STL-SAT Changeover

User's manual

THRSHLDS RdsQ1: 50 %
MpxIn: 30 % LR: 5 %

STL-SAT CHANGEOVER

MAIN
BACKUP
ALARM
RUN

itel

itel
elettronica e telecomunicazioni

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Section

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Introduction

1 Introduction

The equipment realizes a partial or complete re-coding system of the RDS signal already contained in the incoming signal and automatic MPX exchange between the MPX source and another stereo audio source such as a satellite decoder.
The RDS signal in the MPX can be switched directly to the output or suppressed and replaced completely or partially.
Internal RDS coder settings, such as PSN, RadioText, PI, PTY, DI strings, will be transmitted in cases where the unit must be fully replaced by the RDS signal, or if the stereo audio source is aired .
In partial re-coding, only alternative frequency tables are replaced, while the rest of the information will remain the same as the original RDS signal.

Optional GSM modem add-on modules or ethernet connection interface allow remote control of the device.

1.1 Review

1.1.0 18/1/2014 First Edition for firmware 2.0.0.0

2.0.0 16/6/2014 New functions for firmware 2.1.0.0: tunnel RDS-MPX, BYPASS function on GPIO e SMS. Proper Pin Out GPIO

2.0.1 2/7/2014 New functions for firmware 2.1.0.1: dropouts reconize

3.0.0 10/04/2017 New LCD Menu, New SW functions, NSR Measures on MPX e reconize software dropouts (glitch) on satellite

1.1.1 Patent

- Italy Patent n° 1.427.697
- New Patent Pending

1.2   Warnings

Before attempting any operation, please follow the safety instructions contained in the following paragraph

The producer declines any liability for damage to people or things due to non-compliance even if partial, of the following indications

- Ensure that the supply voltage corresponds to what is indicated on the apparatus.

- Ensure that the electrical system is equipped with ground connection,

- Use only power sockets and cables with ground connection

- Disconnect power before attempting any operation inside the device

- The power cutting device is the power cord, so this should be easily accessible and the socket must be positioned close to apparatus

- Any operation involving the access to internal parts must be performed only by trained service personnel.

1.3 Front Panel
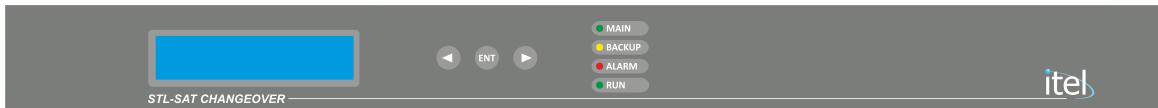
Front Panel indicators

- MAIN   Main audio is on output
- BACKUP   Reserve audio is on output
- ALARM   Fixed: One or many alarms are active

                   Blink: No alarms, Warnings active
- RUN   Blink, Equipment OK.

Front Panel Push Buttons

- <   left/increment
- ENT   edit/enter
- >   right/decrement

1.4 Rear Panel

Connectors and Regulations on Rear Panel

- LEFT INPUT (XLR-F)   Audio Analog Left Input from SAT Receiver
- RIGHT INPUT (XLR-F)   Audio Analog Right Input from SAT Receiver
- TRIM LEFT/RIGHT   Fine tuning L/R Level (+/-0.5dB)
- MPX IN 0dBm (BNC-F)   Input MPX STL. Nominal Level Accepted 0dBm
-                                    (2.2Vpp, 775mV RMS)
- RDS INJ   RDS Level for OUT 1..3
- TRIM IN   MPX Input Fine tuning (not present in all models)
- TRIM OUT   MPX Out fine tuning +1dB..-3dB
- PC RS232 (DB9-F)   Com Port RS232
- GPIO   Control Connector GPIO.
- OUT1..3   Independent audio out. *Note: OUT 3 che be configured for be the copy of MPX In (Un buffered) .*
- DC24V IN   Battery Supply Input 24V (min 18V, max 32V)
- DC FUSE 630mAT   Fuse for battery supply

Other connectors are present (LAN, MODEM VDE), GROUND). AC SUPPLY 100..230V AC 50/60 HZ

1.5   Connectors

1.5.1   Audio

Front view XLR female connector

PIN#	DESCRIPTION	NOTE
1	GROUND	Ground
2	+	Positive
3	-	Negative

1.5.2 RS 232
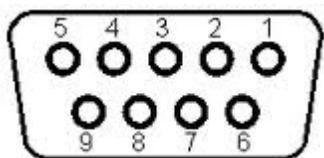
**Front view of RS232 DB9 female
connector**

PIN#	DESCRIPTION	NOTE
1	APP LINK	+9V
2	TXD	Data Transmission
3	RXD	Data Reception
4	PC CONN	External PC Input connection
5	GND	Ground
6	NC	
7	TALKER SEL	Talker devices selection (CPU o MODEM)
8	NC	
9	NC	

1.5.3 GPIO Board

Front view GPIO female connector
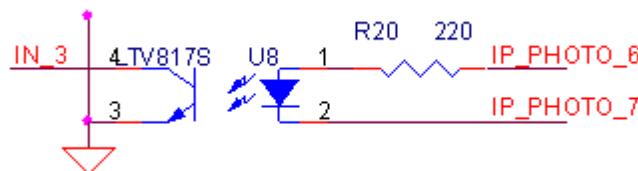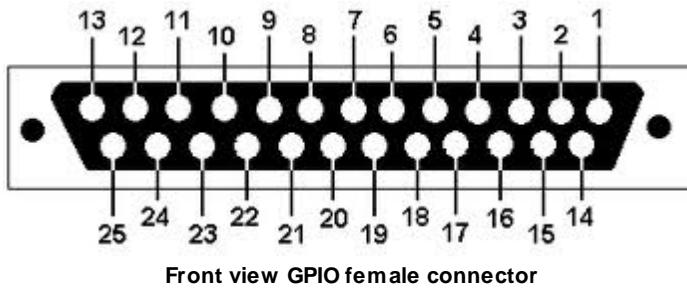
Equivalent input circuit
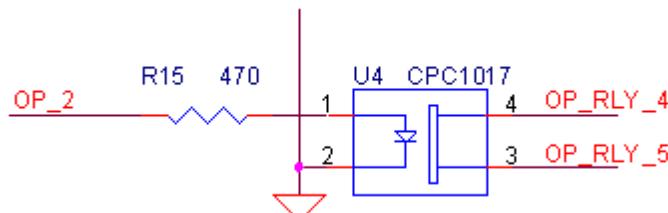
Equivalent output circuit

PIN #	DESCRIPTION	NOTE
1	TLS RESERVE STATUS +	RELAYS CLOSED WITH PIN#2 IF RESERVE CH IS OK
2	TLS RESERVE STATUS -	RELAYS CLOSED WITH PIN#1 IF RESERVE CH IS OK
3	TLS ALARMS +	RELAYS CLOSED WITH PIN#4 NO ALARMS
4	TLS ALARMS -	RELAYS CLOSED WITH PIN#3 NO ALARMS
5	+5V OUT	5V OUT 220 OHM SERIES RESISTOR
6	+5V OUT	5V OUT 220 OHM SERIES RESISTOR
7	TLC ON +	ANODE OPTOELECTRONIC DIODE WITH 220 OHM SERIES RESISTOR
8	TLC ON -	CATHODE OPTOELECTRONIC
9	TLC OFF +	ANODE OPTOELECTRONIC DIODE WITH 220 OHM SERIES RESISTOR
10	TLC OFF -	CATHODE OPTOELECTRONIC
11	NC	
12	TLC DROPOUT +	ANODE OPTOELECTRONIC DIODE WITH 220 OHM SERIES RESISTOR
13	TLC DROPOUT -	CATHODE OPTOELECTRONIC

14	TLS MAIN ONAIR +	RELAYS CLOSED WITH PIN#15 IF MAIN CH IS ON OUT
15	TLS MAIN ONAIR -	RELAYS CLOSED WITH PIN#14 IF MAIN CH IS ON OUT
16	NC	
17	NC	
18	+5V OUT	5V OUT 220 OHM SERIES RESISTOR
19	+5V OUT	5V OUT 220 OHM SERIES RESISTOR
20	GND (CHASSIS)	
21	GND (CHASSIS)	
22	GND (CHASSIS)	
23	GND (CHASSIS)	
24	TLC BYPASS -	BYPASS APPARATUS.CATHODE OPTOELECTRONIC
25	TLC BYPASS +	ANODE OPTOELECTRONIC DIODE WITH 220 OHM SERIES RESISTOR

1.6   LCD Menu

The various menus can be accessed via the "left / increment" and "right / decrement" buttons on the front panel, to edit editable parameters, once you enter the desired window, press the "Edit / Enter"

```
Clip: ON P_Emph: ON
In Gain: 0dB
```

Pressing the edit / enter key will display a "*" next to the first editable item. The indicator does not appear if there are no editable items in the window.

```
Clip: ON* P_Emph: ON
In Gain: 0dB
```

By pressing the "left / increment" or "right / decrement" buttons, you can position (with the "*") on the other editable items in the selected window.

```
Clip: ON  P_Emph: ON *
In Gain: 0dB
```

If you want to change the status of the pre-enphasis, for example, press the "Edit / Enter" button again. The "*" symbol replaces a "<" symbol, which indicates that the parameter is now being edited.

```
Clip: ON  P_Emph: ON <
In Gain: 0dB
```

Now pressing the "Right / Increment" and "Left / Decrement" keys, you can change the value of the selected parameter.

```
Clip: ON  P_Emph: OFF <
In Gain: 0dB
```

Once the desired value has been set, press the "Edit / Enter" key again. The symbol will return "*" to indicate that you have returned to navigation mode. You can then go to modify other parameters within the same window.

```
Clip: ON  P_Emph: OFF*
In Gain: 0dB
```

If the editing operations are finished, the "Edit / Enter" button once again is displayed. The "*" symbol will disappear and you will be able to navigate through the other windows using the "Left / Increment" and "Right / Decrement" keys

```
Clip: ON  P_Emph: OFF
In Gain: 0dB
```

1.7 Password

Parameter editing is password protected, therefore, at the first attempt to modify any of the parameters, the access code request window will be displayed
Default Code is "0000".

Once the access code has been entered, place on the "ENTER" element, which will start blinking, and press the ENT key on the front panel.

At this point you will be redirected to the window within which you were doing the editing operation.

The unit will automatically return to lock status after 2 hours from the last push of a button or immediately with the "LOCK" function.

Section

Display Function

2

2   Display Function

The menus available in the current software version are:

- Mpx Encoder
- Rds Encoder
- Changeover
- System

Once you have selected the menu to access the submenus where you want to edit the parameters, just press the edit / enter key

2.1   Station ID

On the main page along with the name of the various menus to the left of the "<" symbol, a user-definable label is shown on the bottom line to identify the repeater to which the device is assigned.
The text shown will not be sent to any RDS block, since it is only a reference for the user.

2.2   Mpx Encoder

The first available menu is Mpx Encoder, once the edit / enter key is pressed you access the submenu parameters.

2.2.1   Audio Levels
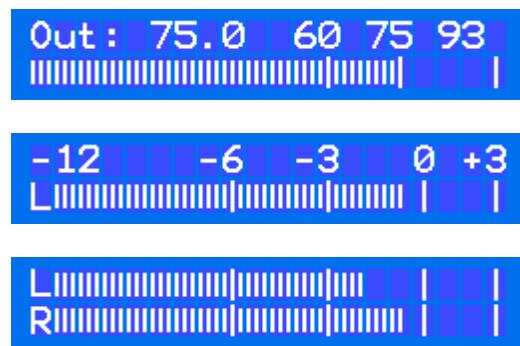
In the first submenu of the Mpx Encoder, the MPX output level is indicated.
The subsequent displays show the input levels of the left / right channels, with a graduated scale in dB in one and both channels in the other.
The input level can be adjusted by 0.5dB steps through the next menu by using the "In Gain" parameter or, finely, using the trimmers on the rear panel next to the audio input connectors (TRIMs).
A 0dB input level on both channels will produce a total deviation relative to the audio only, excluding the pilot carrier and the RDS signal, of about 67KHz.
By adding these two components, you will achieve the 75KHz total deviation.

2.2.2 Pre Enphasis, Audio Level and Clipper

```
Clip:OFF P_Emph: ON
In Gain:-12.0 dB
```

In the second submenu of the Mpx Encoder you can adjust the audio signal input level at 0.5dB steps, activate the clipper and pre-phase. If a fine adjustment of the input level is required, it is possible to act on the TRIM trimmers placed next to the audio input connectors that allow a continuous adjustment of +/- 0.5dB.

