



# **/RDS-TEX2HE & /RDS-TEX3HE**

**USER MANUAL**

**Additional Manual for  
TEX-LCD series and  
TEX-LIGHT series**



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18/12/2020	1.1	Techical Annex & WinRDS+ Integration	J. H. Berti

/RDS-TEX2HE & /RDS-TEX3HE - User Manual  
Version 1.1

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R.V.R. Elettronica

Via del Fonditore 2/2c - 40138 - Bologna (Italia)

Phone: +39 051 6010506

Fax: +39 051 6011104

Email: [info@rvr.it](mailto:info@rvr.it)

Web: [www.rvr.it](http://www.rvr.it)

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# 1. Introduction

## 1.1 Main Highlights

- The RDS encoder is made with full digital technology capable to generating a very high quality of modulation and of spectral purity.
- It supports all popular services including TMC, TDC, IH and EWS.
- The card can be programmed using any UECP SPB490 compatible software.
- The programming software is also supplied, obviously compatible with SPB490, capable to managing all the functions and services available on the hardware in addition to the personalized management of PS messages.
- The card is equipped with at least two serial ports, which can be used respectively for programming and for dynamic data (e.g. TMC data).
- The firmware can be updated via serial port without the need of hardware settings and without service interruption.

## 1.2 RDS System Description

The Radio-Data-System is proper for the transmission of information in mono/ stereo programs of VHF/FM (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  $\pm 2$  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 purpose of the **/RDS-TEX2HE & /RDS-TEX3HE** option 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 **/RDS-TEX2HE & /RDS-TEX3HE** 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, in the receiver, the music and the spoken equalization 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 transmission; 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 - TRANSPARENT DATA CHANNEL:** it's used for the data transmission and it could be free used, for example, to send messages on a brightly sign.

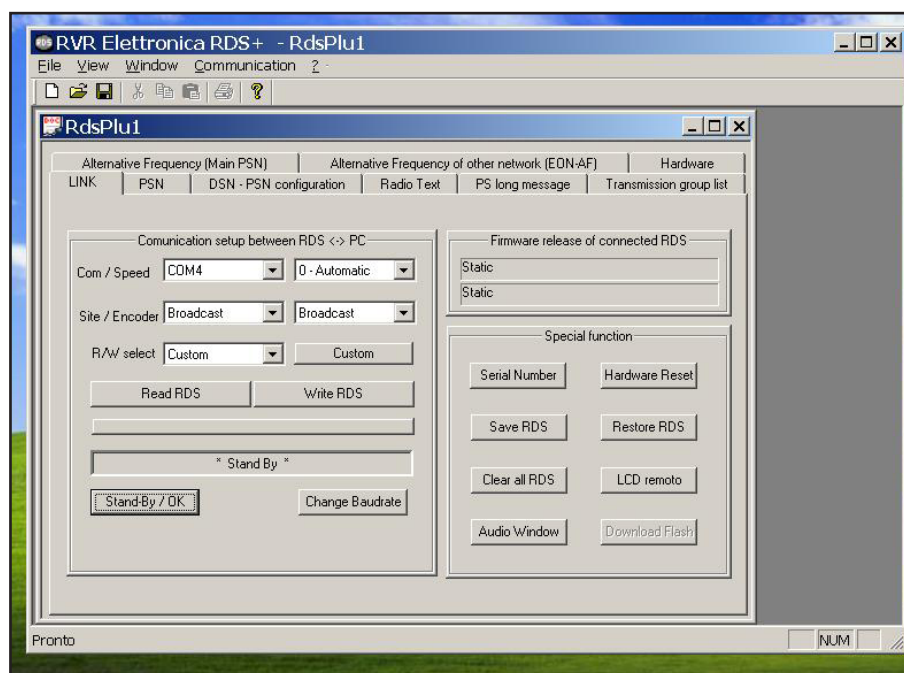
**IH - IN HOUSE APPLICATION:** it's used to transmit data of exclusive use of the broadcaster and it can be utilized , for example, to send telemetry data, software, etc...

## 1.3 Software

The WINRDS+ software in kit (in italian and english language), on a CD-Rom supplied, allows actually to set 16 different RDS messages, each of 64 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 **/RDS-TEX2HE & /RDS-TEX3HE** option management applications are configurable with a IBM-compatible Personal Computer, which has to be connected by RS232 serial cable to **I<sup>2</sup>C BUS** or **SERVICE/RDS** input (depending on model).

After programming, disconnect the RS232 data cable and then reconnect the custom cable to the **I<sup>2</sup>C BUS** or **SERVICE/RDS** input.



The software and the new version can be downloaded directly from RVR web site.

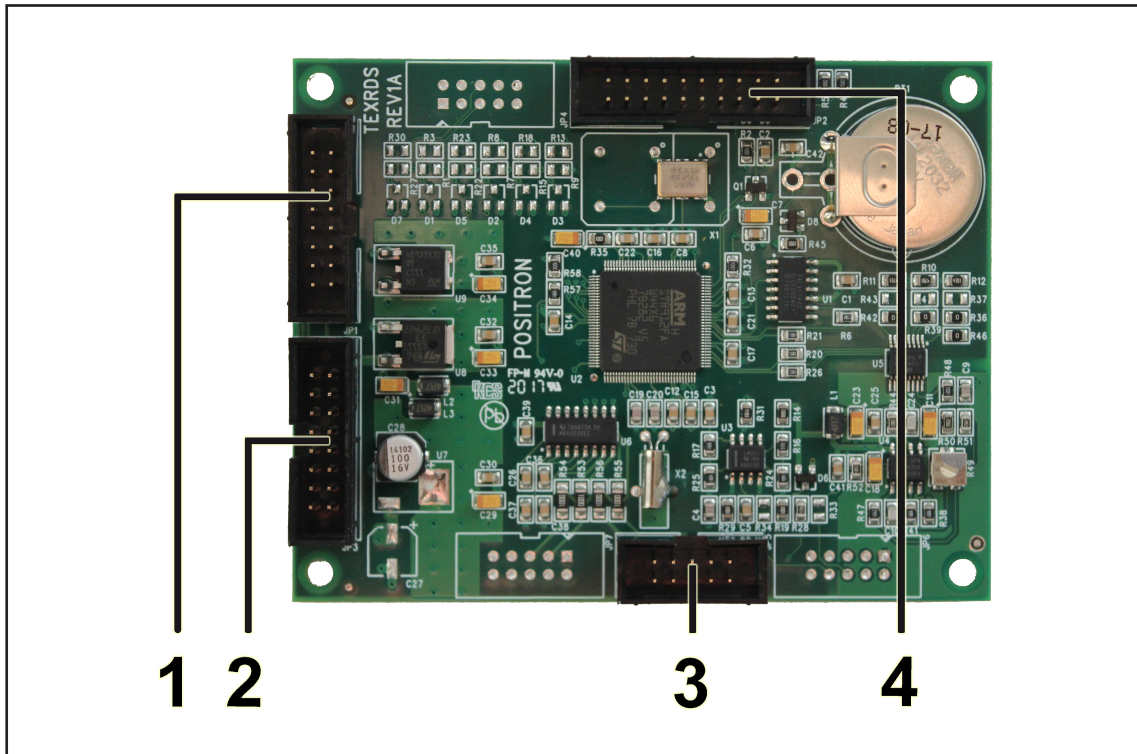


## 2. Technical Specifications

		/RDS-TEX2HE & /RDS-TEX3HE	
Parameters		U.M.	Value
<b>GENERAL</b>			
RDS Output	Standards		Cenelec 50067 Specification
	Frequency	kHz	57 +/- 0,3Hz (internal reference)
	Bandwidth	kHz	+/- 2,4 (-50dB)
	Level	mVpp	2.200
	Phase / Pilote	Deg.	Adjustable from 0 to 360 in 0.33 increments
	Connector		IDC 10p Mas.
	Impedance	ohm	50
PILOTE input	Sync frequency	kHz	19 +/- 2Hz
	Input level	dBu	from -30 to +4 (sinusoidal or TTL)
	Connector		IDC 10p Mas.
Primary Serial Port	Speed in continuous flow	bps	from 1200 to 19200
	Programming speed	bps	from 1200 to 115200
	Transmission format		8 bit – no parity – 1 stop bit
	Connector		IDC 10p Mas.
Auxiliary Serial Port	Speed in continuous flow	bps	19200
	Programming speed	bps	19200
	Transmission format		8 bit – no parity – 1 stop bit
	Connector		IDC 10p Mas.
Elaboration	D/A conversion		24 bit (Dynamic range 106 dB)
	DSP		32 bit, fixed point
Ambient working temperature		°C	0 to + 50
Ambient Working Humidity		%	85 (Without condensing)
<b>RDS SERVICES</b>			
Services			PTY, PTYN, TA, TP, MS, DI, PI, PS, AF, PIN, EON, RT, TDC, TMC, EWS, IH, CT
Programs	DSN		6
	PSN		N ° 1 PSN Main + N ° 7 PSN - EON for each DSN
Specifications	PS (custom)		N ° 6 or 10 words managed in time and in mode
	AF		N ° 100 Lists of 25 frequencies for each main PSN
	RT		N ° 16 for each DSN
	EON		N ° 100 AF
	IH,TDC,TMC		N ° 1 Buffer UECP, N ° 1 Buffer FFG, N ° 1 Buffer ODA (MEC42 , MEC45)
	EWS		N ° 1 Buffer UECP, N ° 1 Buffer FFG
Programming	Groups		Custom management
	Addresses		N ° 5 site addresses, 5 encoder addresses
	Command formats		UECP - SPB490 Ver.6.1 / 2003
	Custom functions		PS and DSN messages management
<b>POWER REQUIREMENT</b>			
DC Power Input	DC Supply Voltage	V	5
	DC Current	A	0,2
<b>MECHANICAL DIMENSIONS</b>			
Physical Dimensions	Width	mm	74
	Depth	mm	96
Weight		g	200
<b>OTHER CONNECTORS</b>			
<b>STANDARD COMPLIANCE</b>			
Safety			EN60215:1997
EMC			EN 301 489-11 V1.4.1

### 3. Physical Description

#### 3.1 Board Layout



- |                   |  |
|-------------------|--|
| [1] INPUT         | Connector for data exchange from the modulator panel board.                                  |
| [2] OUTPUT        | Connector for data exchange to the modulator panel board.                                    |
| [3] SERIAL        | Connector for data exchange to the RS232 connector on rear panel + RDS output + Pilot input. |
| [4] PROGRAMMATION | Not used (reserved).   |

