R V R ELETTRONICA TRDS4001 Broadcast Systems User Manual

Contents

R V R ELETTRONICA TRDS4001 Broadcast Systems

Product Information

Product Name	TRDS4001
Manufacturer	Italy
File Name	CAPITOLI_EN.P65
Version	5.2
Date	23/06/2006

Product Description:
The TRDS4001 is a piece of electronic equipment manufactured by R.V.R. Elettronica SpA in Italy. It is a device used for RDS (Radio Data System) encoding and decoding.

Contact Information:

- **Manufacturer:** R.V.R. Elettronica SpA
- **Address:** Via del Fonditore 2/2c – 40138 – Bologna (Italy)
- **Telephone:** +39 051 6010506
- **Fax:** +39 051 6011104
- **Email:** info@rvr.it
- **Website:** www.rvr.it

Product Usage Instructions

Preliminary instructions

- This manual is written as a general guide for those who have previous knowledge and experience with this type of equipment. It is not intended to contain a complete statement of all safety rules that should be observed when using this or other electronic equipment.
- The installation, use, and maintenance of this equipment involve risks for both the personnel performing them and the device itself. Therefore, it should only be used by trained personnel. R.V.R. does not 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 when operating 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, the user may be requested 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.

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

Date	Version	Reason	Editor
23 /03/01	4. 0	First Version	D.Canazza
15/07/03	5 . 0	Reduced Version	D.Canazza
19/06/06	5. 1	Technical Specifications Upgrade	J.H.Berti
23/06/06	5. 2	Manual modernization, removed /SAT, added / M	J.H.Berti

TRDS 4001 – User Manual
Version 5.2

R. V.R. Elettronica SpA

1. Via del Fonditore 2/2c – 40138 – Bologna (Italy)
2. **Telefono:** +39 051 6010506
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Preliminary instructions

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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. 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 manufacturer 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:

- 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 aboutproblems 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.
- 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.
- 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 (ie., 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.
    - Be sure to enclose a written technical report that mentions 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

First Aid

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

Treatment of electrical shocks

If the victim is not responsive follow the A-B-C's of basic life support

- Place the victim flat on his back on a hard surface.
- Open airway: lift up the 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 an airtight seal, and four quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible

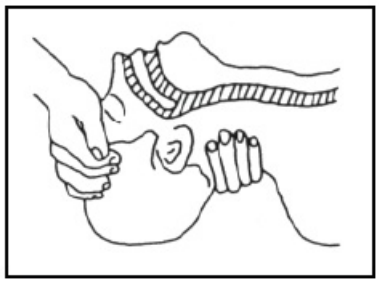


Figure 1

Figure 2

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

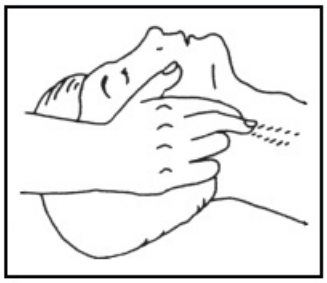


Figura 3

Figura 4

Figura 5

- **APPROX. 80 SEC.:** ONE RESCUER, 15 COMPRESSIONS
- **APPROX. 60 SEC.:** TWO RESCUERS, 5 COMPRESSIONS, 1 BREATH
- DO NOT INTERRUPT THE RHYTHM OF COMPRESSIONS WHEN THE SECOND PERSON IS GIVING BREATH
- Call for medical assistance as soon as possible.

If the 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

Treatment of Electrical Burns

Extensive burned and broken skin
Cover the area with a 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 the 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 the 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

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 a clean dry dressing if necessary.
- Treat the victim for shock as required.
- Arrange transportation to a hospital as quickly as possible
- If arms or legs are affected keep them elevated.

General Description

Introduction

- The necessity to immediately know the working parameters of several devices in a system or to transmit with all the several units that have to manage a firm is a greater and 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, the need to transmit not only radio signals but also data packages of different kinds is already strongly felt for many years because it allows to better quality and reliability of the available services and in the end implementation of new ones.
- This necessity is also felt in the international field, so much so that a proper research team has constituted itself to identify the different necessities and to determine a broadcasting standard that would appear more proper for the sector.
- The team has reached the “RADIO-DATA-SYSTEM (RDS)”, which appears today as the data broadcasting system more used in the radio field.
- The TRDS4001 system allows transmission, 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

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 that are already working.