2.2.3 Pilot Level And Phase

```
Pilot Lv:     6.0 KHz
Pilot Ph:    0.00
```

In the third submenu of the Mpx Encoder you can set the level and phase of the pilot tone of the stereo coder.

2.3 Rds Encoder

```
Rds Encoder     <
ID:Station name
```

The second available menu is Rds Encoder, the parameters in this menu are related to the programming of the internal coder.

2.3.1 PS,PI, PTY Indications

```
PS:My Radio  PI:0000
TY:11 MS:1 TP:1 TA:0
```

In the first submenu of the Rds Encoder the following parameters are shown:

PS: Program Station Name
PI: Program Identification,
TY: Program TYpe,
MS: Music/Speech, 1 for the most of the time music programs, 0 for the most of the time speech programs.
TP: (Traffic Program) 1 indicates that the issuer, during programming, provides traffic information, but these are not necessarily aired at the moment.
TA: (Traffic Announce) 1 indicates that, at present, the issuer is providing a traffic information program

The PS will only be shown when the coder generates RDS signal internally. In the 'override AF tables' mode, the PS already on the MPX input will be aired.
In this case, the word 'OVERRIDE' will be indicated instead of the PS.

2.3.2 Radiotext Indications

In the second sub-menu of the RDS Encoder are shown the strings related to internally programmed radiotext.

Radiotext:
this is a very long

Radiotext:
radiotext to show it

Radiotext:
 scrolling

It indicates if the encoder is running then enabled for transmitting the Radiotext and radiotext currently transmitted.

Note: As the radiotext string is longer than the display, it will be displayed for 20 character blocks each. The resulting animation is not present on the actually streamed string. An example is shown in the images.

As with the PS, the internal Radiotext is aired and displayed on the display when the unit is not in 'override AF tables' mode.
If this mode is selected, the radiotext will be transmitted, if present, of the incoming MPX signal and "OVERRIDE MODE" will be displayed on the display.

2.4 Changeover

The third available menu is Changeover, which defines the modes of exchange, parameter setting, timing and intensity thresholds.

2.4.1 Set Up main channel and back up

In the first changeover submenu, you can set the main (Main) and Back (Main) channels, each of which can be selected from:

STE: Stereo-encoded L / R audio input, internally generated RDS
MON: L / R audio input, internally generated RDS
MPX: External MPX input, RDS generated internally if an incoming RDS signal is not available.
FILT: External MPX input eliminating the RDS sub-carrier.
this mode is selected if you want to complete the RDS block replacement on the incoming MPX signal or replace the AF tables only.

The current channel is also provided

Out: <STE,MON,MPX,FILT> channel currently on the air
Out: Mute no channel is aired because both are in alarm condition
Out: BYP! the output was bypassed to the MPX input for one or more internal malfunctions (see window status / alarms)

Finally, the status of the timer is displayed for switching to the backup channel or, from the backup channel, to the main channel.
Ctr:0

If swap channels are switched on (SwapChans: ON), the words "Main" and "Back" will alternately flash with "Swap" to indicate this state.
You will see that the backup channel will be aired even if the main channel is valid.
The "Main" and "Back" labels will continue to indicate the channels that, under normal conditions, are the main and secondary channels, respectively.

2.4.2   Changeover Setting Mode

```
Alarm Setup
Audio Level   OFF
```

In the second changeover submenu, you can set the various parameters that handle the exchange conditions:

Audio Level:On/Off   -audio level (can be set in percent by 100% in the THRESHOLDS window)

PI Code:On/Off   -PI code verification, this on the incoming MPX signal, must be equal to the internally generated code

RDS Quality:On/Off   -Incoming RDS signal quality (can be set as a percentage in the THRESHOLDS window)

Pilot Level:On/Off   -pilot tone level that must be higher than 4KHz (the threshold is set to 3KHz)

MPX Noise:On/Off   -signal / noise ratio level on MPX channel (adjustable in dB in the Noise window)

SAT Dropouts:On/Off   -dropouts detected on the stereo L-R audio channel, then from the SAT receiver (Settable Sensitivity in the Dropouts window)

In the following menus are the setting parameters of each respective item.

2.4.3   Changeover Time Set

```
Alarm Timings
Alarm Timeout    20
```

In the third Changeover submenu, Alarm Timings can set commutation times

Alarm timeout: timeout (in seconds) before the exchange is made once an alarm condition is detected.
Back Timeout: timeout (in seconds) to restore the main channel once the cause of the alarm has been cleared.

2.4.4 RDS Substitution(override) and Tunnel RDS-MPX

```
Override :AF Tables
STL RDS on SAT:0
```

In the fourth Changeover submenu you can select the override mode of the incoming RDS signal, the available modes are:

AfTables: only the alternative frequency tables are replaced, leaving the other contents of the incoming RDS signal unaltered.

Full: the incoming RDS signal is suppressed and replaced completely with the internally generated input signal.

Both modes are supported if the MPX channel, master or backup, is set to "FILT" mode.

STL RDS on SAT: By setting this flag a1, you can have the RDS stream received from the MPX input even when the L / R channel is airing.

2.4.5 Dropouts Reconize

```
HW Dropouts   :0
SW Drops sens:Min
```

In the fifth changeover submenu, the parameters of the satellite dropouts are available:

HW Dropouts: By setting this flag to 1, it activates the dropouts detection on the GPIO input, the contacts of this port relative to the DROPOUTS input must be connected to the SAT receiver status output, this function requires a (Hardware) acknowledgment from the decoder sat.
During regular operation, then in the absence of dropouts detected by the SAT decoder the contacts must be closed.

SW Drops sens: It allows you to choose three levels of sensitivity (minimum, average, maximum) in software recognition made by the Dropouts Cahngeover DSP in the L / R audio inputs that come from the SAT decoder.

2.4.6 PI Code Control

```
Fast PI-Plt SW:0
Ignore REG PI :0
```

In the sixth Changeover submenu there are two extensive swap configuration flags:

Fast PI-Plt SW: if "1" is switched on and an exchange mode is entered that includes control of the PI code and / or pilot tone level, causes immediate switching to the reserve channel if an unsuitable PI code is detected and / or the tone is missing pilot.

Ignore REG PI: if activated "1", it will validate the incoming PI code and all its regional variants.
For example, having a PI 5252 internally programmed, 5452 or 5C52 will also be considered valid.
This flag should be programmed if you intend to use an exchange mode that includes the PI code control and

the broadcaster transmits regional programming or advertising splits.

2.4.7 SNR on MPX

```
Noise lev:-67.3   dB
Noise thr:-30     dB
```

In the seventh submenu of the Changeover, the MPX channel deul noise measurements are displayed

Noise lev: measured noise level with respect to the 0 dB of the MPX audio signal.

Noise thr: the noise exchange threshold when it is exceeded and the MPX channel has a noise signal ratio worse than the one set, the exchange

2.4.8 Threshold Levels

```
THRSHLDS RdsQl: 90 %
MpxIn: 20 % LR: 20 %
```

In the eighth Change Over submenu, THRESHOLDS, you can set alarm thresholds for MPX and L / R channels.

To be considered valid, the values read by the channels should be higher than or equal to those set.

RdsQl: RDS input quality threshold
MpxIn: input MPX signal threshold
LR: signal threshold coming from the satellite receiver or other source. The control is done on both channels, so if a channel is disconnected or attenuated, the source will still be considered an alarm even if the other channel has the correct level.

2.4.9 MPX parameters Reading

```
Ext PI:0000 Lev: 80%
Qlt:100% 19K: 6,4KHz
```

In the ninth submenu of the changeover, some parameters of the incoming MPX signal are shown

Ext PI: Pi code of the incoming MPX signal. This code, if an exchange mode is enabled that identifies the PI code, must be the same as the PI generated internally, otherwise the MPX source will be considered an alarm.
Lev: peak MPX input signal level (100% = 75KHz)
Qlt: Incoming RDS signal quality.
19K: pilot tone level of input MPX signal.

2.4.10 RDS Data Buffer

```
Buf:||||||||||||||||||||||||||||||||| |
Qlt: 98% Alg:=
```

In the tenth menu under the Changeover menu are displayed: the status of the buffer that contains the incoming RDS data, the quality and the time base used.
A proprietary algorithm manages the buffer queue to ensure proper operation even under difficult reception conditions.
However, if the quality of the RDS signal drops below 80% and regardless of the override setting, the unit will automatically switch to "full override" by replacing the entire received RDS block with that generated internally.

2.5 System

```
System                <
ID:Station name
```

The fourth available menu allows you to select some system parameters such as general settings, communication, keyboard, and password.

2.5.1 GPIO Port Control

```
GPIO Enab: ON In: 0
SwapChans:OFF Eth:1
```

In the first submenu of the system, the control window of the GPIO card and the reversal state of the master-backup channels are shown.
It may be necessary sometimes to temporarily exchange the master channel with the secondary (backup).
This function can be called by activating the "SwapChans" flag, by means of a sms ("SWAP" command) or by a temporary contact on the TC_SWAP input of the GPIO card: each GPIO or SMS message impulse will reverse the state of the Swap function.

Example:
 Start   SwapChans=OFF
 <input close for while TC_SWAP>   SwapChans=ON
<sms "SWAP">   SwapChans=OFF

<sms "SWAP">   SwapChans=ON
<input close for while TC_SWAP>   SwapChans=OFF
<input close for while TC_SWAP>   SwapChans=ON

GPIO Enab:<ON/OFF>   :if ON, you can control the exchange of master / backup channels using the GPIO port.

In OFF mode, the outputs will still be piloted, but the unit will not accept commands from this interface.

NOTE: The GPIO input must only be enabled if the optional GPIO card has been installed

In: xxx   :Decimal value representing the state of the inputs.
SwapChans:<ON/OFF> :if ON, the master / backup channels will be exchanged.

The SwapChans function is intended as a temporary mode and will be indicated in the status window with a warning.

Eth: if set to 1 enables the Ethernet communication interface if it is installed.

2.5.2   Reading Parameters

```
BattV:24.7  Alm:OFF
Mains:OK AlmMin:OFF
```

The second submenu of the system displays the parameters related to the power supplies and their alarm conditions

BattV: battery voltage connected to the rear input. Voltage is considered correct if greater than 20V.
Alm: (ON/OFF) if it is ON (ON), an alarm will be generated if the battery voltage is less than 18V.

Mains:(OK/NO) indication of the status of the network power supply.
AlmMin:(1..255/OFF) timeout in minutes for sending the alarm message for missing network. A message will be sent after the network is missing for a longer time than the one set, and after the same period of time, to reboot the network power.

2.5.3   Modem Status and SMS alarms Activation

```
GSMdBm:-64  SMS:ON
IDLE 0 TestSend:OFF
```

In the third submenu of the system there are the parameters related to GSM

GSMdBm: field reading received by the modem. Reading is updated once per second.
SMS:(ON/OFF) If enabled (ON), enables SMS communication with the device.
IDLE:(IDLE/RECV/SEND/INIT/DEL/BIN) display of communication activity to PC or modem.
        IDLE: waiting for PC or SMS data from the modem
        RECV: in receiving an SMS message
        SEND: transmission of an SMS message
        INIT: when initializing the modem
        DEL: deleting the received message
        BIN: in binary communication
        the numeric value next to the label indicates the secondary code for the current activity.
TestSend:(ON/OFF) test sending message. When the flag is set to "ON", a test message will be sent to all

the phone numbers programmed in the system.

If the device exceeds the amount of alarms that can be sent per time unit, additional messages will be suspended for a period of 2 hours, and "Pause Reset: 0" will appear in the modem window. By resetting the timer (bring the reset parameter to 1) you can resume sending the message immediately.

2.5.4   IP Settings

```
Ip:192.168.   1. 50
Port:54000
```

If there is the ethernet interface module this page will be present, from here you can view the ip and the door of the machine.
To make changes to network parameters, access the web page of the device through a internet browser by typing the ip address displayed and the following login credentials:
User: admin
Password: admin
The ethernet module allows you to connect to the device via the "Xvr programmer" software provided through the TCP / IP protocol.

```
Connection type                    Remotes list
  ○ Serial port      ● TCP-IP

Communication port: CLOSED

192.168.1.50                           Connect

Remote Port :        54000 ▲▼
```
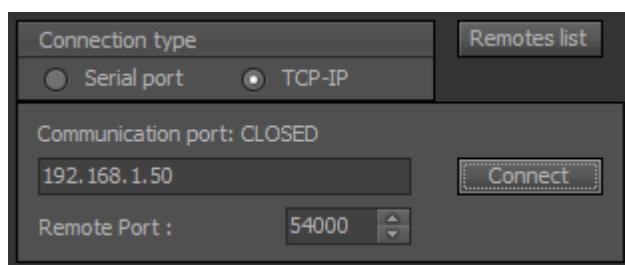
2.5.5   Functioning, Alarms and Warninngs

```
ERRORS:    Reset:OFF
No Errors
```

In the second line of the ERRORS menu, alarms or active alerts will be displayed sequentially.
At the same time, the "ALARM" LED on the front panel will blink if there are warnings and no alarms or it will be lit when there is at least one alarm.