## 4. Installation and Setting-up

### 4.1 Preparation

#### 4.1.1 Preliminary checks

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

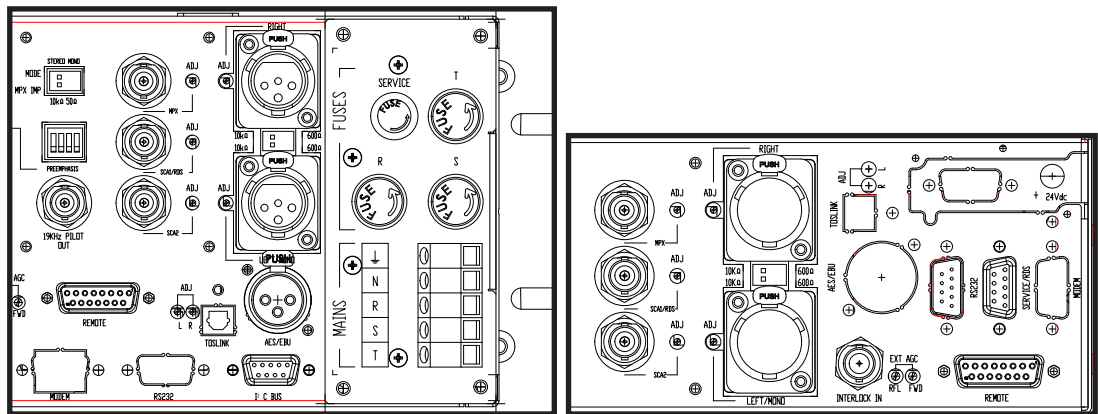
✓ Connection cable kit including:

- Custom cable (included) to connect MPX/RDS and sync signals;

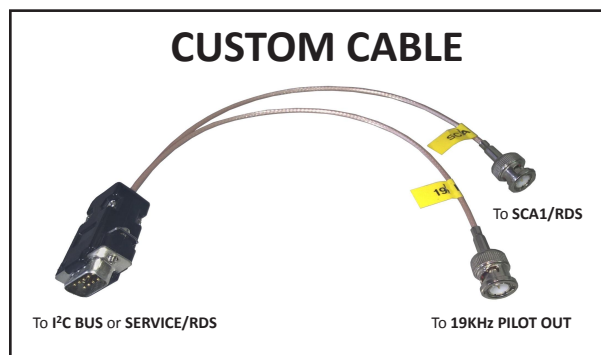
or

- RS232 data cable (not included) for direct connection to PC in case of programming.

### 4.2 Connections



- Connect the DB9 connector to the **I<sup>2</sup>C BUS** or **SERVICE/RDS** (depending on model) of **/RDS-TEX2HE & /RDS-TEX3HE** option to the two BNC outputs named **19KHZ PILOT OUT** (synchronization signal) and **SCA1/RDS** (RDS signal) always present in the back of the machine itself. If the connecting device is different, identify an equivalent.



**Note :** For programming you need to connect it directly to a PC by using an RS232 cable or an USB-RS232 converter. This is a pre-requisite to ensure the proper operation of the equipment. Disconnect the DB9 connector from the **I<sup>2</sup>C BUS** or **SERVICE/RDS** input and then connect it to your PC.

*After programming, disconnect the RS232 data cable and then reconnect the custom cable to the **I<sup>2</sup>C BUS** or **SERVICE/RDS** input*

## 5. WINRDS+ Software Introduction

### 5.1 WINRDS+ Application

**WINRDS+** is an application based on documents, each document (file) represents a RDS system and contains all information relating to it.

You can open multiple documents and communicate with several devices simultaneously, provided that each works towards a different serial, or you can have multiple devices on same serial port, provided that only one at a time is allowed to send. If you try to transfer data towards two devices, on the same serial, the second window will not connect while the first will attempt to configure both devices, creating conflicts.

The application communicates in UDP from version 1.X.2.0, towards a selected address in the "Communication-> RS232" (IP + PORT) POP-UP. Only one of the open windows can use UDP communication instead of RS232 communication.

### 5.2 RDS Devices

This section contains information on how RDS is structured.

The data contained in **DNS ACTIVE** is continuously transmits from each device. To activate the DNS see special section "**Enabling DNS-PSN**".

Each DNS contains the **MAIN\_PSN** or PSN-1 all RADIO's data that is transmitting, PI and PS are required in these data otherwise the radio receiver can not use the RDS data. In addition to the PSN-1 are available 7 other PSN called "**EON-1 ... EON-7**" that user can decide to enable and use if it has the "Friends Radio" on which move the tuning when the radio signal becomes too low.

In addition, each DNS contains one or more lists of **alternative frequencies** that are used to tune the car radio when you move from an area covered by a frequency to another. Also for friends broadcasters is possible to define pairs of frequencies that enable the radio receiver to change tuning.

Each DNS contains a buffer that can accommodate up to 16 message of "Radio Text", each long up to 64 characters that can be read by radio enabled (typically likes fixed receivers, and not by the car radio).

The users who wish to have different data during specific times of day can enable the **time management of DNS** by loading data from other DNS enabled up to a maximum of 5 or 6 DNS depending on apparatus. The devices based on BIOS TRAxXX have 6 DNS while other units have only 5 DNS.

The users who need to see motion written on the car radio must use the window “PS Messages” that allows to have up to 8 sliding messages each long up to 128 characters or compound from 2 to 16 PS that rotating with personalized times. These messages, if enabled, are transmitted instead of PS within the PSN and do not depend on DNS enabled.

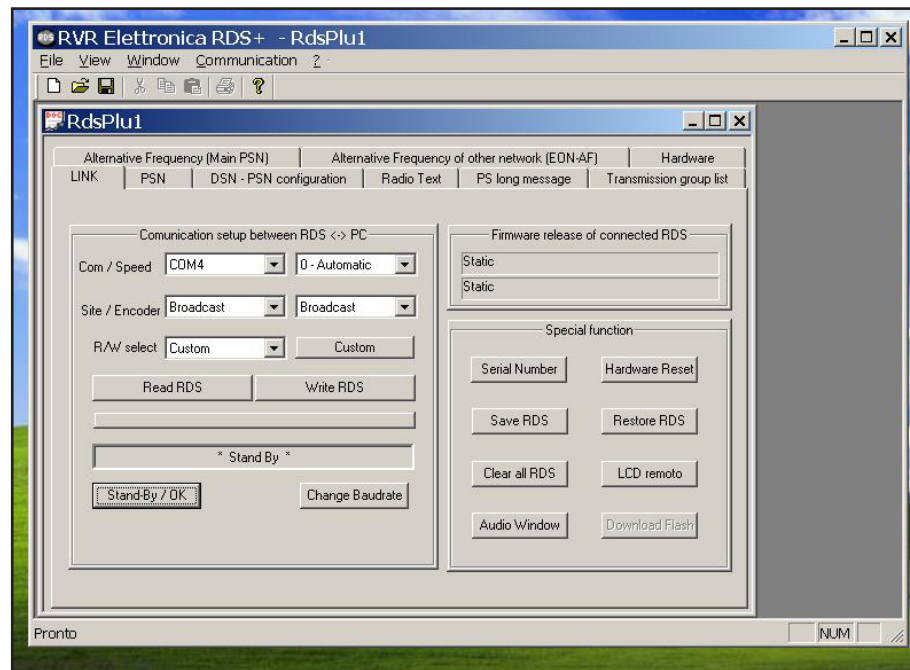
## 6. Software Description

### 6.1 WINRDS+ opening application

The usage of this application requires no installation process, it can be placed in any directory on your PC, even on the DESKTOP.

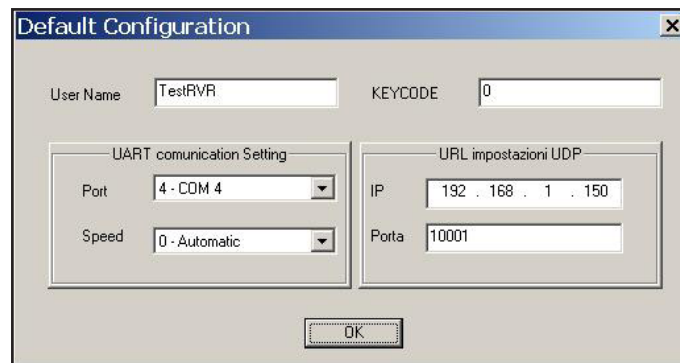
To start the application:

- ▶ Double-click to opening with RDS EMPTY called RdsPlu1 and that the user must rename it if he wants to save.



After launching the application in minimized window, it can be moved with the MOUSE all RDS documents (\*.Rds) inside the window to open they automatically. In addition, after the first use, you can drag a file generated by the program over the icon of the program to get the opening of the document (\*.Rds).

In case the program is started in WINDOWS environment for the first time, it comes "recorded" that is it provides to operating system a configuration that will be used every time someone starts this program. These data are requested through a special DIALOG. In the next sessions, input of this information will no longer be required, but they will be editable via the MENU "**Communication ▶ Set RS232**" / "**Comunicazione ▶ Set RS232**".

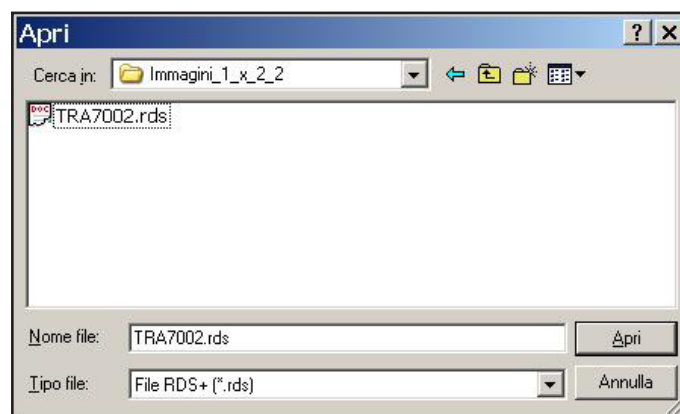


The “UART communication Setting” section allows you to choose the PC serial port used to communicate with the devices and the speed communication from 1200 to 115200. The “Automatic” selection forces the program to groped all connections (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200) seeking equipment connected.

The “URL settings UDP” section is used to select the “IP” address and the port to which send UDP messages and receive replies. Please note that this connection is no connection so you can send messages from multiple applications at once (TMC + ODA + RT Messages); however communicating simultaneously with two WINRDS+ the responses may be not consistent and then one or both applications may fail.