- The system, selected by an international specialistic team, allows 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 length 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 separate 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 that transmits the signal.
- The purpose 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.

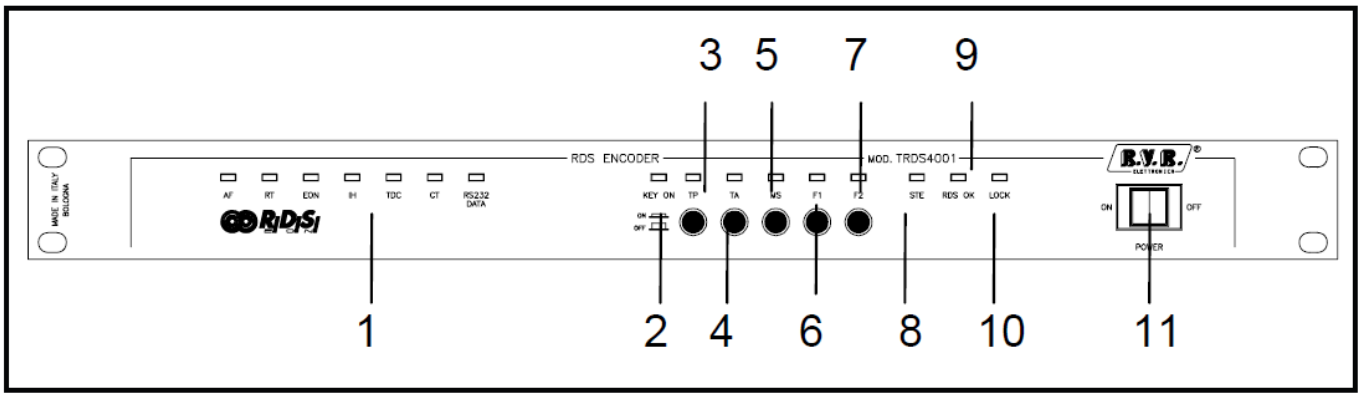
As follows, we'll mention a short description of the function of each of these services.

- **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 a 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 receiver 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 (for example News, Sports, Rock, etc.) It's used to qualify the receiver for the automatic 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 frequency list of different transmitters that 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 is on air. The receiver could use the signal in one of the following modes:
    - To switch automatically from the Tape (or from the Compact Disk) to the radio;
    - To automatically switch on the radio when the traffic news begins;
    - To automatically change over from a station that 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 a preselected date and hour.

- **RT – RADIOTEXT:** it's used to transmit text transmission; this function is mainly for domestic applications (house receivers).
- **EON-ENHANCED OTHER NETWORKS:** it's used to transmit the PI, PS, AF, and PTY to the PIN of other radios.
- **TDC – TRANSPARENTE DATA CHANNEL:** it's used for data transmission and it could be freely used, for example, to send messages on a bright 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.

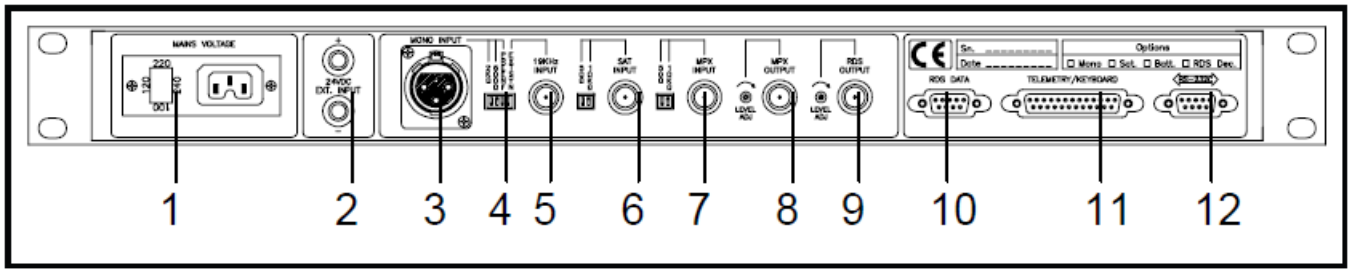
Encoder External Description
The coder TRDS4001 is composed of a 19″, 1HE, and 250 mm depth rack