The "Reset" command allows the reset alarm to be reset and will end, if enabled, the bypass mode forced by the user.
If, even after the reset, there are still active alarms, they will be displayed again, otherwise the "No errors" string will be displayed.

No errors: no alarm or warning present

Alarms:
Memory cksum err : Data errors contained in RDS memory
Memory fault: communication errors with RDS memory
Memory unformatted: the memory was replaced and found unformatted
Main audio fault: the main channel is in alarm condition

Backup audio fault: the backup channel is in alarm condition
Ext PI doesn't match: the PI code of the external channel is not equal to the PI generated by the internal RDS coder
Ext RDS quality low: the incoming RDS signal quality is below the set threshold
Battery Low: the battery voltage is below 18V. The alarm will be suppressed when this is greater than 20V.
Mains supply fault: power supply is missing
Decoder-Subsys fault: the RDS decoding block is defective
DSP Fault: the DSP is in failure
PSU Fault: the negative voltage generator present in the internal power supply unit is defective
Chgover is bypassed: the apparatus was placed in bypass. In this condition, the MPX input is passively connected to the outputs.
The apparatus automatically enters bypass when:
The internal power supply is in partial failure and this is indicated by the concomitance of the "PSU Fault" alarm.
-The DSP is failing and the channel "FILT" is aired.
-The RDS decode block is in failure.
Pilot low <3KHz: an exchange mode has been activated that measures the pilot tone and this is below the 3KHz threshold.
Bypass on user rq.: the device is bypass for user request (SMS command or GPIO port). If the bypass is activated by SMS, you can reset the operation resetting the alarms.
Audio Dropouts: dropouts were detected on the receiver connected to the L / R input.
Noise: the MPX channel has exceeded the maximum noise signal ratio threshold

Note:
Warn channel swap:the "SwapChans" function has been activated via SMS, GPIO port or via the menu.

2.5.6 Software Version

```
Sw:3.X.X.X    Bl:XX
Hw:X.X Ds:3.X Sc:XXX
```

The last System submenu shows the software version of the main processor (Sw), the bootloader version (Bl), the hardware version (Hw) the version of the persistent data structure (Ds) and the software version of the slave controller processor Sc).
You should consider these data when you want to upgrade the software of your device.

2.5.7 Blocco password

Parameter editing is password protected, therefore, at the first attempt to modify any of the parameters, the access code request window will be displayed
The default access code is "0000".

```
Passcode:0000
ENTER
```

Once the access code has been entered, position it on the "ENTER" element, which will start blinking, and press the ENT key on the front panel.

```
Passcode:0000
ENTER
```

If you were making settings, you will be redirected automatically to the window within which you were working.

2.5.7.1   Cambio password, blocco sistema

Having entered the correct password, the LOCK and CHANGE entries will be added to the password menu

```
Passcode:0000
LOCK            CHANGE
```

The LOCK function enables the logout to be blocked immediately, otherwise it will automatically lock after a timeout of approximately 120 minutes after the last push of a button.
If you want to change the access code, enter this in the passcode:

```
Passcode:1234
LOCK            CHANGE
```

Then position the "CHANGE" button and press the enter key.

```
Change passcode?
NO              YES
```

A confirmation window will appear. Selecting "YES" and pressing the enter button will change the password and logout.

2.5.7.2   Recupero password

If the password is forgotten, you can retrieve it by the following procedure:

Enter the password window:

```
Passcode:0000
ENTER
```

Hold down the ENTER button for about 30 seconds.

```
Passcode:FDE4A34C9
ENTER
```

A 9-digit code will appear.
This code will be communicated to the manufacturer of the equipment which will provide the access codes.

Section

Control Software

3

3   Control Software

It comes complete with software for setting all coder and exchange functions.
The connection is via a 9600 baud 8N1 serial port, or if the LAN module is installed by TCP connection.

3.1   Main Window
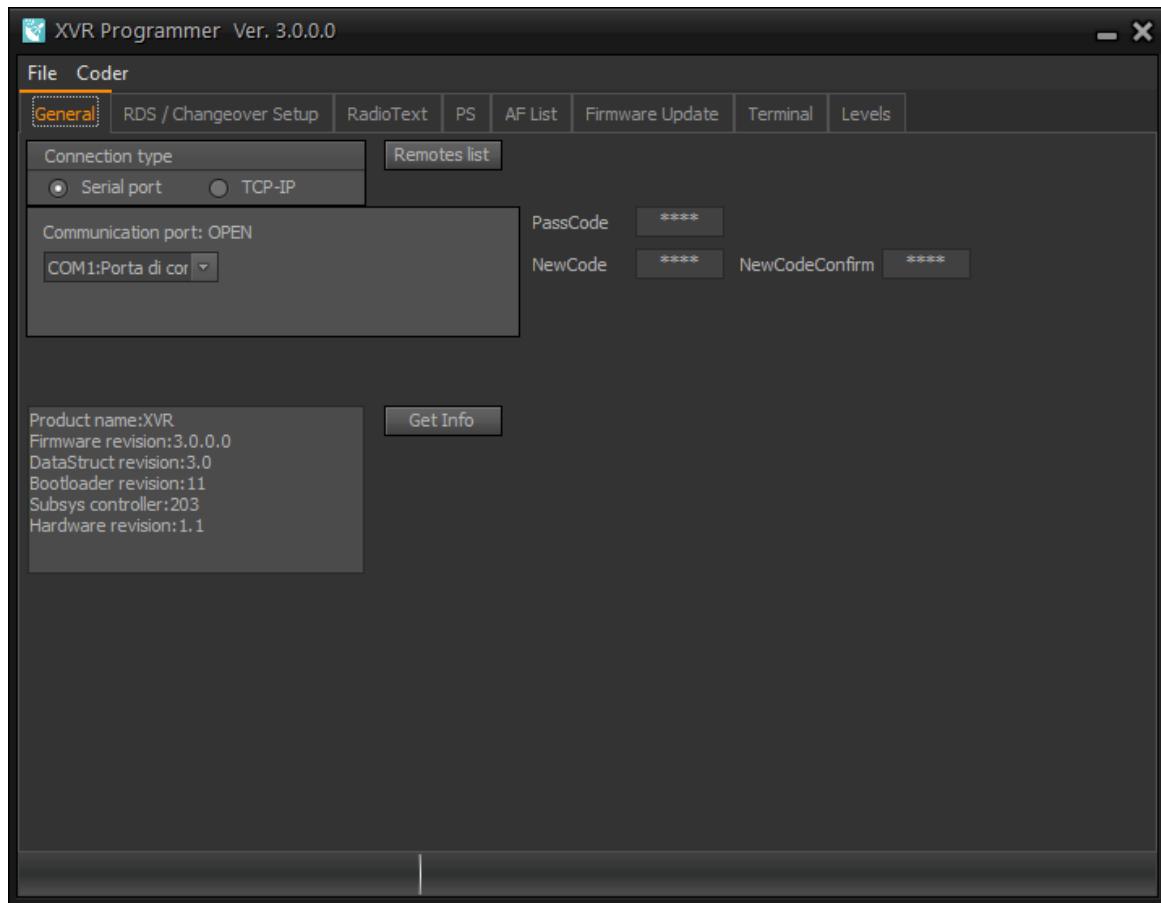
In the main window, you can select the COM port used for communication with the unit.
To check the communication, once the serial port is selected and the login password is entered, connect the device to the PC and press the "Get Info" button.

If communication is correct, you can read:
-ty type of product (product name)
-the version of the datastruct revision
-the firmware version (firmware revision)
-the firmware version of the slave controller (subsys controller revision)
-the hardware version (hardware revision)

The File menu allows you to load and save a configuration file for the entire device including:
- Exchange settings
-RDS attributes
-string radiotext and PSN

-table of alternative frequencies

The Coder menu allows you to read the entire configuration of a device (Read all) or to program an entire device (Write all). Single features, such as alternative frequency tables, PSNs or exchange parameters, can be read from the device or transferred to this separately by means of the "Read" and "Write" buttons in the individual windows.

In the same menu, there are also the functions for managing the access code and updating the firmware of the device.

3.1.1   passcode

The default access code is 0000 and is the code that the XvrProg program, as well as the device, uses at the first start.

This code can be programmed into the device by entering the current code in the "PassCode" box and the new code either in the "NewCode" box or in the "NewCodeConfirm" box.

Then, going to the Coder-> PassCode-> Change Coder Passcode menu, you will start the code change process, after which the code of the device will be changed.

If you want, the new code can be saved to disk so you do not have to type it at every start of the program.

To do this, go to the Coder-> PassCode-> Save PassCode to disk menu.

3.1.1.1   Passcode on XVR file

The access code can be saved to an XVR file so that it can be sent to third parties for device programming without them being aware of the code itself.

To save the access code along with the XVR file, simply go to the "Save Special" menu and choose the "Save XVR file and embed current passcode" function.

The generated file will contain the encrypted access code. When loading the file, if the code entered in this file differs from the code that the user uses by default and can be

saved to disk, will be prompted if you want to use the code contained in the XVR file or if you want to continue using your default code.
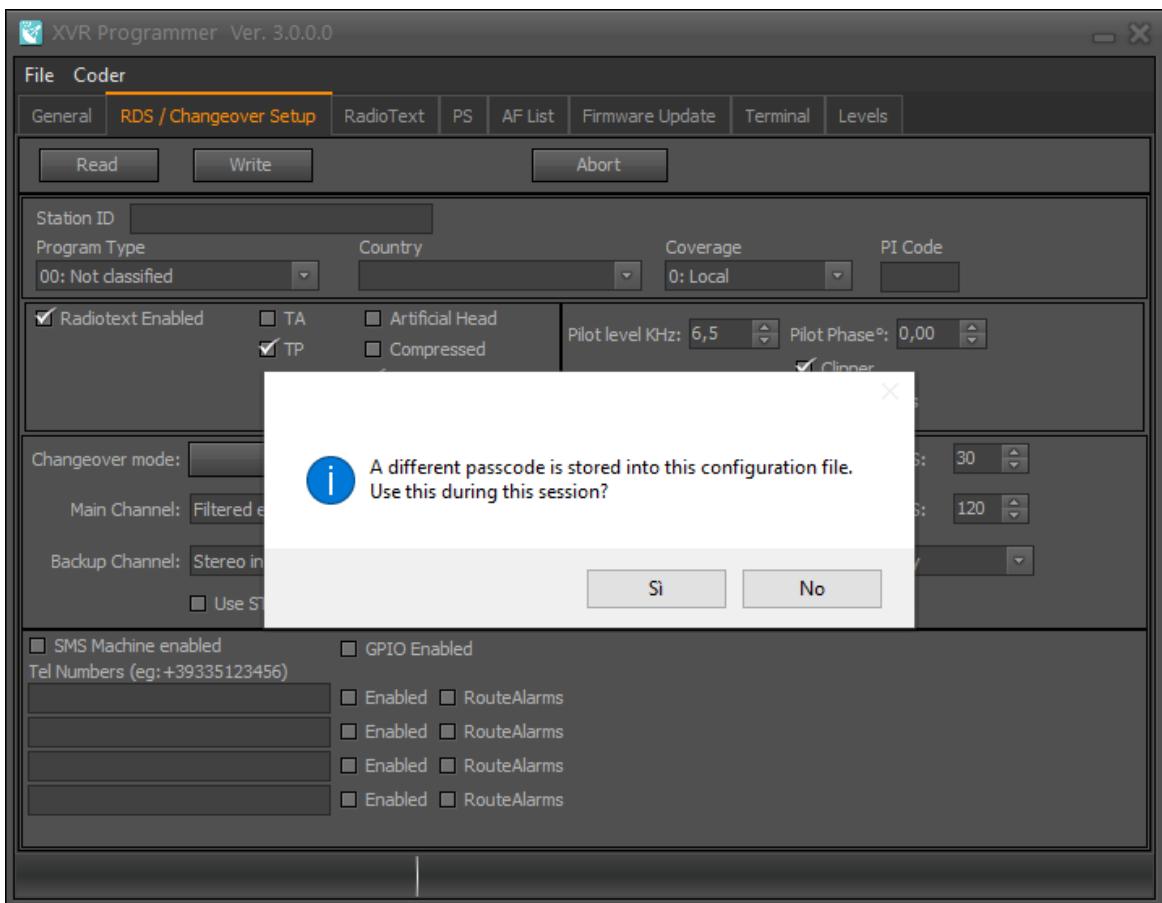
Responding in the affirmative, we will use the code previously saved in the XVR file, otherwise the code entered in the program will be used