## 6.2 Opening a saved document

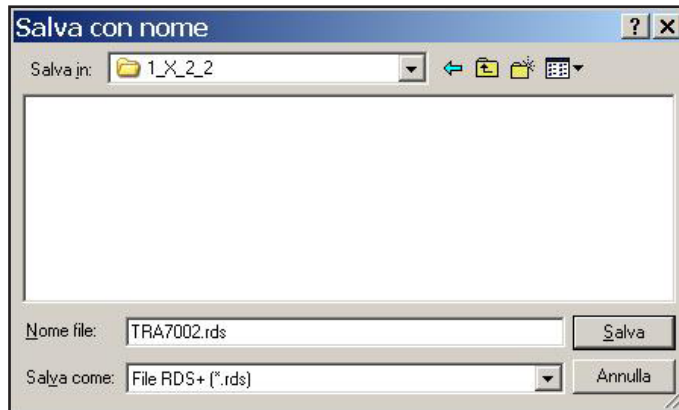
To open a previously saved document you should use the drop-down menu “**FILE ► OPEN**” / “**FILE ► APRI**”, or the “**CTRL+A**” combination, or the button on toolbar to get the system window for the opening of file. This window looks for files with the extension \* .rds.





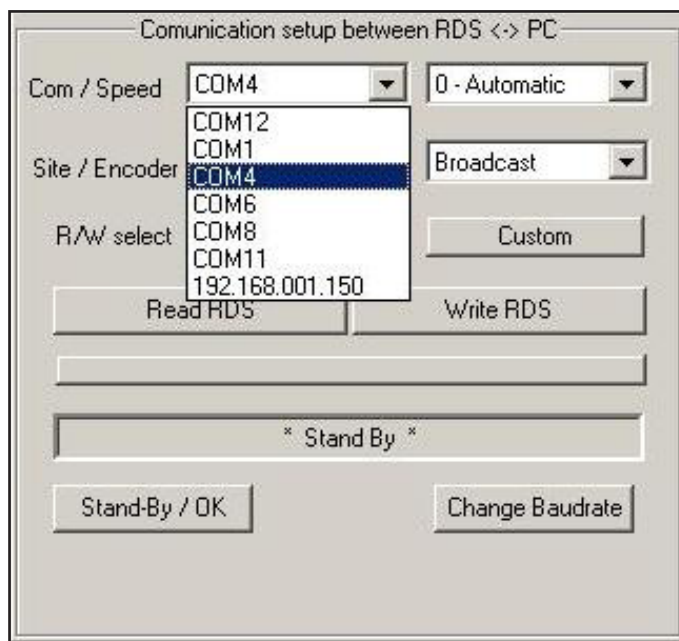
### 6.3 Saving document

To save the changes made to a document through the windows described below, you should use the drop-down menu **"FILE ► SAVE"** / **"FILE ► SALVA"**, or the **"CTRL+S"** combination, or the button on toolbar.

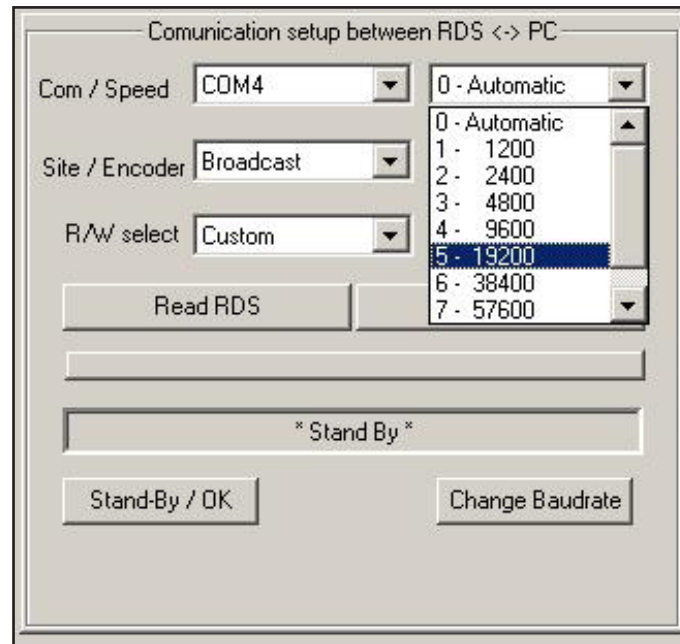


### 6.4 PC ◀▶ RDS Data Transfer

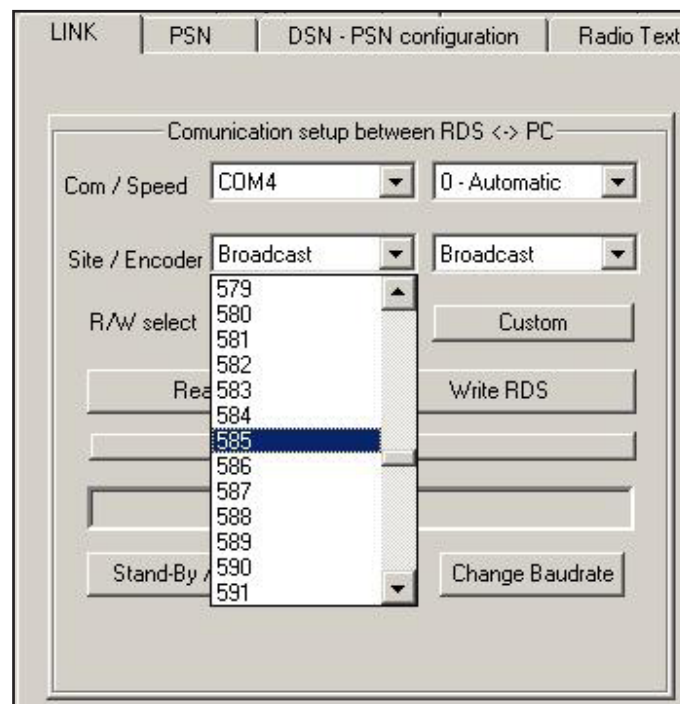
The "LINK" window, where the user must specify which PORT is connected to the equipment, is shown in case that any document is opened. It is not necessary to configure the communication if you only work on documents. The window only proposes the serial actually present on the PC and the UDP NODE in case you have been set through the **"Communication ► Set RS232"** / **"Comunicazione ► Set RS232"** window.



A user, who knows the owner set speed on equipment, can sets the appropriate field, otherwise is better if you leave "Auto" and the program will try to find all speeds to interview properly. When you set 115K2-USB protocol, used by the program, it is ASCII rather than binary.



If the user sets a station (1-1023) or an equipment (1-63) address, or both, the messages will be created with the address and only the equipment that will recognize itself into address will accept the configuration and will answer. The addresses are used from subjected equipment in continuous data flow to recognize their own from those reserved for other devices. When you use this program to configure a device, you must select the correct address, or select “**Broadcast**” / “**Tutti**” in order to have full access to the equipment.



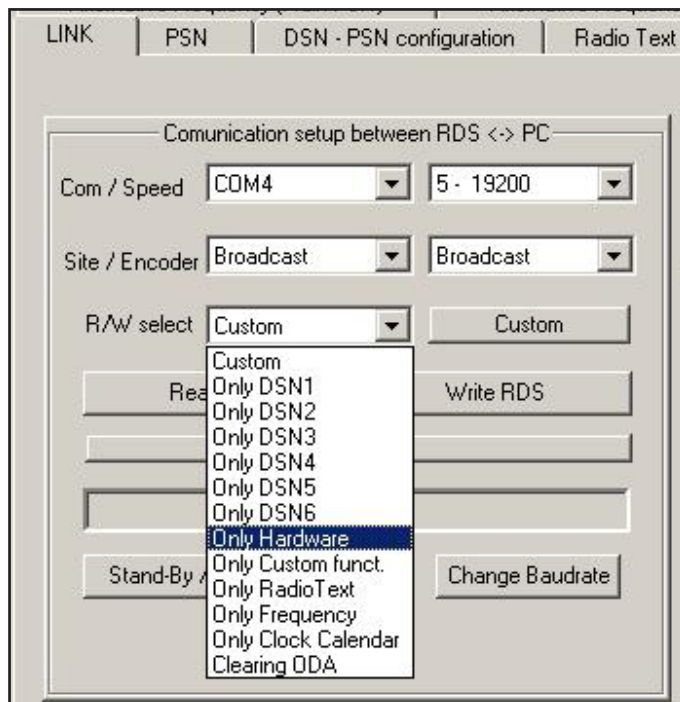
The data transfer may take some time if device is configured to 1200bps, then the user who wishes to use only RDS part can press “**Custom**” / “**Personalizza**” and decide what to include or exclude from the data transfer to reduce the time.



You can also use the drop-down menu to select whether you want to transfer all selected data through custom or data blocks (for example update only the clock or only the hardware settings).

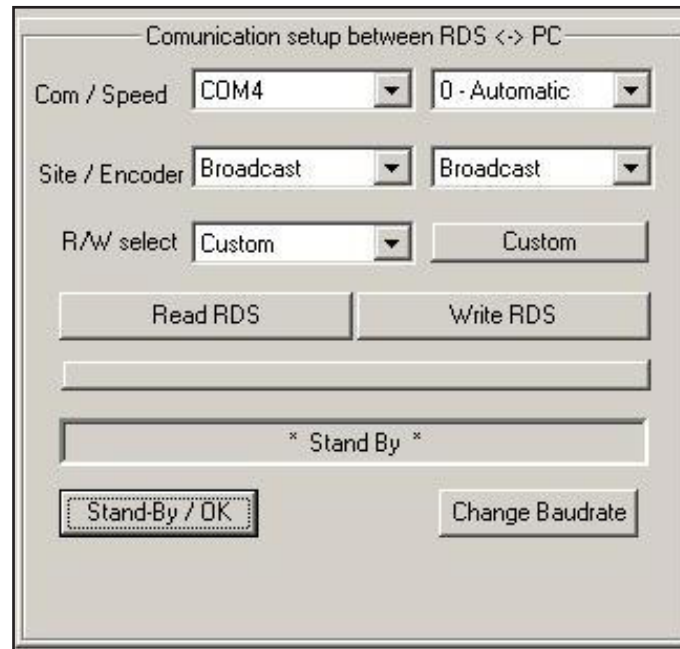


**Warning:** when you read only a part of data from an equipment to edit themselves make sure you have the same selection when writing otherwise all selected parts before writing, but have not been read previously by the equipment, will have unpredictable values (or empty data with data from previous readings).



