



# Broadcast Electronics

## DMPX RDS Digital stereo coder

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### User's manual



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# Section

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Description

# 1

# 1 Description

This device is a fully digital stereo encoder with preemphasis limiter and optional RDS encoder.

## 1.1 List of changes

1.1.0	17/06/2014	first release
2.0.0	23/09/2014	updated to new firmware 2.0 features
2.0.1	20/11/2014	updated to new firmware 2.1 features
3.0.0	10/03/2015	updated to new firmware 3.0 features
3.1.0	18/12/2015	MPX coder version only features added
3.1.0	25/01/2016	updated to new firmware 3.1 features
3.2.0	14/09/2016	updated to new firmware 3.2 features
3.2.1	08/03/2021	updated to new firmware 3.2.1 features

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

## 1.3 Front panel



### Front panel indicators and rotary knob

- RDS: RDS is active, if the led blinking the "AudioMuteRDS" function is active, see paragraph PI PTY
- CLIP: The analog input level is too high.
- DIG IN: AES/EBU digital input is selected as audio source
- NET: Network audio is selected as audio source(option).

Menus navigation and parameter editing is done through the rotary knob.

## 1.4 Rear panel



### Connectors on rear panel

- DIG OUT (XLR M) AES/EBU output (option)
- DIG IN (XLR F) AES/EBU input
- LEFT IN (XLR F) Left analog input
- RIGHT IN (XLR F) Right analog input
- 19K OUT/MPX IN (BNC F) 19KHz output for external RDS encoder synchronization. (1Vpp trapezoidal wave) or MPX input for audio changeover (option)
- MPX OUT (BNC F) Composite MPX output (+6/-6dBm)
- SCA IN (BNC F) External SCA / RDS input (will be mixed to MPX output with a gain of -20dB)
- LEFT OUT (XLR M) Left channel analog output (option)
- RIGHT OUT (XLR M) Right channel analog output (option)
- RS232 (DSUB 9F) RS232 connector
- USB DRIVE (USB-A) USB connector for fallback audio on external drive (available on Ip Audio Stream option)
- LAN (RJ45) LAN connector for remote control or streaming audio module

## 1.5 Editing and navigation

Menu navigation and parameters editing is done by the front panel knob.

On the main menu which appears after firmware boot, is possible to select the submenu for the various settings.



Pressing the knob, will enter the selected submenu.



Once entered in the desired sub-menu, if there are adjustable parameters, you can proceed to editing



Pressing the knob, an asterisk "\*" will appear next to the first editable element. This will not happen if, on the current window, there are no editable parameters.



Turn the knob to position the "\*" cursor on the other editable elements of the current window.



If you want now to change the analog input sensitivity, press the knob again. A "<" symbol will appear next to the parameter to indicate that this is being edited.

```

Set      Input:Digital
Analog   lev:  0 < dB
Dig.     lev:  0.0 dB
Net      lev:  0.0 dB

```

Turning the knob, you now will modify the selected parameter's value.

```

Set      Input:Digital
Analog   lev: -6 < dB
Dig.     lev:  0.0 dB
Net      lev:  0.0 dB

```

Once set the desired value, press the knob again. The cursor will switch to "\*" again, indicating that items navigation mode is now active and other items can be selected and edited as described before.

```

Set      Input:Digital
Analog   lev: -6 * dB
Dig.     lev:  0.0 dB
Net      lev:  0.0 dB

```

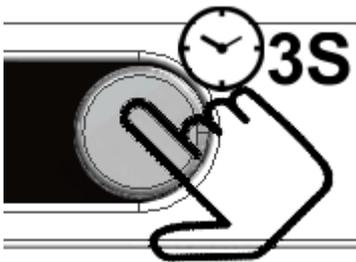
If editing is however terminated, press the knob again and the "\*" cursor will disappear and you can rotate the knob to navigate to other windows.

```

Set      Input:Digital
Analog   lev: -6  dB
Dig.     lev:  0.0 dB
Net      lev:  0.0 dB

```

Inside any submenu, pressing the knob for more than 3 seconds, will cause a jump to the main menu.



```

DMPX Coderx
Audio Input  <
ID:STATION NAME

```

# Section

---

Front panel display

# 2

## 2 Front panel display

Following are listed all menus and functionalities available on the current firmware release.