3.2   RDS,Changeover and SMS Settings
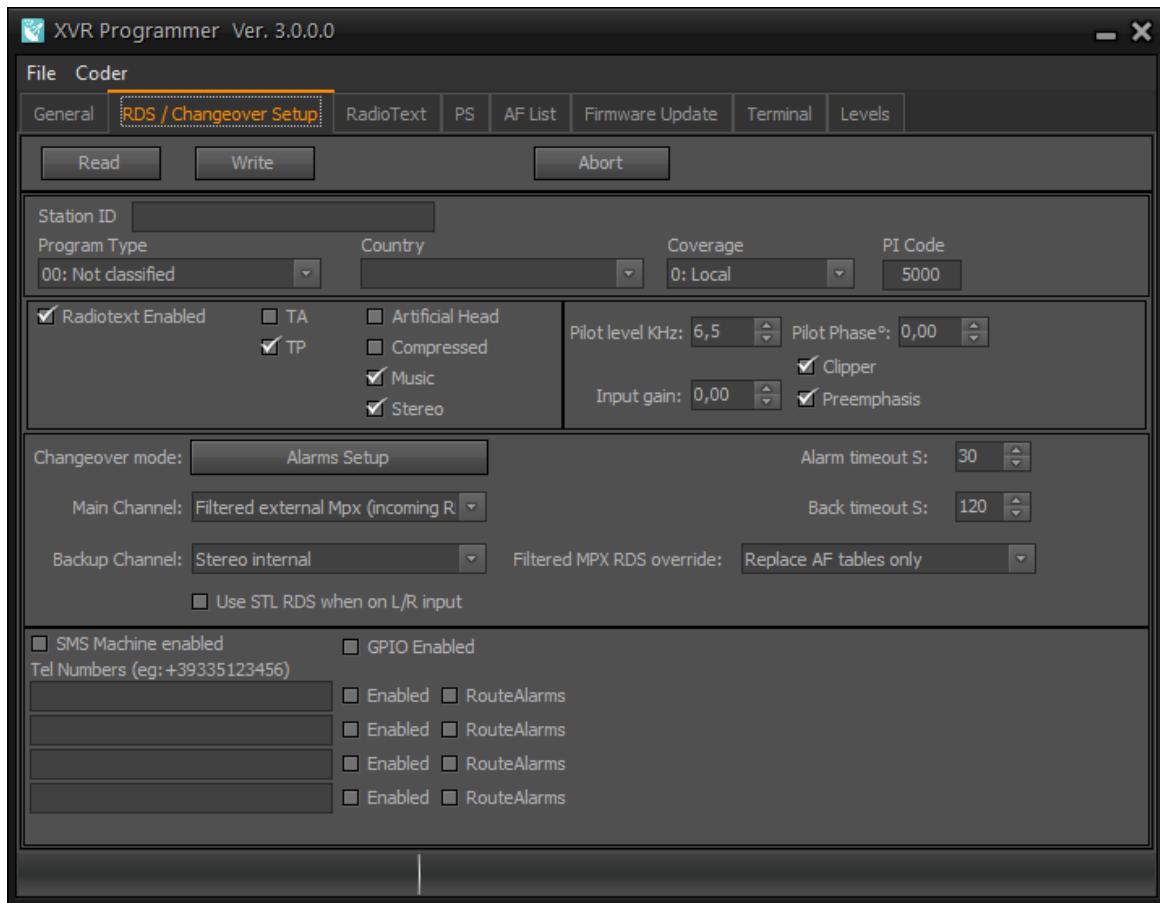
This window shows the device configuration parameters for RDS flags, exchange parameters, and SMS telemetry.

You can read these parameters by pressing the "Read" button or by using the "Coder-> Read all" menu, which will read the entire programming of the unit.

Once the setting is finished, you can only transfer the current window to the device using the "Write" key or the entire programming using the "Coder-> Write all" menu.

3.2.1   Station ID

STATION ID:

This string of max. 16 characters, can be assigned to the coder for its subsequent identification (eg "Monte Mario" or "Coder Seat" or "ABCRadio M.Mario") and is displayed only on the "STATION ID" page of the apparatus.

This string is for the sole purpose of identifying and will not be visible as PSN or Radiotext.

3.2.2   RDS PI,DI,PTY,TA,TP

Program Type	Country	Coverage	PI Code
09: Varied		0: Local	5241

PTY: Program TYpe
Set the format of the station.
Many receivers are equipped to select the stations received by the format type
preferred by the listener.

PI:Program Identification

The PI code, if already known, can be entered directly into the "PI Code" box, otherwise it can be generated by choosing the country from which the program (Country) is originated and Coverage.
Lastly, the user will be asked to choose the last two digits of the code.

The code consists of 4 digits, the first digit indicates the country of origin, the second indicates the coverage area, and the remaining ones identify the issuer within the coverage area.

The first digit, for Italy, should be set to 5.

For the second you choose, depending on the area served, one of the following codes:

0	Local coverage, the issuer has one frequency
1	International
2	national
3	Over regional
4..F	Codes for regional broadcasters

The last two digits identify the issuer in the coverage area and must be different from all other issuers that insist on the same pool.

Some examples:

5001: Italian (5) local coverage (0), program code 01
5202: Italian (5) national broadcaster (2), program code 02
54AF: an Italian broadcasting station (5) with regional coverage (4), AF program code

It is important to note that the PI code is unique in the service area of the issuer, otherwise the frequency change will also occur to the foreign issuer having the PI code equal to one's own.

Flags RDS coder Settings
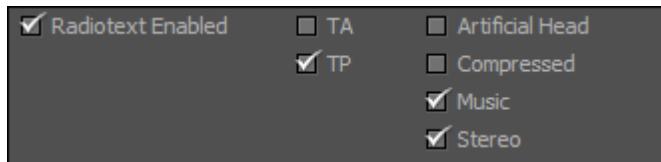
RADIOTEXT ENABLED:
Flag for Enabling Radiotext Transmission.
If disabled, the RDS block type 2A will not be transmitted.

TA:Traffic Annonunce
Traffic News.

TP: Traffic program
Indicates whether the station broadcasts traffic announcements during normal programming.

ARTIFICIAL HEAD:
Flag indicating that the wave program was recorded using an artificial head.
This device is an artificial human head with two microphones placed exactly in the earpieces,
used during recording of a live event, in order to reproduce the original spatiality in a very accurate
manner, if listened to through a headphone.

COMPRESSED:
Flag indicating whether the wave program has been compressed

MUSIC:
Flag indicating whether the station is used to broadcast music or talk.
Some receivers use this information to apply a particular one
equalize the audio or change the volume depending on the type of broadcast program.
STEREO:
Flag indicating whether the broadcast program is stereo

3.2.3 Coder Stereo Settings
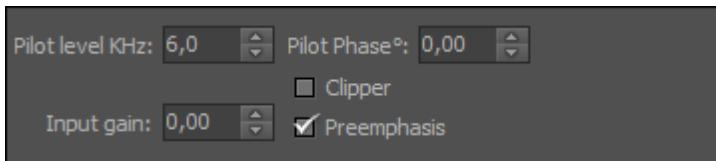
PILOT LEVEL KHz: pilot carrier setting
PILOT PHASE: Pilot carrier phase setting
INPUT GAIN: Input gain setting
CLIPPER: enable the clipper in order to contain the audio peaks.
PREEMPHASIS: pre-emphasis enabling.

3.2.4 Channels and Threshold Settings

Impostazioni scambio:
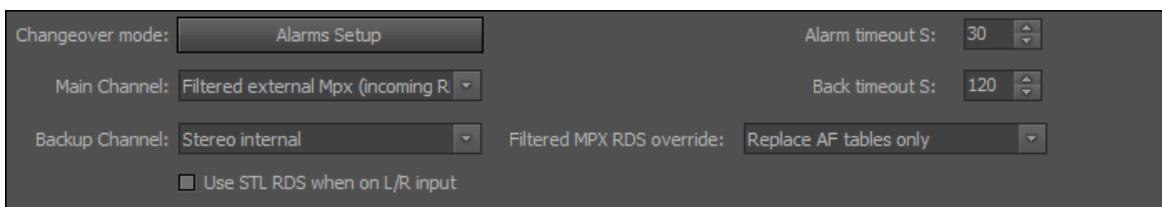
In this section you can make the settings of the modes, times and exchange thresholds. For descriptions of these, refer to the relative front panel configuration windows.

Use STL RDS when on L / R input: By setting this flag, you can have the RDS stream received from the MPX input even when the L / R channel is aired. (available from "STL RDS on SAT: 0/1" display in the "Override" window).

3.2.4.1 Alarms Settings

Push button it will open the following window useful for managing exchange modes, configurable and activated through Flags:
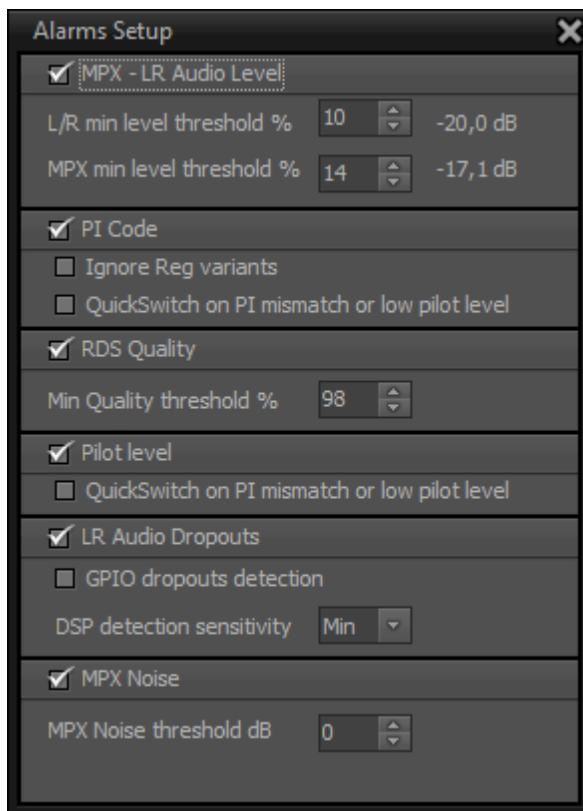
The alarm settings are divided by parameters and can be traced back to the display menu pages described in "Mode setting and switching times"

3.2.4.2 Audio Levels

In this window you set the alarm thresholds for the MPX and L / R channels.
To be considered valid, the values read by the channels should be higher than or equal to those set.

MPX -LR Audio Level: audio level (100% adjustable) (on "Audio level: On / Off" in the "Alarm Setup" window)

MPX min level threshold %: input level MPX input signal expressed as a percentage and converted to dB (on "MpxIn" display in the THRESHOLDS window)
L/R min level threshold %: the audio level of the signal coming from the satellite receiver or other source. The control is done on both channels, so if a channel is disconnected or attenuated, the source will still be considered an alarm even if the other channel has the correct level. (on "LR" display in the THRESHOLDS window).
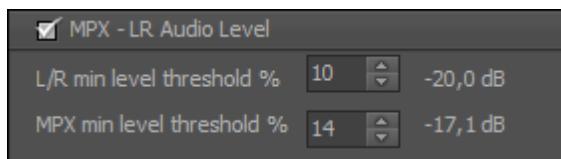
3.2.4.3 PI Code

There are also two extensive swap configuration flags:
QuickSwitch is PI mismatch or low pilot level: if switched on "1" and inserts an exchange mode that controls the PI code and / or the pilot tone level, it causes immediate switching to the backup channel if a code is detected PI unmatched and / or lack of pilot tone. (on the "Fast PI-Plt SW" display on PI Code window).
Ignore REG Variants: If "1" is activated, the PI Entrance Code and all its regional variants will be valid.
For example, having a PI 5252 internally programmed, 5452 or 5C52 will also be considered valid.
This flag is to be programmed if you intend to use an exchange mode that controls the PI code and the transmitter transmits regional programming or advertising splits (on "PI REG PI ignore" on PI window).

☑ PI Code
☐ Ignore Reg variants
☐ QuickSwitch on PI mismatch or low pilot level

3.2.4.4 RDS Data Quality
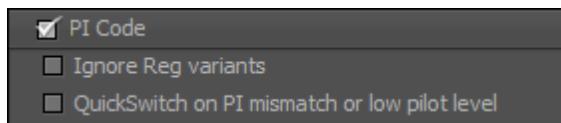
☑ RDS Quality

Min Quality threshold %   98
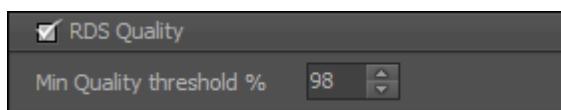
This section sets the minimum alarm threshold for RDS data received in the MPX channel.