The “**Read RDS**” / “**Leggi RDS**” button is used to read all data on equipment and selected through “**Custom**” / “**Personalizza**” controls.

The “**Write RDS**” / “**Aggiorna RDS**” button is used to write to the RAM of equipment all data present on document and selected through “**Custom**” / “**Personalizza**” controls.

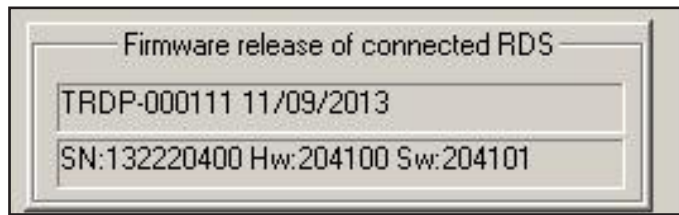


The progress is displayed in the field below the button, in case of transfer failure appears an error code. To clear the error and resume the normal operation of program, you must press the “**Stand-By/OK**” / “**Termina/OK**”. You can interrupt a transfer before the end using this button. The transfer also ends for communication problems with the equipment. The messages that accompany the transfer, or warn about the failure of the same, are at the center of transfer zone in “LINK” window.

The “**Change Baudrate**” / “**Nuovo Baudrate**” button is used to modify the on board communications.

When a transfer begins, whatever the direction, the PC search for equipment and, after finding it, writes the version in the upper area. If the device communicates with the UECP61 protocol, but is not compatible with the SUB\_SET of POSITRON CUSTOM commands, the version will be “UNKNOWN” and the configuration process ends without updating the equipment. Only the top writing will be updated

with the READ / WRITE buttons (see special features).



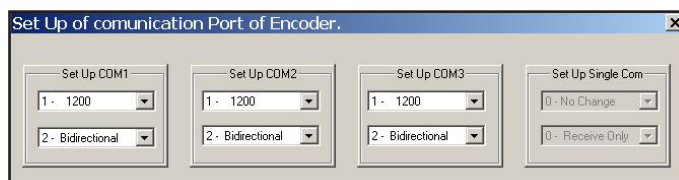
When there is **no connection** with the equipment appears a special window that warns you of problem. The program tries several times before aborting the transfer in case of UDP protocol. There is probably an error in the port selection, speed, device address or a wiring problem.



During the transfer is shown the advancement of communication and, if there are communication errors, the procedure ends with the return to the “Stand-By” state; otherwise an error code is reported from 1 to 999 that you can delete only by the pressure of “Stand-By / OK” button.

## 6.5 Setting of Serial ports of equipment

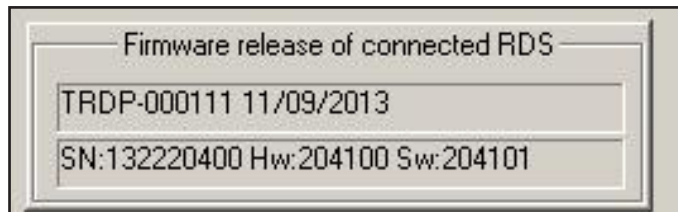
The “**Change Baudrate**” / “**Nuovo Baudrate**” button is used to change the baud rate or the operation mode of the device communication port. The current speed is searched after pressing the button, the device questioned and the current status suggested to operator. The serial port used for communication with WINRDS+ will be always **SPONTANEOUS BIDIRECTIONAL**, because modify the program to be able to talk with the equipment. If you want to have the **MONODIRECTIONAL** active serial, you need to use this “New Baud” function to change the way and then not make further transfers before disconnecting the device.



**Warning:** many equipments offer the chance to edit 3 serial although physically the equipment has not, in these cases if you set the serial not physically accessible on the equipments does not create any results.

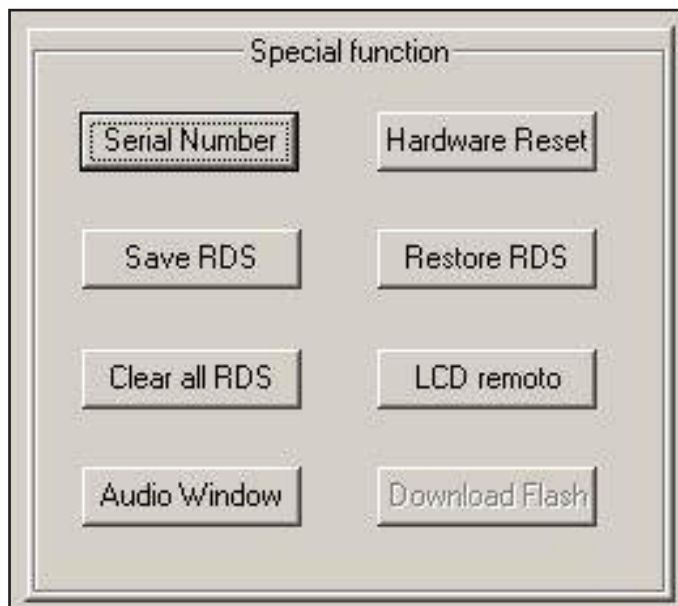
## 6.6 Special Functions - Serial Number

The “**Serial Number**” button opens the connection to request the version but does not do any transfer. The operation result is visible in the appropriate window. This window contains two fields, the first is always filled with the descriptive version of device and the current firmware. The second field contains the serial number of single RDS card including version of hardware and software. For some devices the two fields may coincide. The normal transfers do not update the second field, as to obtain this information you need a special command.



## 6.7 Special Functions - Hardware Reset

The “**Hardware Reset**” button activates a microprocessor output that generates a RESET of card by activating the RESET of all devices connected to it (in case of RDS card/WINRDS+AUDIO embedded within an equipment more complex, only the card undergoes this function).



## 6.8 Special Functions - “Save RDS” - “Restore RDS”

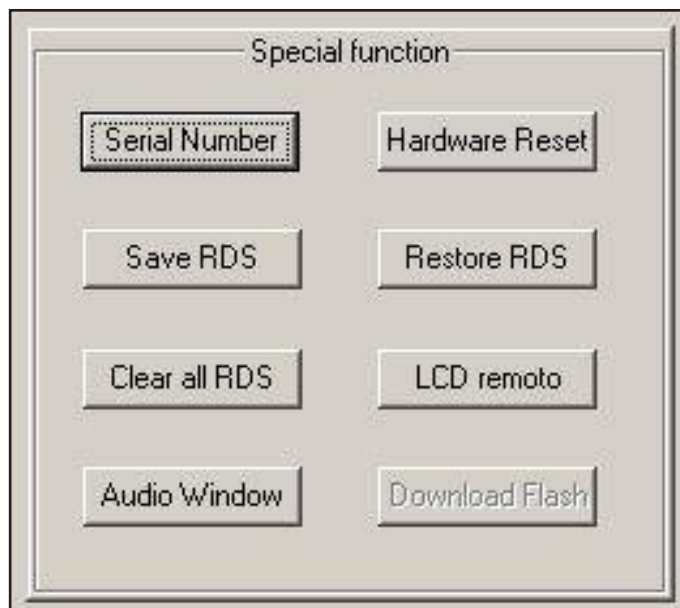
These two functions are active in certain cards only, use them on devices that do not have this function has no effect.

All cards save data to buffered RAM, some cards allow you to use the button “**Save RDS**” to photograph the RDS static data present on the buffered RAM in a dedicated flash bank memory.

All cards that have a valid stock image of RDS data on FLASH memory, by using the “**Restore RDS**” can copy it on the buffered RAM.

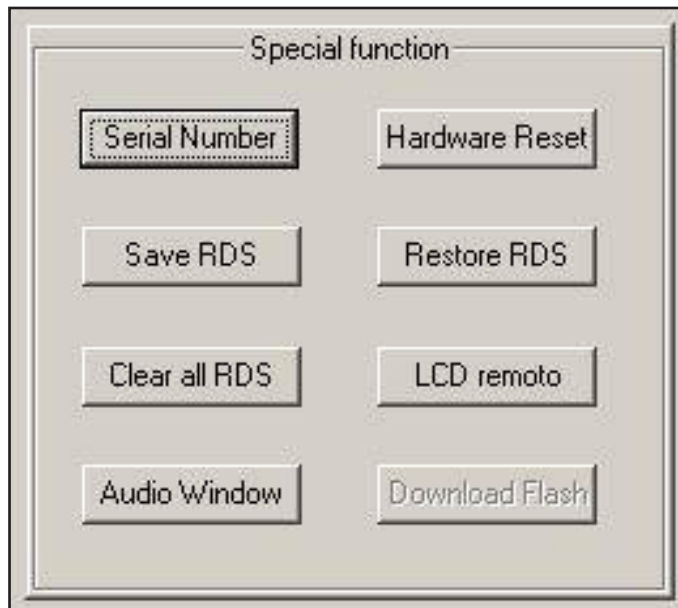
Pay attention to “**Save RDS**” function, because from second time that it is used causes a reset of the card with a brief interruption of output signals. The use of this function also must not exceed the physical characteristics of **10000 cycles Cancellation / Script of FLASH memory**.

The “**Restore RDS**” function has no use limits but every time you call resets the ODA buffer and therefore causes the loss of TMC, IH, TDC, EWS, RT+ messages loaded into RAM and waiting to be transmitted.



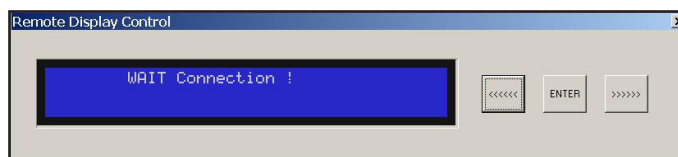
### 6.9 Special Functions - RDS cleaning

The “Clear all RDS” / “Cancella tutto” button is used to delete all data and RDS configurations. This command has NO effect on the document, but it is executed by the equipment, and it is recommended when a SET-UP on the equipment is loaded for the first time so as to lose all present configurations before use “Write RDS” / “Aggiorna RDS”. After using this function, each device is bring back to original condition like at the exit of factory.

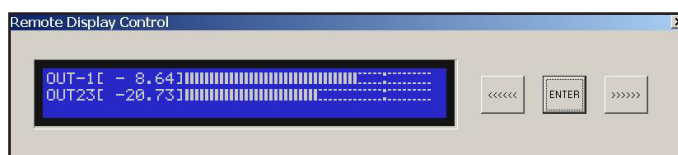


### 6.10 Special Functions - “remote LCD”

Some devices provide the ability to interact with the equipment via RS232 or UDP as if you were physically in front of the apparatus



This feature shows exactly the equipment “DISPLAY” and the ability to change the status with the mouse by pressing the three buttons on the side. Connecting devices that do not have the function, the above window remains until it is closed by the operator, otherwise appears the window present on the equipment (example below).