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 lead 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 indicates the detection of the 19 kHz tone in the MPX input
9. RDS OK green LED, when lit indicates the correct generation of the RDS signal with an additional RDS DECODER FILTER card (reserved for future uses, normally turned off)
10. LOCK green LED, when lit indicates that the inner PLL is locked on the RDS carrier
11. ON mains switch

Rear panel

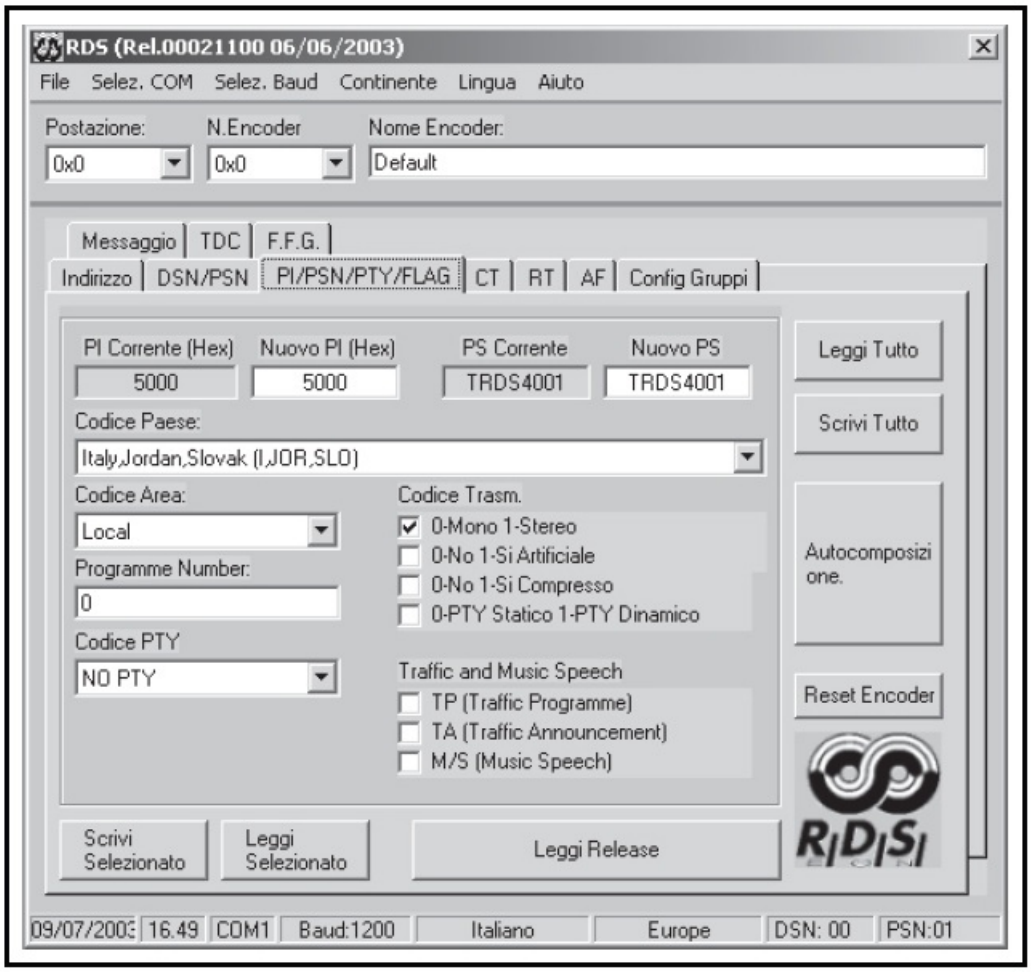


1. Mains Mains plug and voltage changer
2. Vdc 24 V dc in
3. Mono Mono XLR input (activated only with /M “Mono input option”)
4. Dip Sw Dip switch to select the impedance of MONO and the synchronism of pilot tone from the BC input at the side or MPX line
5. 19kHz Pilot tone input
6. SAT optional auxiliary input
7. MPXIN BNC connector for MPX input
8. MPXOUT BNC connector for MPX+RDS output
9. RDS BC connector for RDS output
10. RDS DB9 connector for RDS data (not implemented)
11. TELEMETRY DB25 connector for auxiliary I/O
12. R$232 DB9 connector for serial programming of the encoder

Software
The software in the kit in Italian and English languages, 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 of all the services, which are listed in the foregoing section.

All the ENCODER management applications are configurable with an 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 downloaded directly from the R.V.R. website.