Min Quality threshold%: minimum quality of incoming RDS signal, if the quality falls below this value there is an alarm (on "RdsQl" display on TRESHOLDS window)

3.2.4.5 Pilot Level

☑ Pilot level
☐ QuickSwitch on PI mismatch or low pilot level
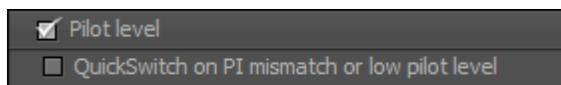
Pilot level: Enables switching if the pilot tone level drops below 4KHz.
QuickSwitch is PI mismatch or low pilot level: if enabled, it can be switched off immediately without waiting for the time set behind the incorrect PI condition or the pilot tone level below the threshold.

3.2.4.6 SAT Dropouts reconizer

☑ LR Audio Dropouts
☐ GPIO dropouts detection
DSP detection sensitivity   Min
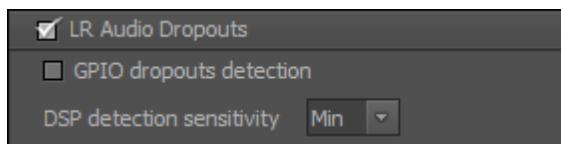
LR Audio Dropouts: Enables switching behind dropouts
GPIO dropouts detection: enables dropout detection by means of a dedicated contact of the GPIO port, in this case the detection is done by the SAT decoder and communicated to the GPIO port contact.
DSP detection sensitivity: allows you to choose the sensitivity level in dropout software on L / R input, this measurement is performed directly from the exchange on the received signal.

3.2.4.7 SNR on MPX
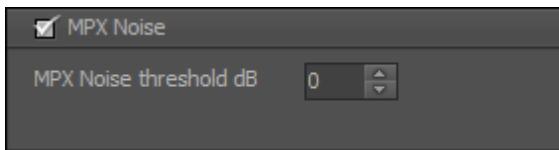
MPX Noise: Enables the exchange under condition of exceeding the threshold noise.
MPX Noise threshold dB: MPX channel noise response threshold level, reading and the value set here refers to the 0dB level.

3.2.5 SMS - GPIO Settings
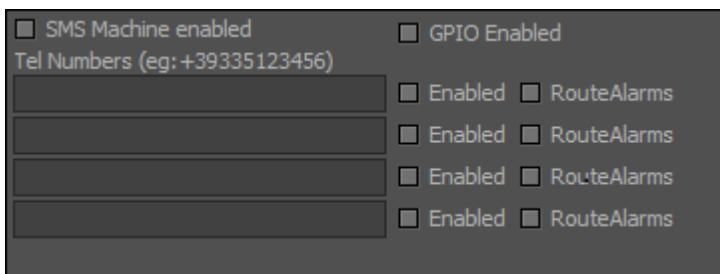
SMS Machine enabled: Enable communication alarms by SMS.

It is possible to enter four phone numbers to which the alarms will be sent by the device, each number should be entered with the international prefix (eg +39 for Italy).
Each number must be enabled (Enabled) and, if you want these alarms to be forwarded, the "RouteAlarms" flag must be enabled.
If the number is not enabled, it is as if this is not present in the device and can not receive alarms or send commands or status requests.
However, if you do not set the RouteAlarms flag, no alarms will be sent to the number, but you may be prompted for the status and send commands.

GPIO Enabled:

If enabled, enable the inputs of the GPIO port.
If idle, GPIO port outputs will be active, while the unit will no longer receive commands from it.

3.3 Radiotext Settings
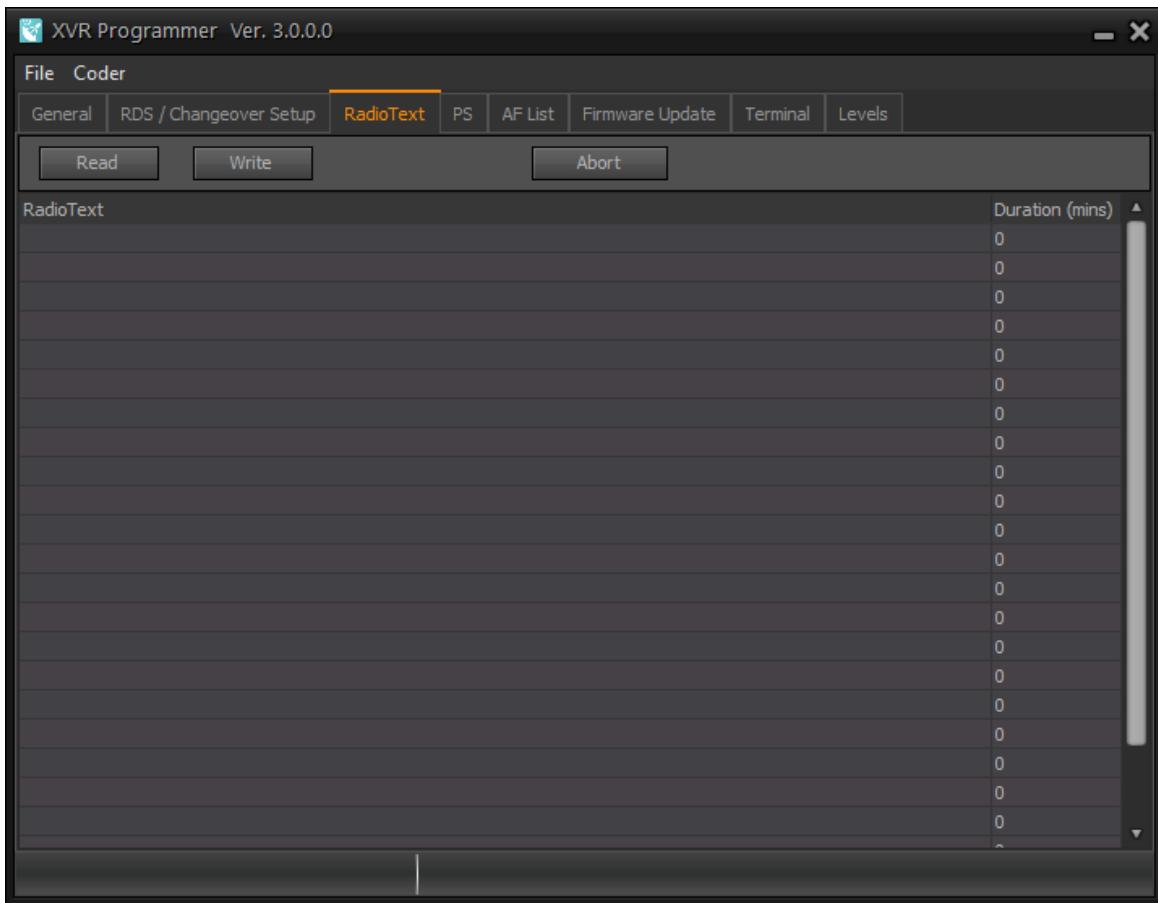
In this window you can enter radiotext strings, each of which can be up to 64 characters long. You can set the display duration in minutes for each string.
Once set to zero, disables the corresponding string.

Read:
button for reading all the radiotext strings in the coder.
Warning: the strings in the program grid will be overwritten.

Write:
button for transferring radiotext strings to the coder.
Warning: the strings in the coder will be overwritten.
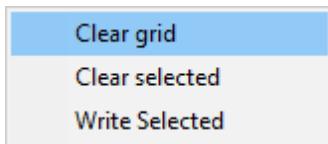
Right-clicking on the grid will display a popup menu for the functions:


Clear grid: delete all the strings in the grid.
Clear selected: deleting only strings selected in the grid.
Write selected: Only the selected strings are sent to the device.

3.4 PS Settings
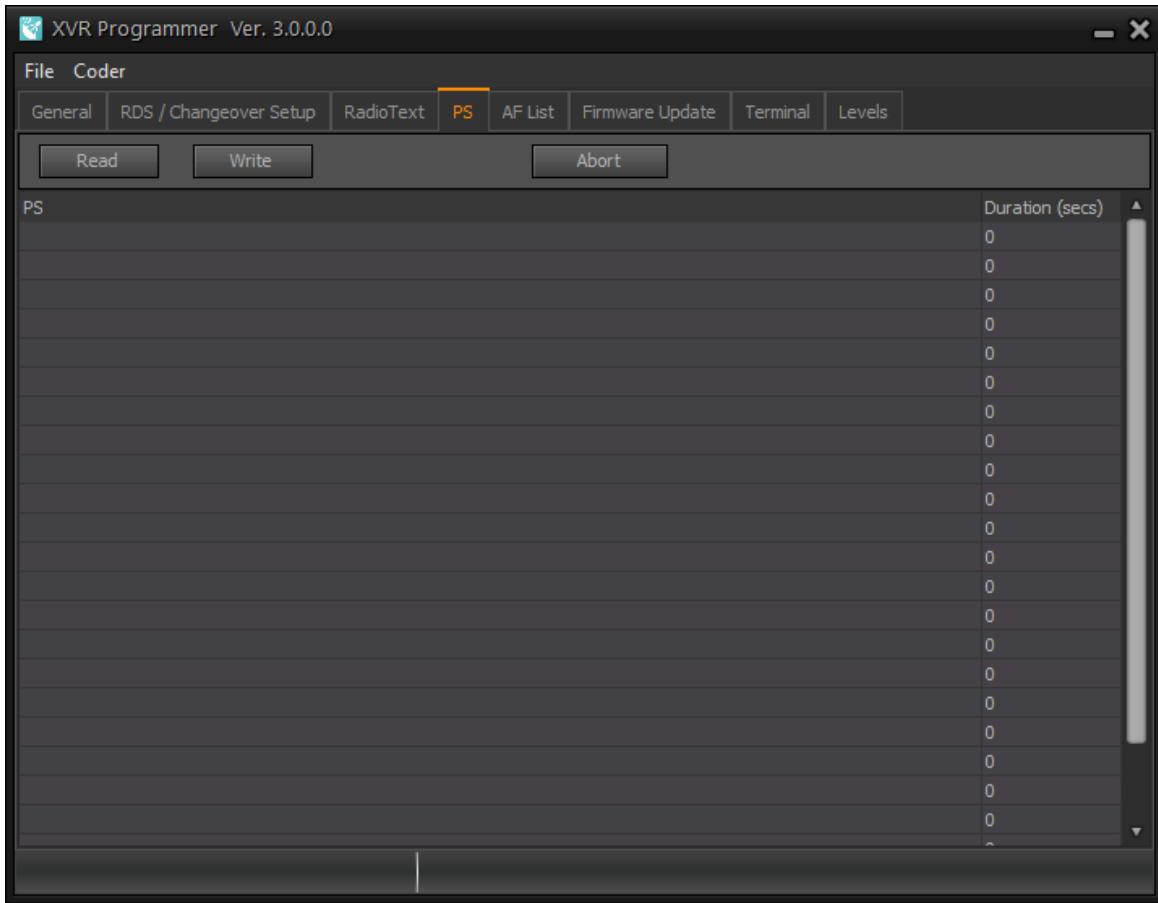
In this window, you can enter the PS strings that will be displayed in the receiver, each of which can be up to 8 characters long.
For each string you can set the display duration in seconds.
Once set to zero, disables the corresponding string.

READ:
button for reading all the PS strings in the coder.
Warning: the strings in the program grid will be overwritten.
WRITE:

button for transferring PS strings to the coder.
Warning: the strings in the program grid will be overwritten.

Right-clicking on the grid will display a popup menu for the functions:

| Clear grid |
| Clear selected |
| Write Selected |
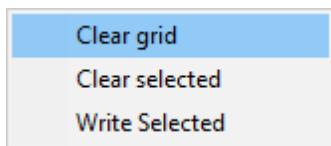
Clear grid: delete all the strings in the grid.
Clear selected: deleting only strings selected in the grid.
Write selected: Only the selected strings are sent to the device.