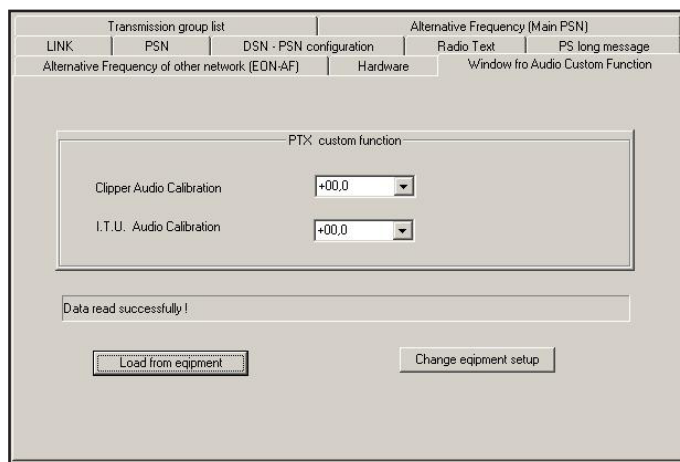
### 6.11 Special Functions - Windows Audio

The “**Audio Windows**” button adds in the active window a sheet for the management of audio functions. This function is not needed if the device is connected, because if it recognizes an equipment with audio functions during the connection adds automatically the correct sheet. However, with this button you can activate an audio interpreter of your choice to edit audio data and then save them on FILE for future equipment upgrades (see AUDIO window).



### 6.12 Special Functions - Windows Audio - PTX

The audio window changes depending on the connected equipment, for PTX the window is shown below. After the opening, the operator can press “Load from equipment” to read the audio data from the equipment and display them in the appropriate fields. In case of modify you can use the “Change equipment setup” button to update the equipment.



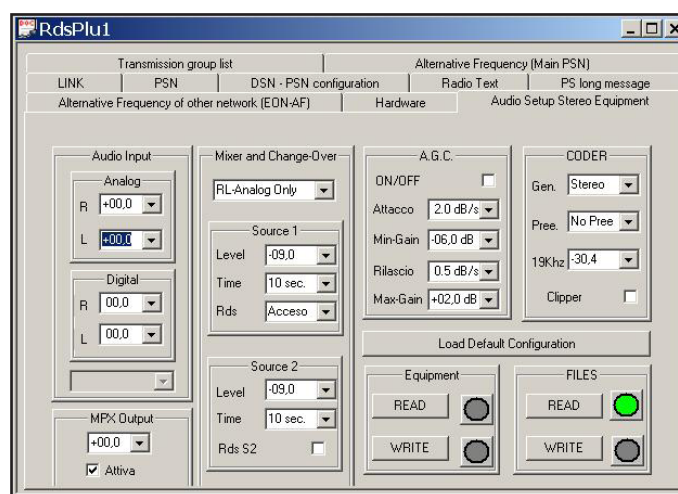
## 6.13 Special Functions - Windows Audio - Stereo

The window audio changes depending on device connected, for the **SDC2000** equipment is the following.

The “**Load Default Configuration**” button allows you to upload all default settings and then change only the ones you want.

The “**Read/Write**” for “**Equipment**” buttons are used to read and update the device.

The “**Read/Write**” for “**FILES**” buttons are used to read from a file or to save a file configuration (please note that the audio files are different from the RDS and have the .RSU extension).



## 6.14 Data Entry of main PSN and PSN-EON

The “PSN” window is used to set the data related to the RADIO. 40 PSN spread across 5 DNS are available on equipments based on TRDSP4. The equipments that do not receive a continuous data stream and do not use the time management of DNS, **must be configured with active DNS-1** and require the configuration of DNS-1. Only “Main-PSN” data belong to radio that is transmitting, the other PSN called “EON-1, ... EON-7” are data related to any “Friends” radio of radio that you are listening to.

The **PS** is the name of radio, under the law must be static and serves the listener to recognize the tuned radio.

The **PI** is the code that the radio uses to recognize the tuned radio. The code is generated automatically by selecting the “code” fields which is the code given to radio at time of purchase of license to broadcast, “Country” which is the State in which the radio transmits the code (for Italy is 5) and finally “Area” that is the radio broadcasting coverage. The operator must select only the “Country/Nation” field of “EON” because the “MAIN” one is automatically updated by editing the “ECC” field

The **DI** represents the characteristics of radio transmitted signal and the presence or absence of remote control of “TA” inside PTY.

The **PTY** represents the characteristics of the Radio programming (eg. SPORT), if they are musical or spoken (active MS means music) and if it has the capacity to handle traffic information (active TP), and if in that moment is transmitting (active TA).

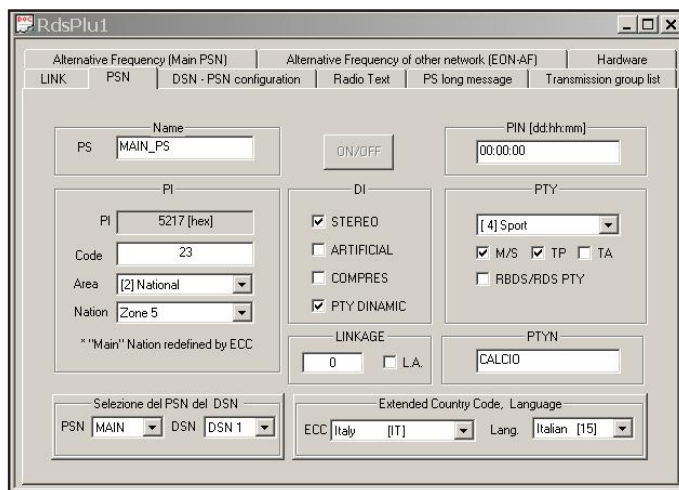
The **RDBS/RDS** is a field that has no effect on sent data from device while it is used from operator to interpret correctly the PTY, indeed the codes from 0 to 31 have a different meaning depending on whether a European RDS or an RBDS.

The **PTYN** is the field called “extension” of PTY, it is transmitted only if at least one 10A group will be inserted in the sequence of DNS transmission groups.

The PIN is a code that identifies a program, it has been included in this software just for test, indeed this field should be changed in real time during programming to allow listeners to be notified when their favorite program starts. It should not be set in this dialog box but sent with a continuous data stream. The PIN is transmitted only if at least one 1A group will be inserted in the sequence of DNS transmission groups.

The **ECC, Language** are two fields that have no effect on the graphical interface, in other words the operator will continue to see the windows in the language set on the operating system (WINDOWS) but activating the transmission of Group 1, the receivers will treat the radio-texts with the fonts defined in “Language”. In addition, the “ECC” field change the country code of the IP. Pay attention, the reading of devices that do not have a programmed “ECC” will result as “USA + number from 1 to 9 or a letter from A to F”, because in America the zones are defined by the codes while in rest of the world each state has its own code.

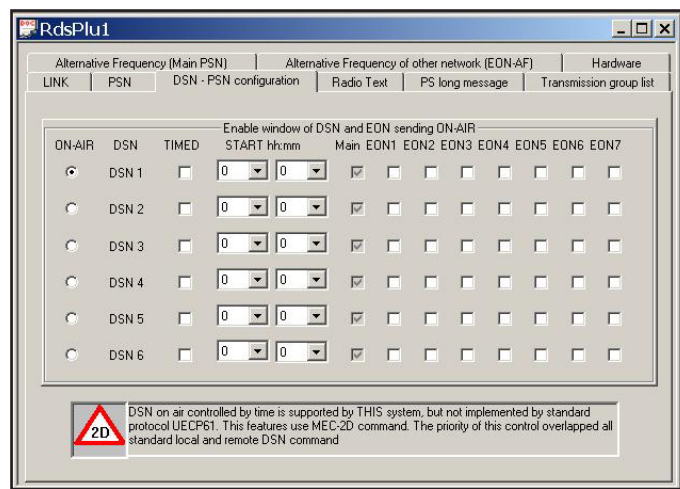
Other 7 PSN configurable in the same way as “Main-PSN” are available for each DNS. Using the “Enable DNS/PSN” you can enable the transmission “14A/14B” groups of data relating to other radio (**EON-1 ... EON-7**) up to a maximum of 7.



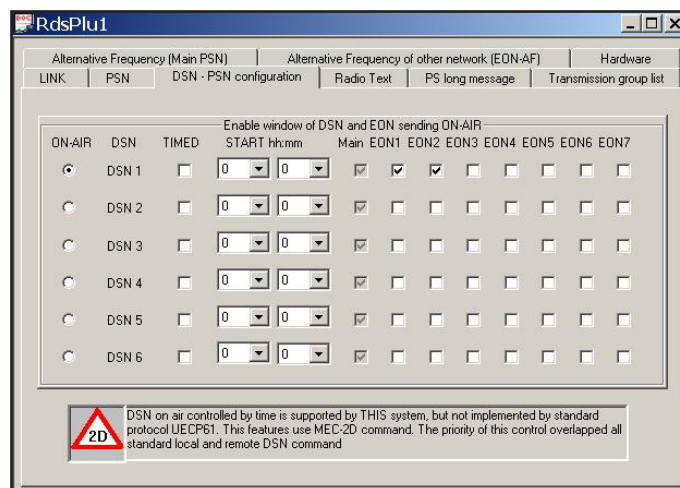
### 6.15 Enabling of DNS, PSN-MAIN and PSN-EON

The window Enable PSN DNS is used to determine which DNS will be transmitted, and what EON are enabled to be transmitted. You can also activate in time, over 24 hours, 2 or more DNS. One of the active DNS should always have start time at 00:00 otherwise from 00:00 until the first time will be transmitted the DNS-1 (default DNS).

