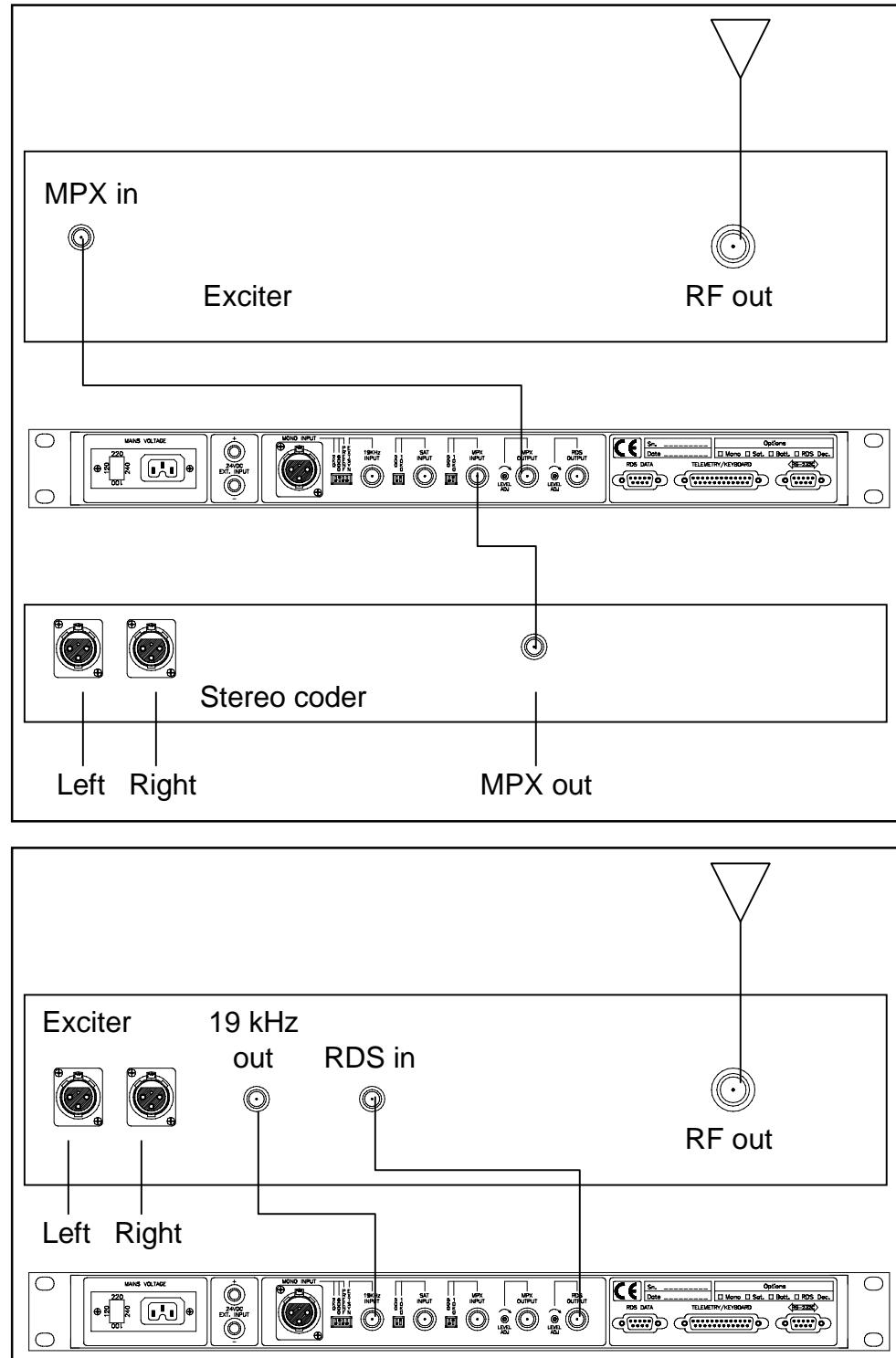
If all the connections have been right realized, the coder will be working in 2-3 seconds and sending the RDS messages.

It doesn't need any adjustment because it's already set before the ship; the MONO or MPX signal is 0dBu (about 2,2 Vpp).

In different cases, it's necessary be equipmented of a modulation analyzer tipically calibrated at 2-2,5 kHz @ 0 dBu respect the MPX level.

6.5   Software Installation

About software installation and more information you can see WINRDS User Manual.