3.5 Alternative frequencies
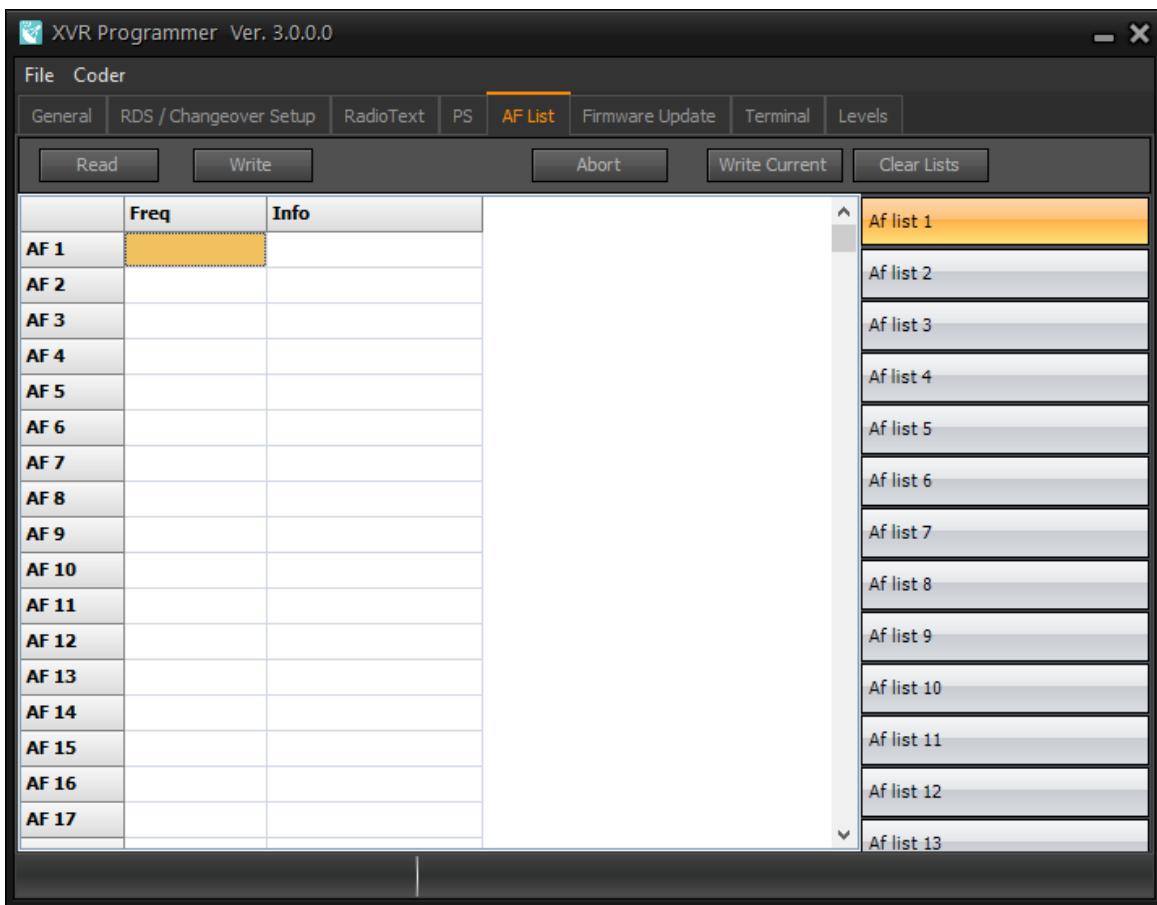
The RDS encoder allows the input of frequencies either with "A" method or with the "B" method.
The choice between the two methods depends on the network structure and the number of alternate frequencies present.
There is no flag indicating to the receiver if alternate frequency tables are transmitted using "A" or "B" method, the difference between the two methods is in the layout of the frequencies in the tables.

Note:
You can not compile different lists using Method A and B at the same time.
*Method A is to be used only when the network has a maximum of 25 frequencies and does not program regionally differentiated.*
Method B is used instead when the alternate frequencies are greater than 25 or when, within the same network, regional programs, such as local newsletters, are broadcast only on some frequencies.
The lists must be filled out from the first and filled in without leaving empty lists: the lists next to the first empty list will not be transmitted.

Editing

In the pop-up menu that you can right-click, there are the main tools for compiling the list
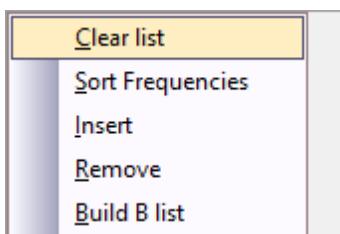
Clear list: deletes the current list only
Sort Frequencies: Sort all ascending frequencies
Insert: inserts a new frequency at the required point and moves down the other frequencies in the list.
Remove: Removes the selected frequency.
Build B list: When AF1 is set as a master frequency and up to 12 alternate frequencies in AF2..AF13 positions, a "B" list will automatically be generated

3.5.1   A Method

This method is the simplest and is suitable for all broadcasters with a maximum of 25 alternative frequencies and do not make regionally differentiated programs.

To implement this method, just enter all the frequencies of the broadcaster in the list 1 list.
Once you have finished inserting, you can sort ascending frequencies by clicking on the grid with the right mouse button and calling the "Sort Frequencies" function.

Example:

104.1
91.3
88.3
104.5
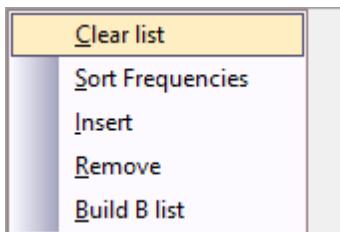
88.3
91.3
104.1
104.5

You can not fill in more than one list of frequencies with Method A, which provides that the frequencies are up to 25 and in a single list.
If there is a need to insert a greater number of alternate frequencies, use Method B.

3.5.2 B Method

This method is indicated if the issuer has more than 25 alternative frequencies or if a multi-regional or national broadcaster diffuses differentiated regional programs at different times of the day.

In this method, the number of busy lists is equal to the number of repeaters present, so the frequency of each repeater and all its possible alternatives is spread.

Each alternate frequency is always transmitted in pairs with the capolist frequency to which it belongs; the order of the capolist-alternate pair defines whether that particular alternative frequency is a regional variation of the capolist frequency.

Each list begins with the capolist frequency, followed by 12 capolist-alternative pairs; If the alternate frequencies were greater than 12 for the same leader, two or more lists may be used.

If instead the same headlamp frequency is used more than once in the network, the alternative frequency list will be separated by a list with a different header so that the receiver does not erroneously associate the alternate frequencies to the same header.

Leader-alternate pairs are generally transmitted in ascending order if the alternate frequency transmits at any time of the day the same program as the capolist frequency.

The decreasing order is instead used to indicate that the alternative frequency is a regional variant of the leader, so at different times of the day, it could transmit a different programming.

To simplify the programming of a list B, set as the first frequency the capolist frequency, and follow all the alternate frequencies (max. 12).

Right-click on the grid and select the "Build B list" function.

If you want to add a new alternate frequency at this point, put it in the queue to the list just populated and select the "Build B list" function again.

Enter the master frequency like AF1 and all other frequencies in queue to it.
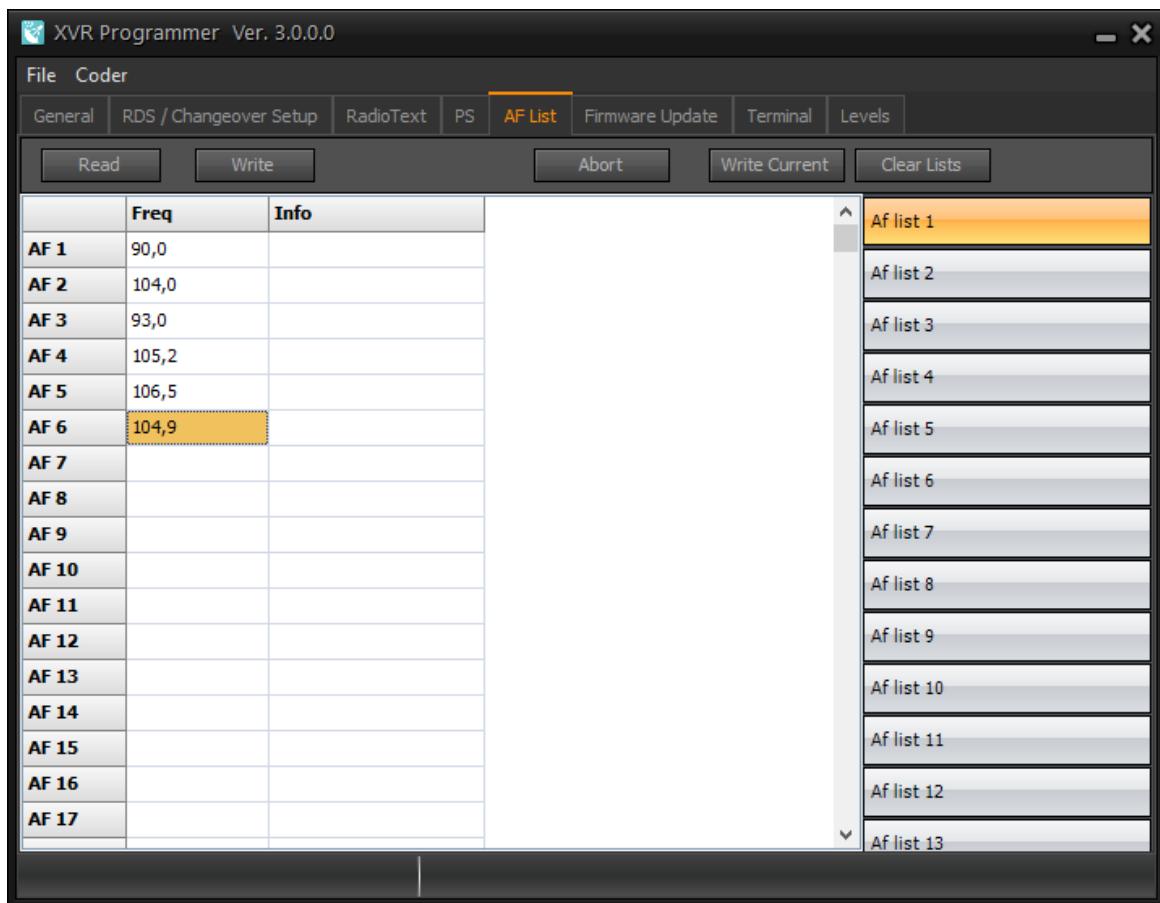
Right-click on the grid to make the pop-up menu appear and select the "Build B List"
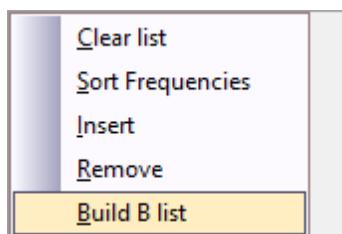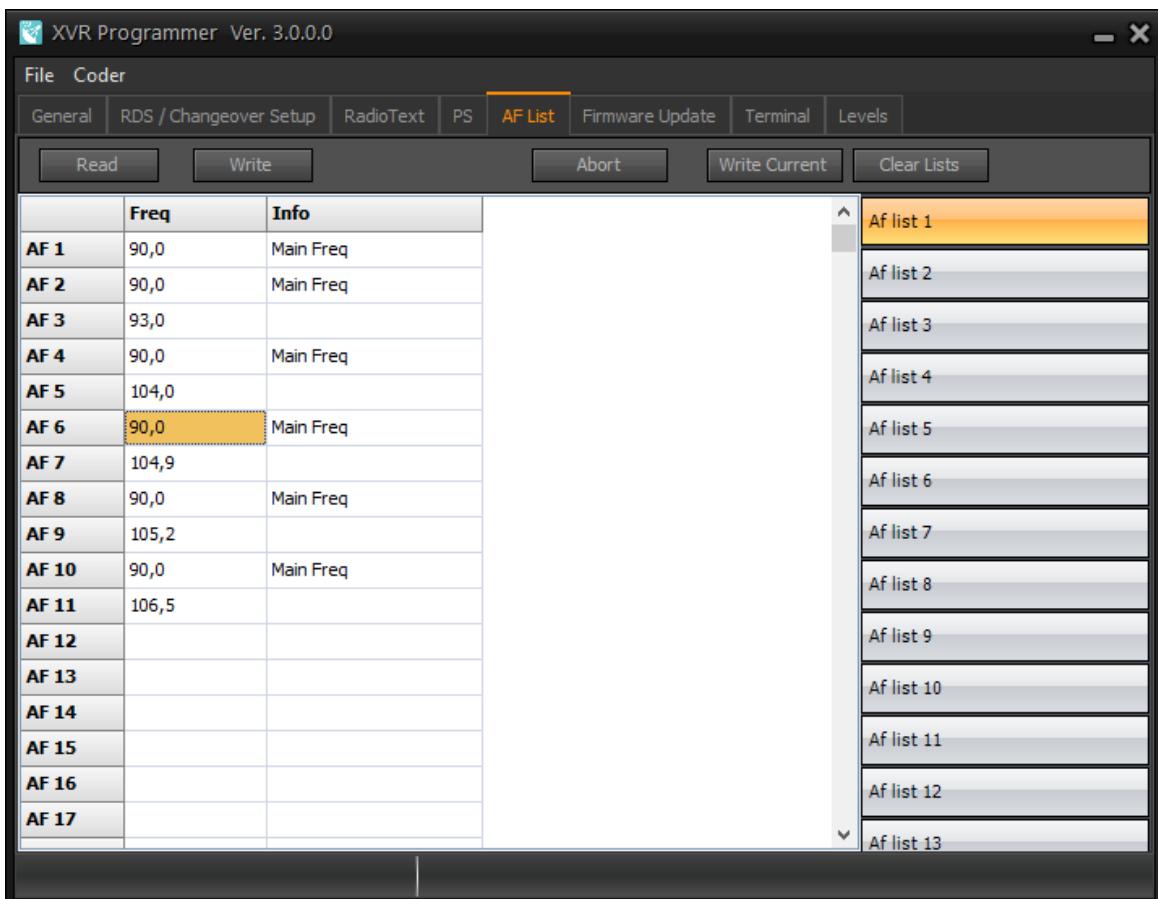
Note: The list is compiled assuming that all frequencies do not make regional programming.