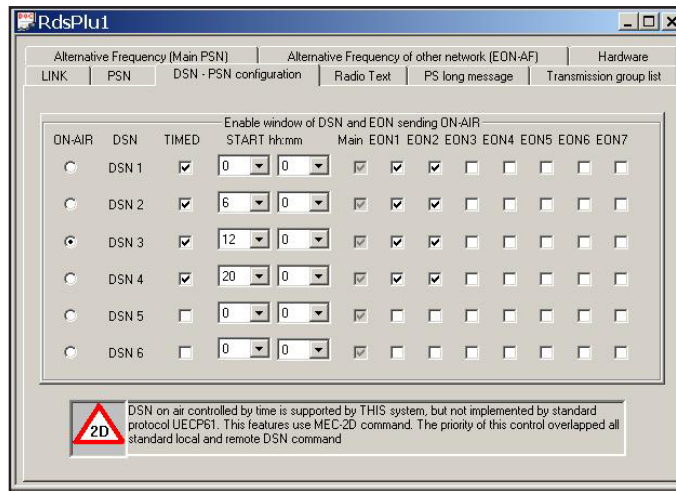
The radio, that should not send information about other radio, sets ON\_AIR the DNS-1 and disables all functions in time and all EON as in the image on the following.



The user that owns an associated network with the other 2 will enable 2 EON as in the example in the following and leave all time controls disabled.

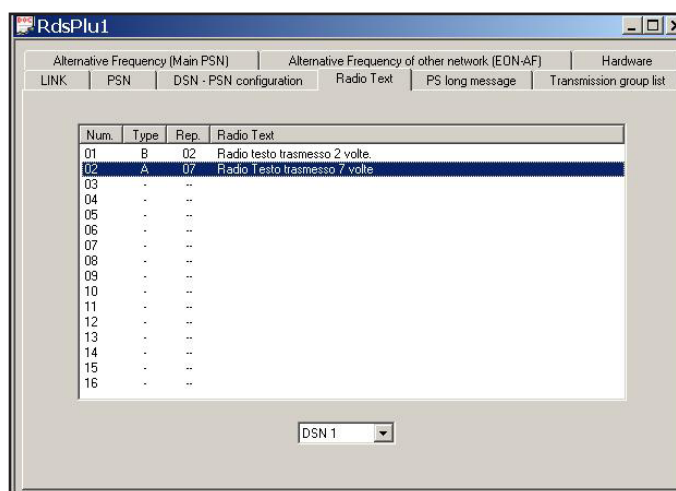


The third example shows an equipment that divides the day in four parts and each part using a different DNS and then in every day section will send a different Radio Texts, and eventually show data with different PSN.

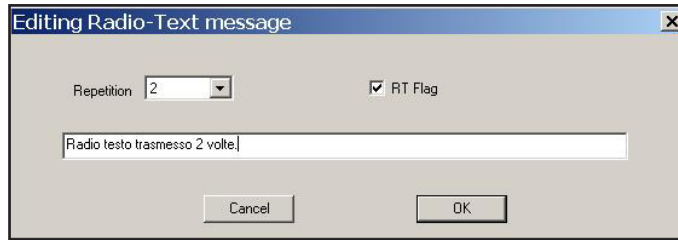


## 6.16 Insertion of Radio Texts

The “Radio Texts” window allows you to define up to 16 texts with a maximum length of 64 characters, which are broadcast from equipment on 2A and/or 2B groups. These messages are transmitted in order in which they are located and after the last message you start over again. The “Rip” attribute defines how many times a message is repeated before moving on to the next on list. The “type” parameter defines how the radio will process the message, or if it is defined as type “A” the radio will write a new message over the old one without deleting it and if it is of type “B” radio delete the previous message and write the new one. The difference between the two messages is crucial if those who receive the message is a data acquisition system, in fact those of type “B” are considered new messages, while those of type “A” are considered updates of previous messages and therefore not stored.

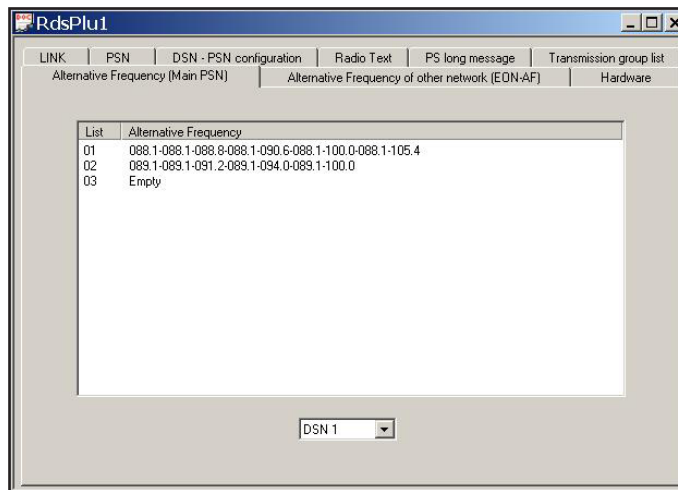


To edit a message, or write a new one, make DOUBLE-CLICK with your mouse on message that you want to edit, or on a blank message. A window appears where you can enter the new Radio Text, or insert a new one. When selecting repetitions is important to know that if a message has a value of “Always” when you go in transmission will not end over and then the next will no longer be transmitted.

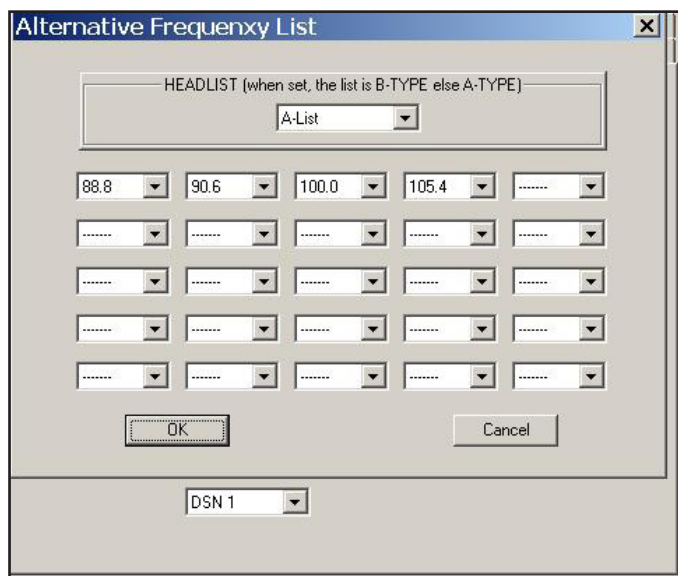


### 6.17 Insertion of Frequency List

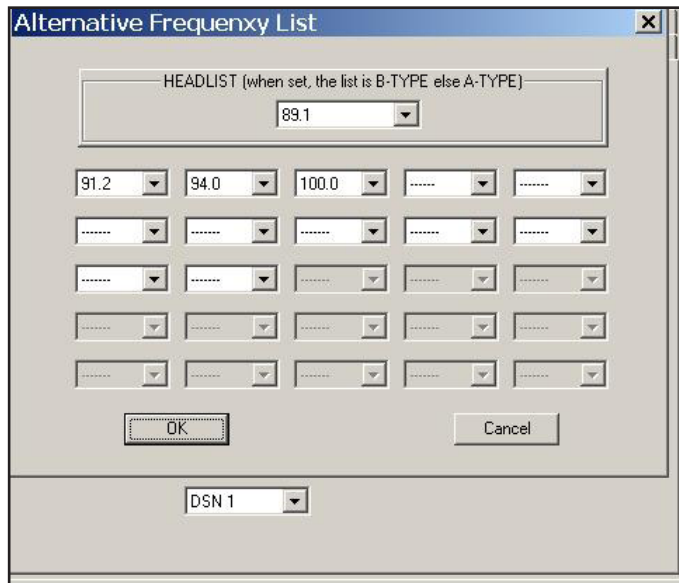
When an issuer has more frequencies on which transmits should fill one or more lists in order to provide all the frequencies to listening radio. This program allows you to fill up to a maximum of 100 lists of 25 type “A” frequencies or up to 100 lists of 12 type “B” frequencies for each of the DNS.



Alternative frequencies are managed with the “Alternative Frequencies Main PSN” window. To edit or to view a detailed list of frequencies make DOUBLE CLICK with mouse on the list, to create a new one please scroll the list until the end and then make DOUBLE CLICK below the last list available.

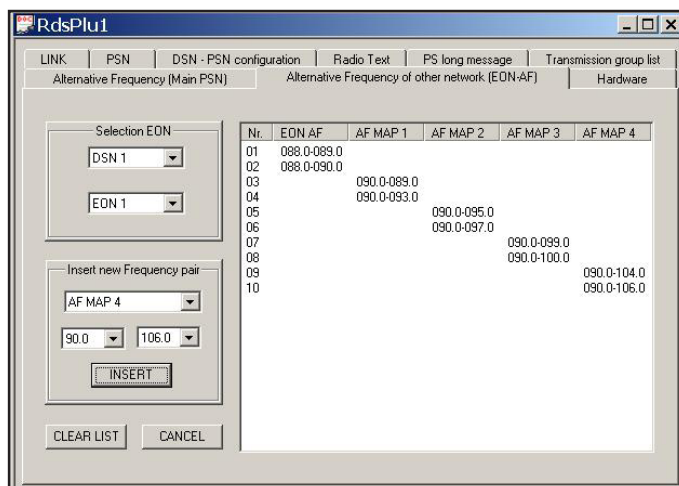


To create a type “B” list select a frequency in the range “list header type B”, making sure that only the first 12 frequencies of the list enter in a list of type B against the 25 frequencies of a type A list.



## 6.18 Insertion of EON frequencies list

Each EON can have its own frequencies list that will be sent on **14A and/or 14B** groups. As opposed to alternative frequencies of Main-PSN, these are mapped and so this software allows you to compile long lists up to 100 bytes or rather 33 couples of frequencies. The user only needs to specify the map and the couple of frequencies within the “Couple Frequency” area and then press “Add”, consequently the program compiles the three codes and inserts it in an appropriate manner inside the list.



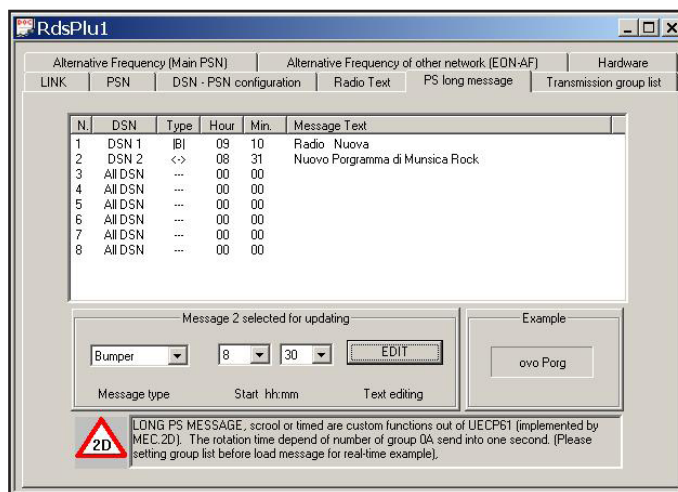
The “**CLEAR LIST**” / “**Svuota Lista**” button completely erases the list.