### 2.1 RDS Coder



Into this section are comprised all functions and menus related to the optional RDS encoder.

#### 2.1.1 RDS level and flags



**RDS(ON/OFF):** sets the coder on and off.

**LEV:** RDS subcarrier level

**TP (ON/OFF):** sets the TP flag status

**TA (ON/OFF):** sets the TA flag status

**RT (ON/OFF):** radiotext enable

**MS (MUS/SPC):** sets the MUSIC/SPEECH flag status

**COMPR (ON/OFF):** sets "COMPRESSED" flag status

**ARTIFICIAL HEAD (ON/OFF):** sets "ARTIFICIAL HEAD" flag status

*The "mono/stereo" flag is switched automatically, depending on the [MPX modulation](#) type selected.*

#### 2.1.2 PI, PTY and AudioMuteRDS



**PI:** PI code setting

**PTY:** Program Type, settings

**AudioMuteRDS:** when enabled, it turns off the RDS encoder when audio input is muted. This to prevent receivers to tune on a muted frequency when the same area is already covered by other repeaters. The mute timeout, AlmTime, can be set into the Fallback page. When the RDS encoder is switched off because of audio mute, the front panel RDS green led will be blinking.

*Changes will take effect once saved.*

### 2.1.3 PS and Radiotext monitor



PS MON MY RADIO I  
RT MON My Radio My best  
radio in town

**PS MON:** Program Station Name actually on air.

**RT MON:** Radiotext actually on air.

If the Radiotext Plus is active for the currently aired Radiotext string, a "+" symbol will be appended to the "RT" label.

*Radiotext Plus, Dynamic PSN and CT (clock time) functions are available using the supplied software RD-Link*

### 2.1.4 PS Editor



PS 1 :MY RADIO  
Dur(secs): 2 SAVE DEL

In this window you can enter and edit PS strings that will be displayed by the receiver, each of which can be up to 8 characters long.

**PS 1..24:** selection of the item to edit.

**Dur (secs):** display time, in seconds, of the currently selected string . A duration of zero, will disable the display of the string.

**SAVE:** Save the modified item

**DEL:** delete the selected item

*User must save changes before selecting a new string or before exiting the window, otherwise they will be lost*

### 2.1.5 RT Editor



RT 2<:My Radio My best  
radio in town  
Dur(mins): 1 SAVE DEL

In this window you can enter and edit RT strings that will be displayed by the receiver, each of which can be up to 8 characters long.

**RT 1..24:** selection of the item to edit.

**Dur (mins):** display time, in minutes, of the currently selected string . A duration of zero, will disable the display of the string.

**SAVE:** Save the modified item

**DEL:** delete the selected item

*User must save changes before selecting a new string or before exiting the window, otherwise they will be lost*

### 2.1.6 AF list Editor



```
AfList: 1 Freqs:14
Freq #: 1 101.0
Freq INSERT DELETE
List SAVE CLEAR
```

Alternative frequencies editing window .It is possible to insert up to 25 frequencies on the first list for the method "A", or 24 lists for method "B". For more details on the differences between the A and B modes, please refer to the [AF List window](#) of programming software.

**AfList 1 ... 24:** selection of the AF list to be edited.

**Freqs:** indication of the number of frequencies into the selected list.

**Freq #:** selection of the frequency number in the list, from 1 to 25, to be edited.

**Freq INSERT:** Insert a new frequency in the "Freq #" position. The other frequencies in the list will be shifted accordingly.

**Freq DELETE:** the current frequency will be deleted.

**List SAVE:** saves the changes

**List CLEAR:** deletes all frequencies in the current list

*Notes:*

*The list, once modified, will be used only after it has been saved using the SAVE button. Selecting a different list (AfList) or exiting the editing window before saving the list, will result in losing all changes.*

*Any empty frequencies (--.) eventually contained into the list, will be deleted automatically upon saving.*

## 2.2 Audio input setup



In this section are present all controls related to audio sources and [automatic audio fallback](#)

### 2.2.1 Audio levels monitor and input level setting



The bars are showing the input signal peak level: the input level must be adjusted to have the reading peaking around 0dB. The single bar below shows, with a long decay time constant, the instantaneous clipping level of the input signal. Short peaks up to +3dB are quite normal, especially when the input signal, despite it was already compressed - limited by a suitable FM broadcasting processor, is then transferred through MPEG compression.