3.6   Firmware Update

To update the device, you need to upload a .PGM file, and then update the update process by responding "Yes" to the update request.
Once started, the power of the PC or the PC used for programming must not be interrupted.

Before updating the firmware, it is advisable to read the data contained in the device (Coder-> Read all) and save it to a file (File-> Save XVR file).
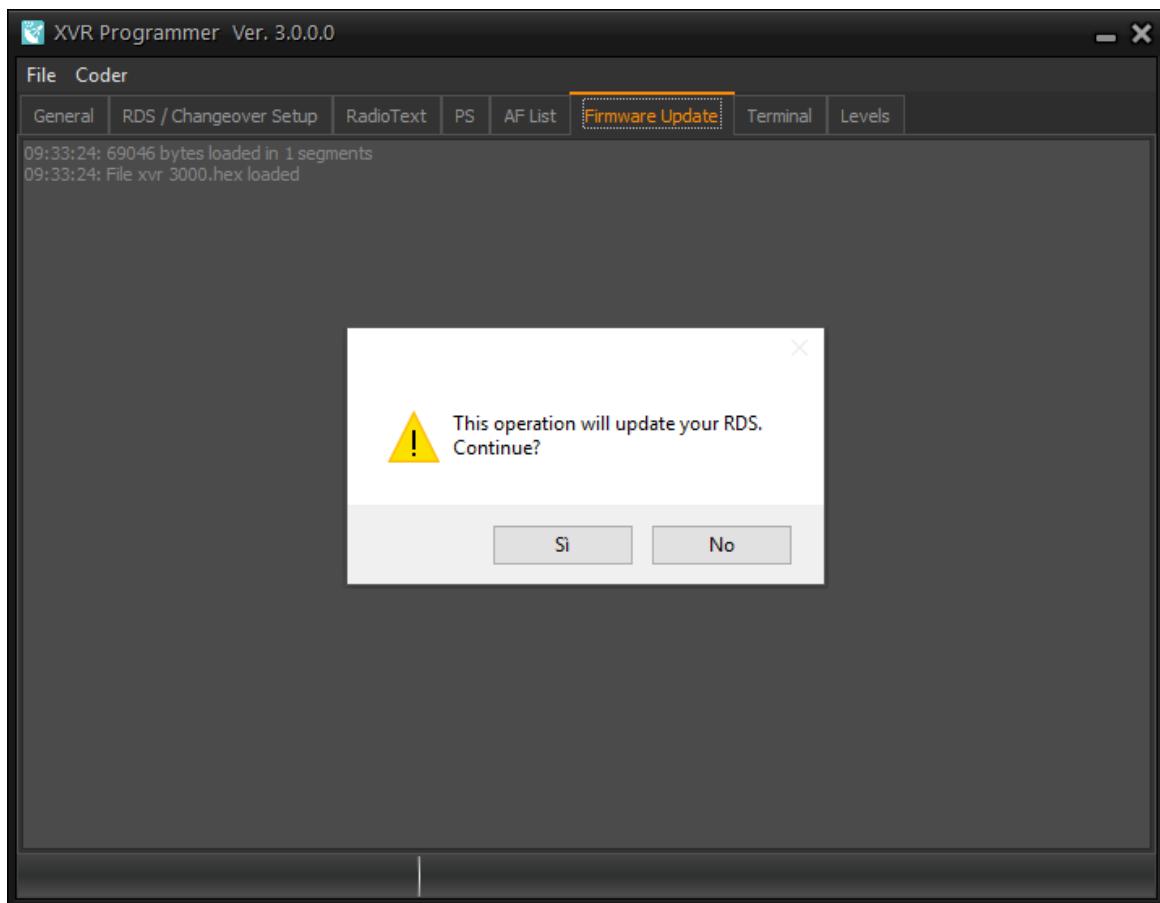
If for any reason the procedure should stop, you can try to restore it as follows:
1. Restart the XVR programmer program and load the new firmware
2. Connect the equipment to the PC serial port
3. switch off the appliance (disconnect it from mains and / or battery power)
4. Select the "Update Firmware" function from the "Coder" menu by not starting the procedure for the moment
5. power the unit and, within 5 seconds, press the "Yes" button on the update request window

The procedure should then start and end normally, otherwise repeat it from step 3.

3.7 Terminal
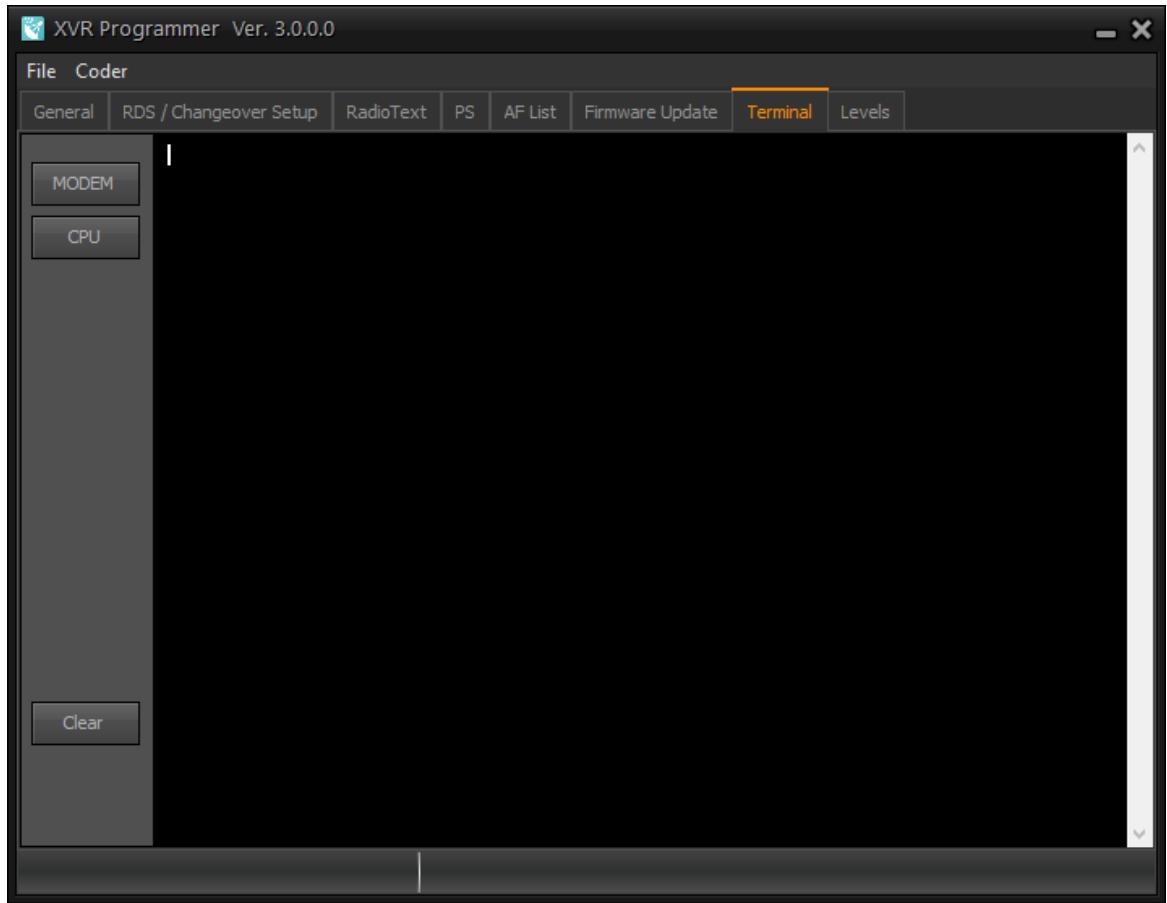
the terminal window implements an ANSI terminal and allows communication with the CPU or modem. The device you want to communicate with must be selected using the keys on the left side of the window. The "Clear" key clears the window.

3.8   **Levels Monitor**
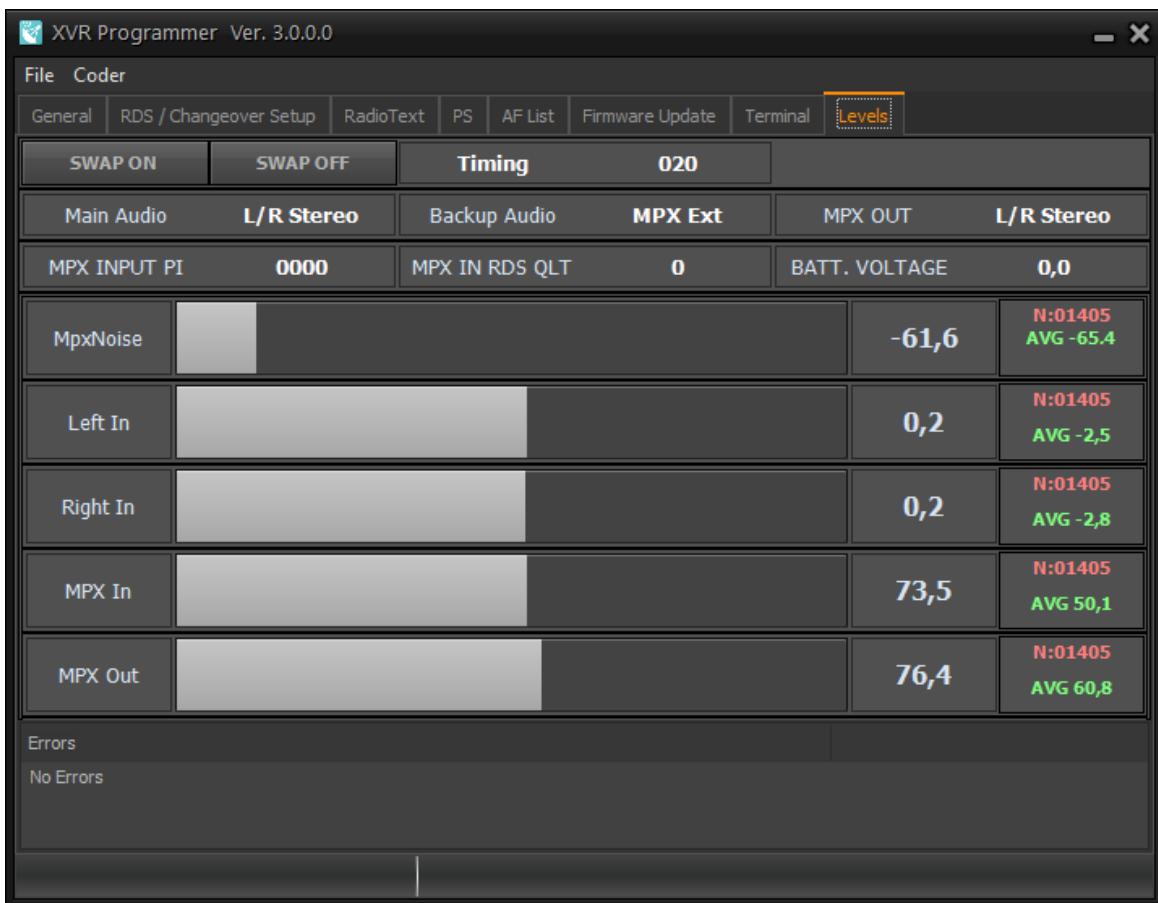
This menu displays the sources selected for main and backup channels, which is currently transmitted by the MPX OUT and the level readings of the various inputs.

Section

GSM - SMS Functions

4

4 GSM - SMS Functions

SMS telemetry allows the user to be alerted by an SMS of the alarm state of the apparatus and to make settings.

Phone numbers registered in the device receive alarm messages (if the flag is activated) and can send commands, but other users can also send commands if they know about the grant code.