The “**CANCEL**” / “**Cancella**” button removes from the list the last couple of frequencies that had been selected by the mouse (or that currently selected).

If you enable the EON transmission that no have alternative frequencies, the equipment will transmit at least the information relating to the name, PI-EON and PTY.

## 6.19 PS messages

The RDS equipments can handle 8 long messages that will scroll on display of car radio in a linear manner (sliding) or in groups of 8 characters (A Blocks).



The **scrolling messages** can be scrolled from right to left, from left to right or, alternately, the persistence of each view is defined by the “Repeat” parameter.

The **block messages** are composed of 1 to 16 groups of 8 characters and each group has its own persistence. At the moment there are 3 special blocks which can be inserted in place of the text and are the time, the Italian date format and the English date format.

Selecting a message with the mouse between 8 messages present in the list, the “**Message...**” / “**Messaggio...**” area shows the type of message, the time in which the message transmission begins. The type of message and the time can be changed from this window while using the “**EDIT**” / “**CAMBIA**” button will open a new window for editing the message, different depending on whether the message is in blocks or sliding. The change of the start time and the type of message must be made directly by acting on these fields.

The “**Example**” / “**Esempio**” area shows in real time the behavior of the message as long as the transmission groups have already been defined, in fact the simulation is based on the set groups, considering full the present ODA groups.

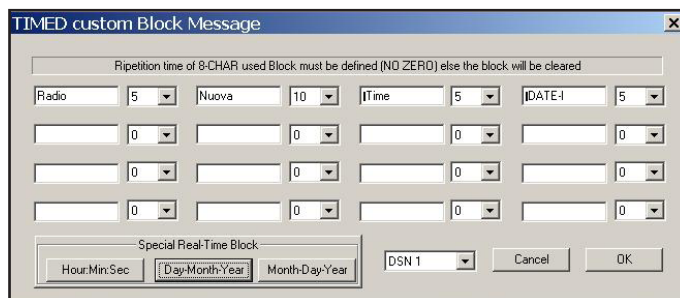
The “DNS” section acts only on devices that have this management.



Pressing the “**EDIT**” / “**CAMBIA**” button, when is selected a scrolling message, opens the editing window for scrolling messages that contain a section of free text to write your own message long up to 128 characters. The repetitions Field determines the persistence of the message between one shift and the next, the minimum acceptable value is 1, the maximum is 59. Press O.K. to confirm the update or press “**CANCEL**” to keep the old message. The DNS field acts only on last generation of RDS, all other equipments ignore this field and activate the messages only in function of time. Selecting this field a message is associated with a single DNS or to ALL (such as equipments that not have this feature).

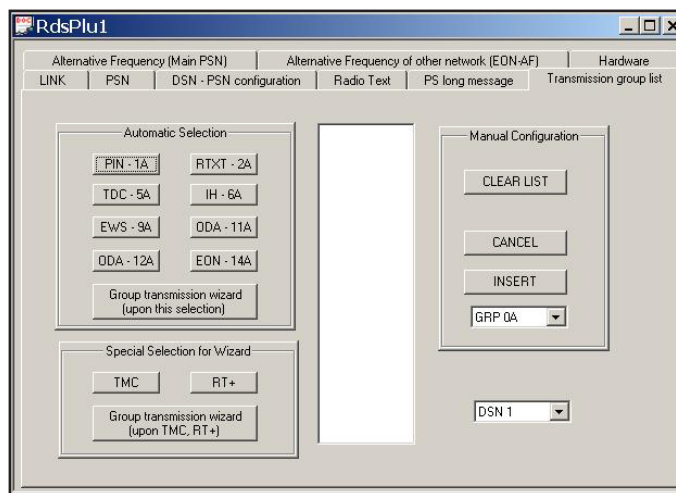


Pressing the “**EDIT**” / “**CAMBIA**”, when is selected a message block, opens the the editing window for block message that contains 16 free text fields any of which may be embodies 8 characters, flanked by 16 numeric fields where you can define the persistence of the block before moving on to the next one. The minimum recommended value is 5 (admitted is 1), while the maximum allowed is 59. When the repetitions field is 0, the corresponding block will not be inserted and its contents will be removed. In this window there are three special buttons that are used to enter in the first empty block a visualization of TIME or DATE type. Press OK to confirm the update or press “**CANCEL**” to keep the old message. The DNS field acts only on last generation of RDS, all other equipments ignore this field and activate the messages only in function of time. Selecting this field a message is associated with a single DNS or to ALL (such as equipments that not have this feature).



## 6.20 Transmission Groups

Each DNS can transmit the RDS groups in a personalized way.



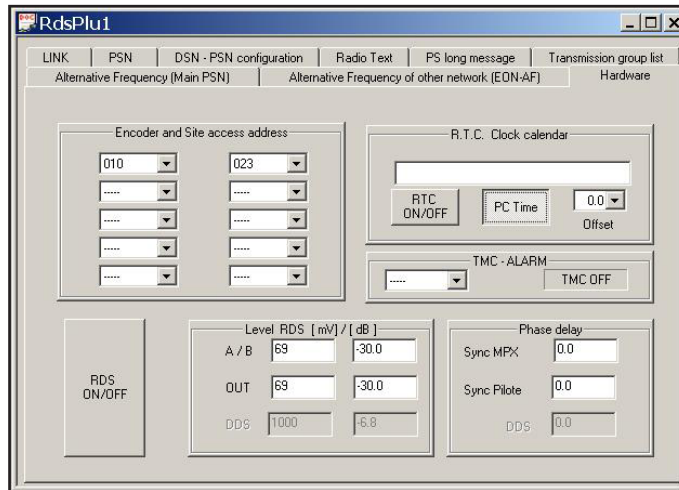
Advanced users can create their own sequence using the **Manual Configuration section**. With the “EMPTY LIST” button you delete all groups. With the “DELETE” button you remove the selected group from the list. With the “INSERT” button you can add to the list, in the selected location, a group specified by the selector below the same button.

The user who want to be helped to compile the list from the program, must select the services you want to use, remembering that the “PSN-0A” service is automatically added, and when they believe that you have completed your selection, press the “**Group transmission wizard**” button and the program will autonomously create a list of transmission. During the creating of list will abide to the rule that needs at least 4 0A groups per second. This list automatically created is modifiable, after its creation, as the list made directly by the user. In addition there are two “TMC” and “RT+” special selections that create specific lists more complex for those who use these services, however after the automatic generation can be modified in manual mode.

Note that the **4A groups** are not loaded into the list and in case the user insert them, will still be ignored. In fact the clock is enabled/disabled via a proper command and does not respect the transmission but exits, if enabled, in synchronous mode to the minute change of internal RTC.

## 6.21 Hardware Window

The hardware window contains informations regarding the equipment in general, and to how communicate with it.



The Address section allows you to assign an identification number of the position in which it will be installed (1-1023) and an identification number of the equipment itself (1-63). This allows to the RDS to recognize only the messages for all and those addressed to him personally. If a device is configured as a Site=9 and equipment=5 it will be recognized itself on 4 addresses.

Address 1: Site = 0 Equipment = 0

Address 2: Site = 9 Equipment = 0

Address 3: Site = 0 Equipment = 5

Address 4: Site = 9 Equipment = 5

The R.T.C. section allows you to set the time and enable the clock transmission through the 4A groups to minute change.

The “RTC ON/OFF” button enables or disables the time transmission time.

The “Use PC” button forces the PC to send the time system instead that one set by the user in the text field above.

The offset is relative to the time zone at meridian 0, in steps of 30 minutes.

In countries like Italy, where the whole territory is within the same time zone, is indifferent to put “the GMT with offset +1” or “local time with offset +0”.

The “RDS ON / OFF” button switches on and switches off the 57KHz RDS carrier.

On the equipment based on TRDSP4 there is only one level for the RDS carrier and a single phase, which can be set through the “A / B” and “Sync MPX” fields. The conversion mV ◀▶ dB is done in real-time by the program, so the user can choose to change the field that prefers.

Some equipment has the management of state on TMC, that is an alarm that can be read and set via UECP protocol. The time defines after how many minutes without TMC flow must intervene the alarm status. The state, however, shows if in the last minute are transmitted, or not, the 8A and 3A groups and if the alarm has expired.