- For more info, you can see the WINDS User Manual.

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

Electrical Description

Introduction

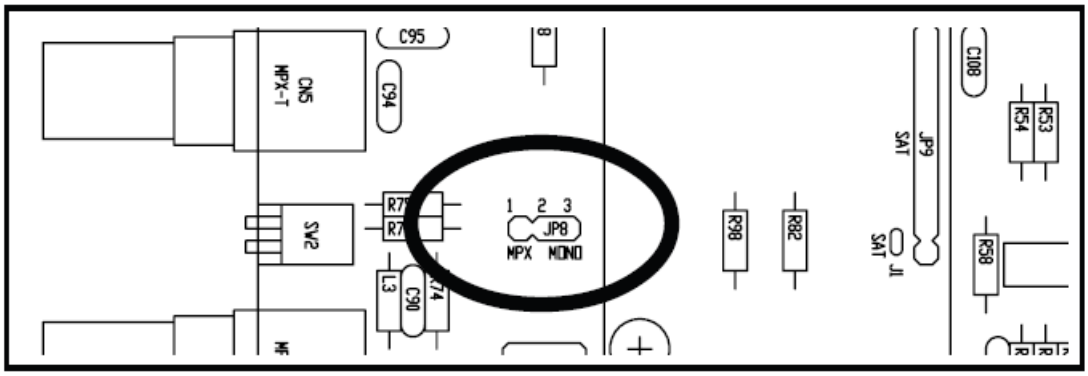
This chapter describes the TRDS4001 ENCODER function. For utility, the device is divided into subassemblies which will be deeply discussed in the following paragraph.

Power Supply

The power supply section is composed of 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 the 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.

RDS Circuit
It presents a micro-checker that manages the production of RDS messages. The set RDS message is preserved also in the absence of a primary power supply. The RDS carrier wave at 57 kHz is produced on locking at the 19 Khz one of the MPX signals 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 codifier microchecker could immediately modify the transmitted message; that guarantees the system is very flexible and adaptable to the different custumers necessities.

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 the JP8 jumper present on the RDS Coder card that must be placed in 2-3 position (see the figure below). This card has the only function of filtering at 15 kHz of Mono input.



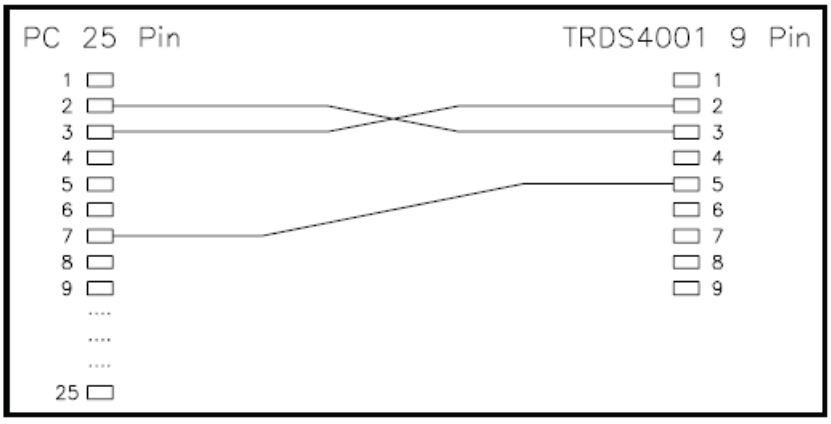
Installation Procedures

Introduction
This chapter contains 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 WinDS software;
4. N. 1 pin-to-pin DB9 serial connection cable, male and female;
5. Manual.

   In case 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 shown in the following screen:



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.

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

1. Cables for the mono and stereo signals the entrance to the TRDS4001 (BNC side TRDS4001):
2. Cables for the connection between codifier and transmitter (BC side TRDS4001);