Therefore, while a registered user may request the status of the device simply by sending an SMS from the "STS" text, a non-registered user must send the "<grantcode> STS" command.

An automatic block of alarm messages has been entered for a period of 2 hours, if the device exceeds the amount of alarms that can be sent per time unit.

The last alarm message sent before the pause will contain the "SMS PAUSED" string within the header of the SMS message.

If you want to re-enable the sending of alarm messages before the scheduled time has elapsed, you can send an "OKSMS" command.

Note: The commands are "case insensitive", so they will be recognized either when capitalized, lowercase, or mixed.

4.1 Commands

The current software version, the recognized commands are as follows:

ADD
AUTO
BYPASS
DEL
HELP
MAN
MUTE
NOQUIET
NUMBERS
QUIET
RESET
SETGRANT
SMS
STS o **INFO**
SWAP

The system responds to commands or status requests through specific messages. To these messages a common header is added to everyone:

<STATION NAME>:   Name of the device
SMS PAUSED: indicated if the device is paused to send after having exceeded the maximum number of inboxes
NOSMS!:   Indicated if sending messages is disabled
QUIET: Indicated if the recipient of the message has disabled the sending of alarm messages to its number.
ALARM: indicated if at least one alarm is active
SWAP: Indicated if SwapChans mode is enabled
<CMD_TELNUM>:   if it is the header of a response message to a command, it is the phone number of the user who sent the command

this header will follow the body of the message that will be diversified depending on the type of message.

4.1.1   ADD

adds a phone number to the internal list.

Sintassi :
ADD<spazio>+39123456
<grantcode><spazio>**ADD**<spazio>**ME**

the first command will add the number +39123456 to the list, the second will add the number of the user who sent the message that it is aware of the security code to be typed at the beginning of the message.

If the procedure is successful, the unit will respond with a message :.

```
STATION NAME
New number added
<numerotel1>-
<numerotel2>-
<nuovonumero>-
EMPTY
```

Otherwise, if the list was already full:

```
STATION NAME
Cannot add number
<numerotel1>-
<numerotel2>-
<numerotel3>-
<numerotel4>-
```

4.1.2   AUTO

set the exchange mode

Syntax:
AUTO<spazio>**<0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15.......,63>**

the argument of the command is the mode of exchange to be used and can be:
0: Manual
1: Exchange only on audio level
2: exchange on PI code
3: Sound level exchange and PI code
4: Incoming RDS quality exchange
5: Sound level exchange and RDS input quality
6: IP code exchange and incoming RDS quality
7: IP exchange, audio level and RDS quality
8: pilot level
9: Pilot level and audio level
10: pilot level and PI code
11: pilot level, audio level and PI code
12: Pilot Level and RDS Incoming Quality
13: Pilot level, audio level, and RDS input quality
14: pilot level, PI code, and incoming RDS quality
15: pilot level, PI code, audio level, and RDS quality
16: noise level
17: noise level and audio level
18: noise level and PI code

19: noise level, audio level and PI code
20: noise level and incoming RDS quality
21: noise level, audio level and RDS input quality
22: noise level, PI code and incoming RDS quality
23: noise level, PI code, audio level, and RDS quality
24: noise level, pilot level
25: noise level, pilot level and audio level
26: noise level, pilot level and PI code
27: noise level, pilot level, audio level and PI code
28: noise level, pilot level and incoming RDS quality
29: noise level, pilot level, audio level and RDS input quality
30: noise level, pilot level, PI code, and incoming RDS quality
31: noise level, pilot level, PI code, audio level and RDS quality
32: Dropouts
33: Dropouts and audio level
34: Dropouts and PI code
35: Dropouts, Audio Level and PI Code
36: Dropouts, incoming RDS quality
37: Dropouts, Audio Level, and RDS Incoming Quality
38: Dropouts, PI code and incoming RDS quality
39: Dropouts, PI code, audio level, and RDS quality
40: Dropouts and Pilot Levels
41: Dropouts, pilot level, and audio level
42: Dropouts, Pilot level and PI code
43: Dropouts, pilot level, audio level and PI code
44: Dropouts, Pilot Level, and RDS Incoming Quality
45: Dropouts, Pilot Level, Audio Level, and RDS Incoming Quality
46: Dropouts, pilot level, PI code, and incoming RDS quality
47: Dropouts, Pilot Level, PI Code, Audio Level, and RDS Quality
48: Dropouts and noise level
49: Dropouts, noise level and audio level
50: Dropouts, noise level and PI code
51: Dropouts, noise level, audio level and PI code
52: Dropouts, noise level and incoming RDS quality
53: Dropouts, noise level, audio level, and incoming RDS quality
54: Dropouts, noise level, PI code, and incoming RDS quality
55: Dropouts, noise level, PI code, audio level, and RDS quality
56: Dropouts, noise level, pilot level
57: Dropouts, noise level, pilot level, and audio level
58: Dropouts, noise level, pilot level and PI code
59: Dropouts, noise level, pilot level, audio level and PI code
60: Dropouts, noise level, pilot level, and incoming RDS quality
61: Dropouts, noise level, pilot level, audio level, and incoming RDS quality
62: Dropouts, noise level, pilot level, PI code, and incoming RDS quality
63: Dropouts, noise level, pilot level, PI code, audio level, and RDS quality

If a topic is not specified, the device will respond by listing the valid values list and a brief description.
Sending an AUTO 0 command is equivalent to the MAN command.

Example: AUTO <space> 3 sets the exchange on the audio and PI level of the incoming RDS signal.
The unit will respond with the status message:

```
STATION NAME
<CMD_TELNUM>
Mode:Audio+PI
```

```
Onair:FILT
Main:FILT
Back:STE
MpxIn Qlt:100
MpxIn PI:5432
MpxIn Lev:92
AudioIn L:80
AudioIn R:95
```

4.1.3 BYPASS

BYPASS:
puts the device in hardware bypass mode, then connect the MPX input to the outputs.

Syntax
BYPASS<spazio>ON
BYPASS<spazio>OFF

The appliance continually performs an internal check and automatically enters the bypass if it detects serious malfunctions.
This condition can also be requested by the user by sending the BYPASS ON command.
The user-enforced BYPASS status is not saved as a permanent variable, so it will be terminated by the BYPASS OFF command by resetting the front panel alarms when the system restarts after a sms RESET command or in case power cut.

The BYPASS of the device can also be carried out via the GPIO control port and this command will be a priority with respect to the command given via SMS: if the device is placed in BYPASS by the external port, it will not be possible to resume operation via the command " BYPASS OFF ".

4.1.4 DEL

removes a phone number from the internal list.

Syntax :
DEL<spazio>+39123456

The device will confirm the deletion with the message:

```
STATION NAME
Number deleted
<numerotel1>-
<numerotel2>-
EMPTY
EMPTY
```

4.1.5 HELP

provides a list of available commands

Syntax :
HELP

4.1.6 MAN

sets the exchange in manual mode.
The main channel will be aired and the exchange logic blocked. Under these conditions, automatic switching to the backup channel will never occur.

Syntax
MAN

For more information on how to exchange, refer to the description of the AUTO command.

4.1.7 MUTE

temporarily releases audio output in mute mode or resumes normal operation.
After the specified period, or after a MUTE 0 message, the device will automatically resume normal operation.

Syntax
MUTE<spazio>**0..255**   :puts the device in silence mode for a time between 0 and 255 seconds
MUTE<spazio>**0**   :immediately release the device from the mute state.

4.1.8 NOQUIET

activates the sending of alarms to the number that sent the message

Syntax
NOQUIET

The device will resume sending alarm messages to the number that gave the command.

4.1.9 NUMBERS

requires the list of internal numbers for the device

Syntax
NUMBERS

The apparatus responds with the list of numbers and their status

```
Currently Stored numbers
+39335123456-DQ
+39123456789-Q
+39876543213-
EMPTY
```

the first number is both disabled (D) and in "quiet" (Q) state, can not send commands or require the status and alarms will not be sent to this.
The second number is in "quiet" state, so it can send commands and request status, but no alarms will be sent to this.
The third number has no active restrictions, so you will receive alerts and send commands and status requests

4.1.10 QUIET

inhibits sending alarms to the number that sent the message

Syntax
QUIET

The alarm messages will no longer be sent to the number that sent the command, but this may still require the status and send other commands.
The phone number that is in "quiet" will be added a letter "Q" in the list of internal phone numbers.

4.1.11 RESET

Apparatus Reset

Syntax
RESET

When the command is received, the device will perform an internal reset and will reboot the system.

4.1.12 SETGRANT

SETGRANT:
reset security code.

Sintassi
SETGRANT<spazio><vecchio codice><spazio><nuovo codice>

If the operation is successful, the unit will respond with:

Grant code successfully changed to:*<nuovo grant code>*

4.1.13 SMS

SMS:
Enables or disables the sending of messages.

Sintassi
SMS<spazio>ON
SMS<spazio>OFF

The SMS ON command, if sent when the device is paused to send, immediately resends the sending of alarm messages.
However, with the SMS OFF command, all users are not allowed to send alarm messages, but they can still send status requests or commands.

4.1.14 STS/INFO

STS or INFO:
required internal status, audio inputs or telemetry.

Syntax:
STS

STS <space> TLM
STS <space> HW
ABOUT
INFO <space> TLM
INFO <space> HW

the command sent without argument provides the status of the audio inputs and the exchange

ALARM: if present, indicates that one or more alarm codes are active
TEST: If present, indicates that the message was sent from the "TestSend" function.
SWAP: if present, indicates that SwapChans mode is active.
Channels displayed as "main" and "back" on the setup program,
both on the display and on the SMS are the main and back channels used under conditions
normal, without taking into account SWAPCHANS status.
Mode: Audio + PI: Active swapping mode
Onair: STE: audio source on air. If "MUTED" is indicated, the output has been muted
as no valid source was found. "USRMUTED!" indicates that
the output has been muted at the user's request.
"USRBYPASS" indicates that the unit was placed in bypass on request
user, via SMS or GPIO port.
Main: FILT! : audio source for the main channel. An exclamation point indicates one
alarm condition.The display channel is always the master channel
regardless of SWAPCHANS status.
Back: STE: audio source for backup channel. The displayed channel is always there
the actual backup channel, regardless of SWAPCHANS state.
Pilot: 6.5: Pilot tone deviation in KHz
Qlt: 100: Incoming RDS signal quality
PI: 5432! : PI code of the incoming RDS signal. The exclamation point indicates one
alarm condition, in the specific case, the PI code detected is not
the same code generated by the internal coder.
MpxIn Lev: 92: peak level (%) of the incoming MPX signal (100% = 0dBm)
AudioIn L: 80: peak level (%) of audio signal, left channel (100% = 0dBm)
AudioIn R: 95 DRP! : peak level (%) of the audio signal, right channel (100% = 0dBm)
if 'DRP!' is displayed dropouts were detected on the L / R audio input

the command sent with the TLM argument provides the status of the external power supply and the battery
voltage

ALARM: if present, indicates that one or more alarm codes are active
Mode: Audio + PI: Active swapping mode
Onair: STE: audio source on air
Main: FILT! : audio source for the main channel. An exclamation point
indicates an alarm condition.
The displayed channel is always the actual master channel,
regardless of SWAPCHANS status.
Back: STE: audio source for backup channel.
The channel displayed is always the actual backup channel,
regardless of SWAPCHANS status.
Vbatt: 20.5: Battery voltage
Mains: OK: Network power status

the command sent with the HW topic provides information about the hardware / software versions of the
device

Fw: 2.0.0.0: firmware version
Sc: 201: subsys controller version

Ds: 2.0: persistent data structure version
Hw: 1.0: Hardware version
Output: Ok (BYPASS!): Audio output status. If BYPASS! Is displayed, the output has been switched on the MPX input.
Subsys: Ok (FLT): RDS / slave controller decode state. If FLT is displayed, the system is defective.
DSP: Ok (FLT): DSP status. If FLT is displayed, the system is malfunctioning
PwSupply: Ok (FLT): Power Supply Status. If FLT is displayed, the power supply is damaged.

4.1.15 SWAP

Exchange primary audio sources and backups.
Each command sent will match the previous status reversal, so if the SWAPCHANS mode has already been enabled, it will be disabled and vice versa.

Syntax
SWAP

When the command is executed, a status SMS is sent

```
STATION NAME
<CMD_TELNUM>
SWAP
Mode:Audio+PI
Onair:FILT
Main:FILT
Back:STE
MpxIn Qlt:100
MpxIn PI:5432
MpxIn Lev:92
AudioIn L:80
AudioIn R:95
```

The added "SWAP" string indicates that SWAPCHANS mode has been activated.