TMC OFF: groups not transmitted with TIMEOUT not set

TMC run: 8A and 3A groups transmitted with TIMEOUT not set

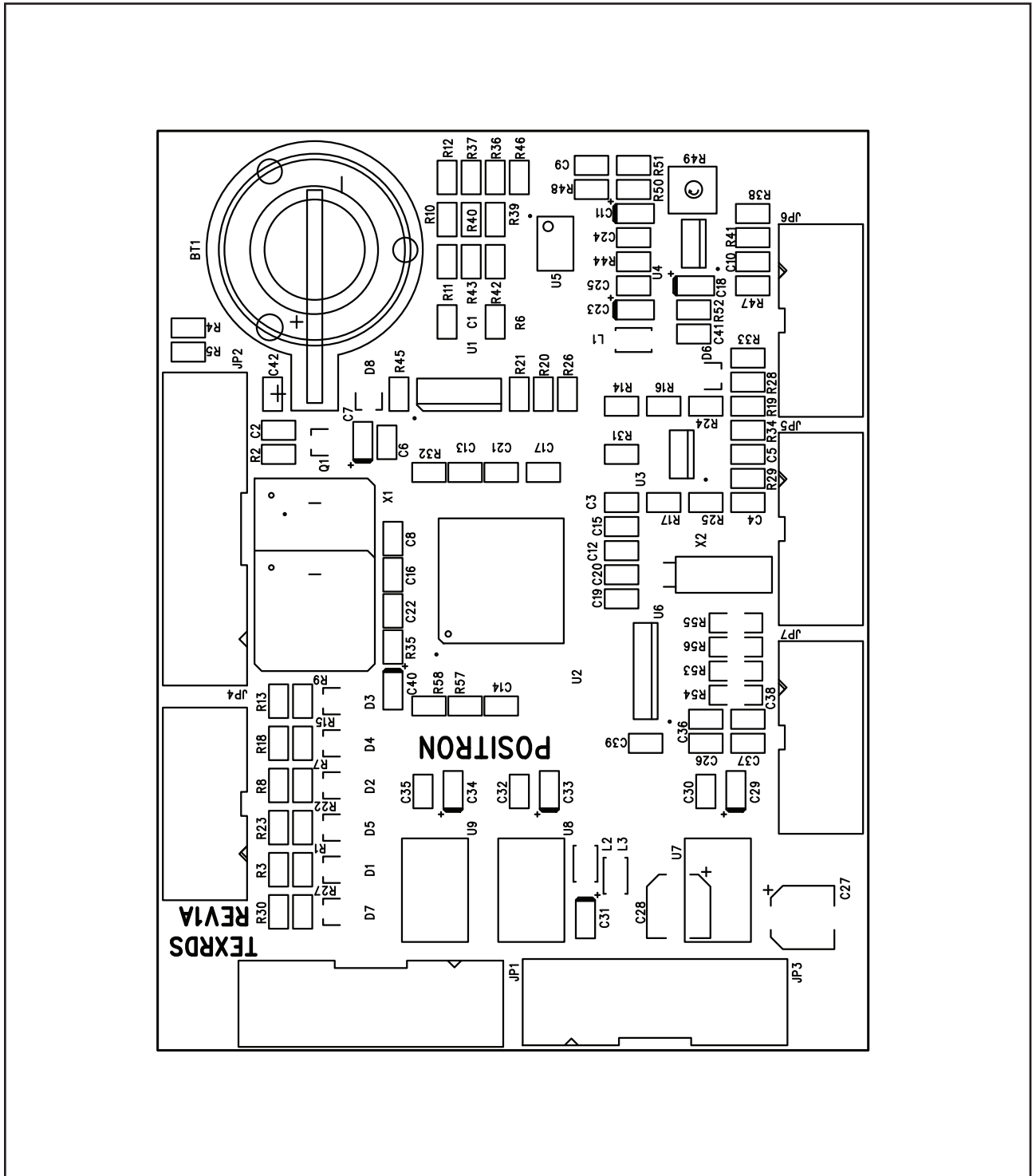
TMC O.K.: 8A or 3A groups transmitted with TIMEOUT not set

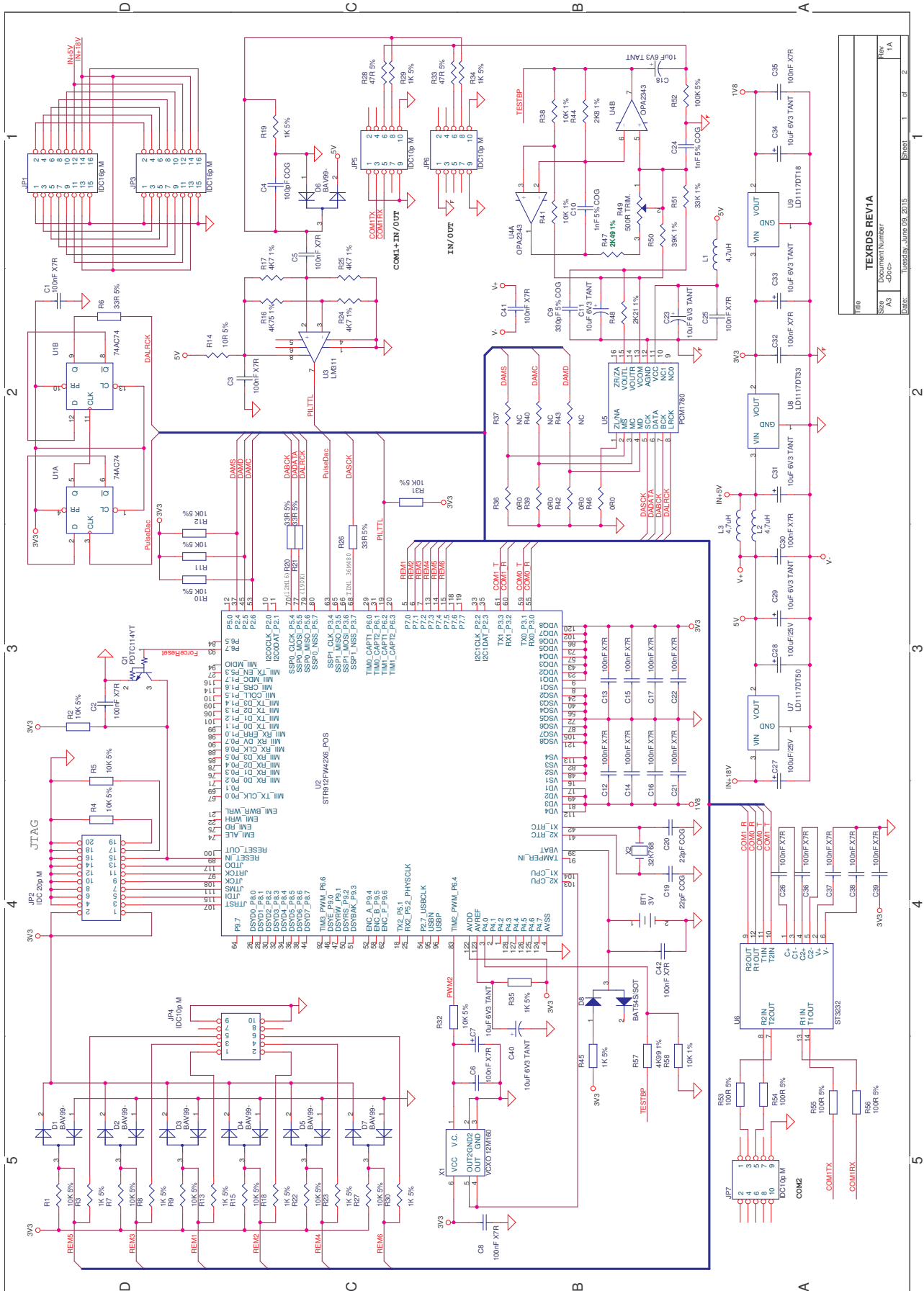
TMC idle: 8A or 3A groups absent with TIMEOUT not expired

TMC alm: 8A or 3A groups absent with TIMEOUT expired

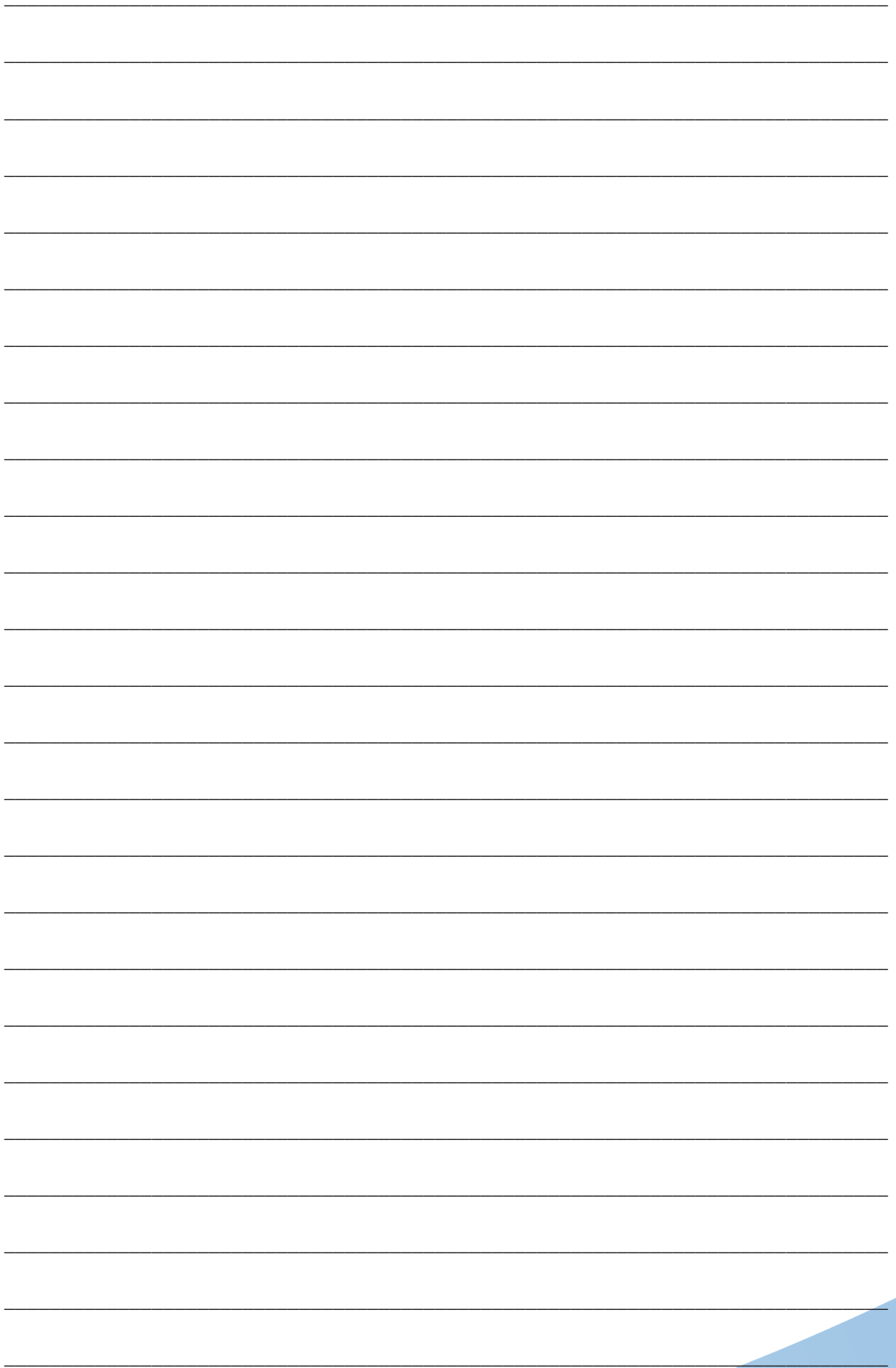
## 7. Technical Annex

### 7.1 RDS board - RDS4003KIT





TEXRDS REV1A	
Doc#	A3
DocName	<Doc>
Date	Tuesday, June 09, 2015
Sheet	1 of 2
Rev	1A





**R.V.R Elettronica**

Via del Fonditore, 2 / 2c  
Zona Industriale Roveri · 40138 Bologna · Italy  
Phone: +39 051 6010506 · Fax: +39 051 6011104  
e-mail: [info@rvr.it](mailto:info@rvr.it) · web: <http://www.rvr.it>

Member of CISQ Federation



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