It is possible to adjust the clipping threshold in the "[Preemphasis Limiter and Clipper](#)" menus.

*The input level of the selected channel can be adjusted, but the channel will not be put on air. To change the on air input channel, the following window must be used.*

### 2.2.2 Audio source setup

**Audio input:** Analog, analog input  
Digital, AES/EBU input  
NetAudio, streaming audio input.

**Analog lev:** audio input attenuator level. This adjustment sets the input level to the A / D converter. The nominal level is indicated in the bars:



The initial adjustment of the input level should be made so that the maximum analog input level is equal to or only slightly above that limit.

*In no case the front panel "CLIP" led should light.*

**Dig. lev:** AES/EBU level adjustment

**Net lev:** streaming module level adjustment.

The adjustment of the individual channels is in 0.1dB steps.

### 2.2.3 Audio fallback setup (audio backup)

The processor can be set to automatically switch to an auxiliary input source if the main input audio level is below a minimum threshold.

```
Fallback:OFF OnAir:DIG
x I1:ANA AlmTime : 30
o I2:DIG BackTime:120
o I3:NET AlmThr: -60 dB
```

**Fallback (ON/OFF):** Enable / Disable automatic audio fallback on backup source.

**OnAir:** audio source actually on air

**I1 - I2 - I3:** Channel list. The channel are listed by order of priority, with maximum priority assigned to channel 1.

When an high priority channel will become unavailable, it will be replaced by a lower priority one until its recovery.

**AlmTime:** Alarm timeout

**Back Time:** Back timeout. It is the time for which the main audio source must be above the minimum threshold before it can be set back on air.

**AlmThr:** minimum audio level threshold

The main audio source is considered valid If the level of both channels L / R are above the alarm threshold. If a single channel is less than the alarm threshold for a period longer than the alarm timeout, the backup source will be put on air.

When the main audio source will recover, once elapsed the "Back Timeout", it will be put back on air.

*Changes will be applied upon exiting the menu.*

## 2.3 Audio output setup

```
DMPX Coderx
Audio Output <
ID:STATION NAME
```

This section contains the settings relating to the DIG OUT - L R OUT audio outputs (only if the optional outputs are present).

### 2.3.1 Audio output regulation

```
ANA Out lev : 0.0 dBu
DIG Out lev : -6.0 dBFS
OUT deemph : 50uS
Out pos: Post clip&filt
```

**ANA LR Out** : audio output level on rear XLR Left-Right OUT connector.

**DIG LR Out** : output audio level on rear XLR DIG OUT connector

**Out deemph**: output audio deemphasis. This is related only to the audio output, not to MPX output.

**Out pos**: point of acquisition of the output signal, it can be selected form:

**Post clip&flt**: output signal is taken after clipper and lowpass filter.

**Pre filter**: output signal is taken prior the lowpass filter, but after the clipper.

**Pre clipper**: output signal is taken before the clipper.

## 2.4 MPX output setup

```
DMPX Coderx
MPX Output <
ID:STATION NAME
```

### 2.4.1 MPX modulation and pilot subcarrier setup

```
Modulation : Stereo
Preemphasis : 50us
Pilot Level : 5.0 KHz
Pilot Phase : 0.00 Deg
```

**Modulation (stereo, mono l+r, mono L, mono R):**

Stereo: stereo modulation

Mono L+R: monoaural modulation from L+R channels sum.

Mono L, Mono R: monoaural modulation from a single channel.

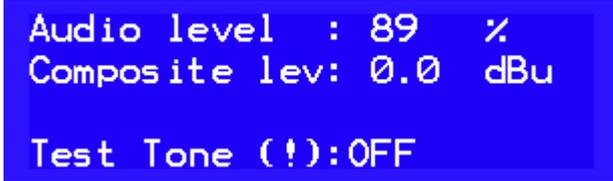
**Preemphasis**: 50/75uS preemphasis, it should be set according to local FM broadcasting

standards.