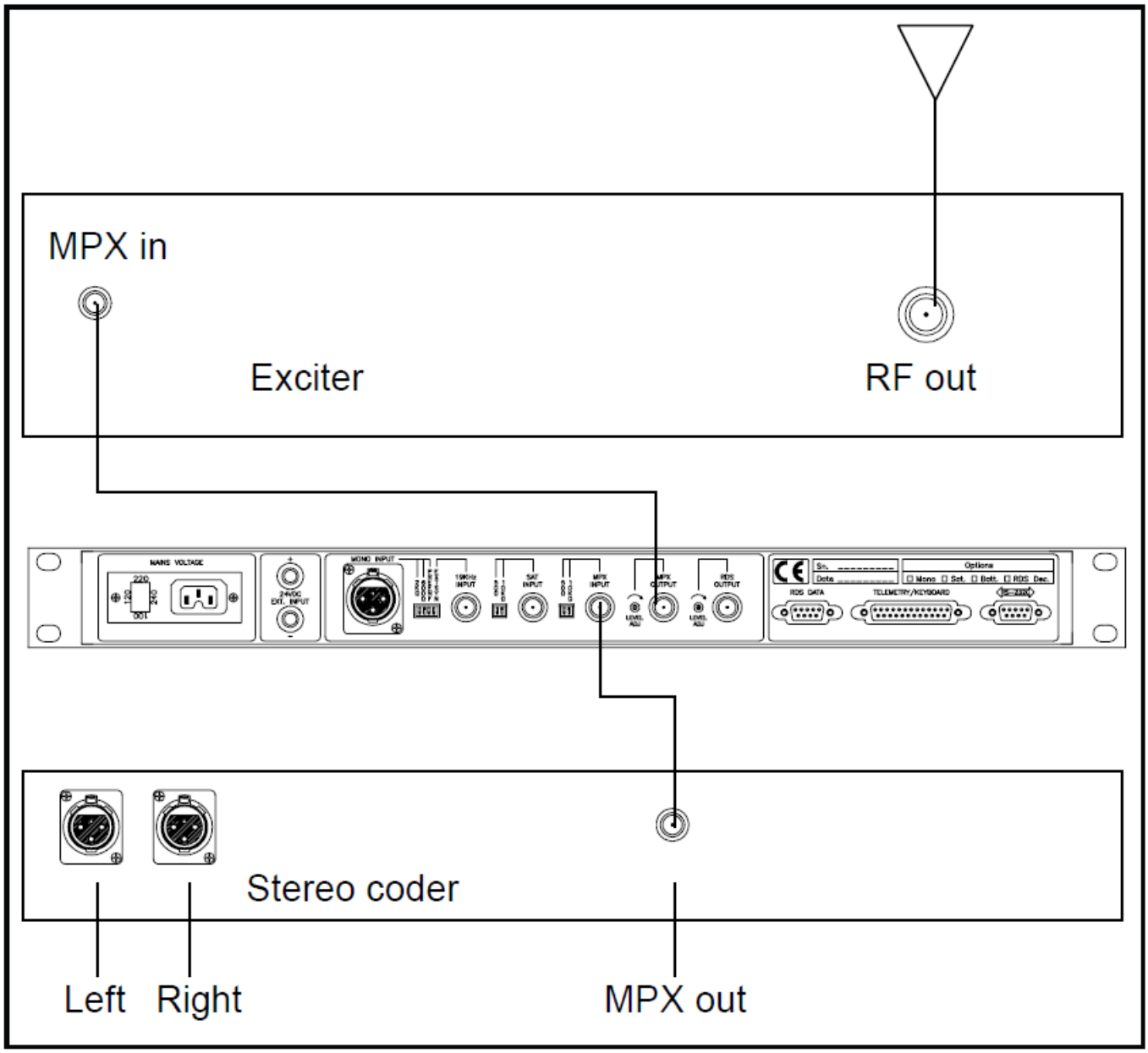
For the right TRDS4001 codifier to work, it's important to observe with attention as follows:

1. The TRDS4001 coder has to be installed immediately before the transmitter, either for stereo transmissions or the mono ones.
2. The connections have 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 directly 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 finishing damages
9. In case of damages, switch off the system and contact directly the firm R. V.R. ELETTRONICA s.p.a.

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

- it can add the RDS signal to an 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

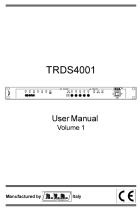
The following figure gives a schematic example of the two ways of installing the encoder.



- If all the connections have been 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 OdBu (about 2,2 Vpp).
- In different cases, it's necessary to have the equipment of a modulation analyzer typically calibrated at 2-2,5 kHz @ 0 Bu with respect to the MPX level.

Software Installation
For software installation and more information, you can see the WINDS User Manual.

Documents / Resources



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TRDS4001, TRDS4001 Broadcast Systems, Broadcast Systems, Systems