**Pilot level:** 19KHz pilot tone injection level.

**Pilot Phase:** pilot tone phase adjustment.

## 2.4.2 Output level setup



```
Audio level : 89 %  
Composite lev: 0.0 dBu  
Test Tone (!): OFF
```

**Audio level:** percentage of audio signal (L+R, L-R) into the composite MPX signal.

In case of monoaural broadcasting, without RDS and pilot subcarrier, this level can be left at 100%, and this will produce a deviation of 75KHz.

In all other cases it should be reduced according to the level of injection of the two subcarriers, otherwise overmodulation will occur.

For example, if a RDS subcarrier of 2KHz and a pilot tone of 6KHz are desired, the audio signal level can not be greater than

$$100 * (1 - ((\text{PilotCarrierDeviation} + \text{RDSCarrierDeviation}) / 75))$$

which, for the example described above, will correspond to:

$$100 * (1 - ((6 + 2) / 75)) = 89.3\%$$

**Composite level:** MPX output level.

**Test tone (!):** when activated, will put on air a 400Hz tone, having an amplitude equal to 100% modulation.

If RDS and pilot subcarriers were correctly set, the final modulation will not go above this limit.

### 2.4.3 Preemphasis Limiter and Clipper

```
Preemph Limiter: OFF
Output CLipLev : 0.1 dB
```

**Preemph limiter:** enables a preemphasis limiter to prevent sibilance splatter when the input material was not already processed through a processor expressly designed for FM broadcasting.  
**Clip level:** adjustment of audio clipping threshold referred to 0dB.

## 2.5 System setup

```
DMPX Coderx
System      <
ID:STATION NAME
```

### 2.5.1 Display, Source Dependent Presets, Device ID

```
Contrast : 16
ID:STATION NAME
```

**Contrast:** display contrast adjustment.

**ID:** device identifier. It is a 16 characters long label which will be shown in the main menu screen, useful for identification when multiple devices are installed.

### 2.5.2 GPI and MPX changeover option (Split)

```
76543210
GPI status : 00000000
Split ctrl port:OFF
Invert split status:OFF
```

In this menu it is possible to remotely select the channel to be broadcast or manage an MPX advertising split in output (option). The election is possible via GPI, serial and Network card.

**GPI status:** status of the 8 available ports, from 7 to 0.

**Split ctrl port:** enable the function and select the communication mode.

OFF: disabled function.

GPI: active function on CTRL port.

Serial: active function on RS-232 port.

Network: active function on Ethernet port.

**Invert split status:** invert commutation MPX Input set on GPI mode

OFF: without command it is set in [NETWORK] mode.

ON: without command it is set in [SPLITTING] mode.

The split status is shown at the top of the display.

In [SPLITTING] mode, in MPX output there is the processed signal coming from Analog or Digital Inputs or Net Ip stream (if present).

In [NETWORK] mode, in MPX output, the signal applied to MPX IN is present.

### Rear Connectro GPI (CTRL)

**GPI port status:**

**0: Pin 6 - Set ANALOG Input**

**1: Pin 2 - Set DIGITAL Input**

**2: Pin 7 - Set NET/IP Input**

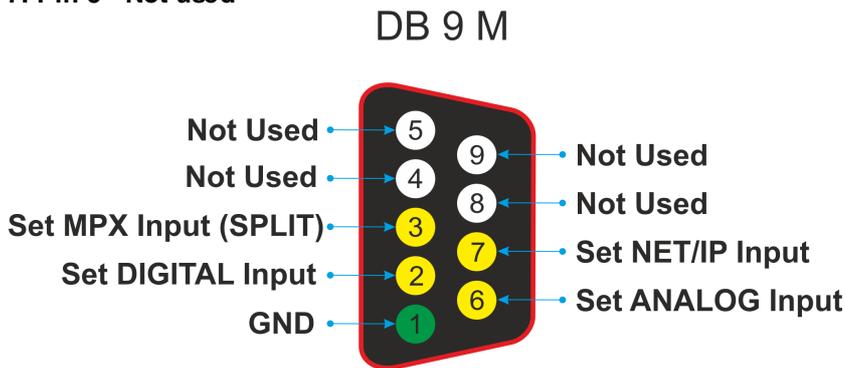
**3: Pin 3 - Set MPX Input (SPLIT)**

**4: Pin 8 - Not used**

**5: Pin 4 - Not used**

**6: Pin 9 - Not used**

**7: Pin 5 - Not used**



The inputs are activated by grounding the relative pin or by providing a voltage from 5 to 12VDC, in this case the jumpers placed on the board inside the device will have to be moved from the "CLOSE" to "VIN" position.

The selection of the channels through the GPI port takes place with exclusive priority on a single channel, if more inputs are activated at the same time the channel is restored before the selection, only the MPX channel has absolute priority and at each activation it does not take into account the status of the other 3 inputs by bringing the MPX IN signal to MPX OUT.

Example 1: the Analog channel is on the air, pin 2 is activated by broadcasting the Digital channel, at the same time pin 7 NET / IP is also activated, since the selection of two channels is not valid at the same time, the channel returns to air Analog.

Example 2: the Digital channel is on the air, pin 6 is activated by broadcasting the Analog channel, at the same time the MPX pin 3 is activated, the analog channel remains active but the MPX output is switched to MPX IN.

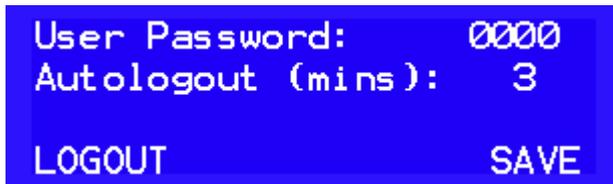
**Network command by lan:**

By selecting Network on "Split ctrl port" commands can be sent via LAN using the UDP protocol with standard ethernet card, the TCP protocol with IP Streaming option card.

```
[AB010103] select analog input
[AB010200] select digital input
[AB010301] select NET/IP input
[AB010406] / [AA010001] select MPX input
[AB010002] o [AA010100] return on main channel
```

The selection command must be repeated continuously otherwise the device re-enters the main channel.

### 2.5.3 PassCode Setup



```
User Password: 0000
Autologout (mins): 3
LOGOUT          SAVE
```

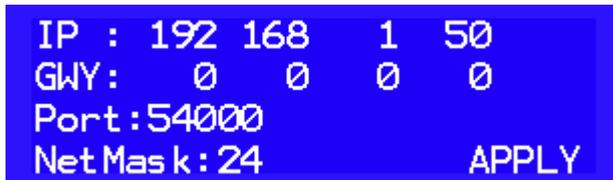
**User Password:** in this section the user can enter a numeric password that will be required for accessing the device. Setting "0000" (default value) will disable the password prompt.

**Autologout (mins):** Automatic lock timeout. If no action is done on the front panel knob within the specified time interval, the device will enter into lock state and the user will need to re-enter the password to log in again.

**LOGOUT:** immediate logout and lock.

**SAVE:** Saves any changes made to the numeric password or the duration of the automatic logout timing.

### 2.5.4 Ethernet setup



```
IP : 192 168 1 50
GWY: 0 0 0 0
Port: 54000
Net Mask: 24          APPLY
```

**IP:** current ip address

**GWY:** gateway address

**Port:** UDP port number

**NetMask:** netmask in CIDR notation.

**APPLY:** apply and save changes.

*This page is visible only if the network module is installed.*

## 2.5.5 System info



**Sys:** operating firmware release

**Proc:** audio processor and MPX coder firmware release

**Hw:** hardware release

**BL:** MCU bootloader release

**SN:** serial number

## 2.5.6 Options



In this window the user must enter the code to enable the optional features.

Once entered the code for the desired option, go to the "ENTER" button and, when it will flash, push the front panel encoder.

The device will verify the code and, if found correct, will activate the requested option.

Example for RDS coder:



## 2.5.7 Login window

To protect the device from unauthorized operation, a security code can be enabled by accessing the System menu, [Set password](#).

When the device is turned on (or the auto logout time is elapsed), the login page will be shown where the pass code is to be entered.



**LOGIN:** when the correct pass code is entered, will log in user.

**Pass code lost or forgotten:** after the 20th unsuccessful login attempt, an unlock code will be displayed. Call customer service and tell this code in order to get back your pass code.





# Section

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Programming software

# 3

### 3 Programming software

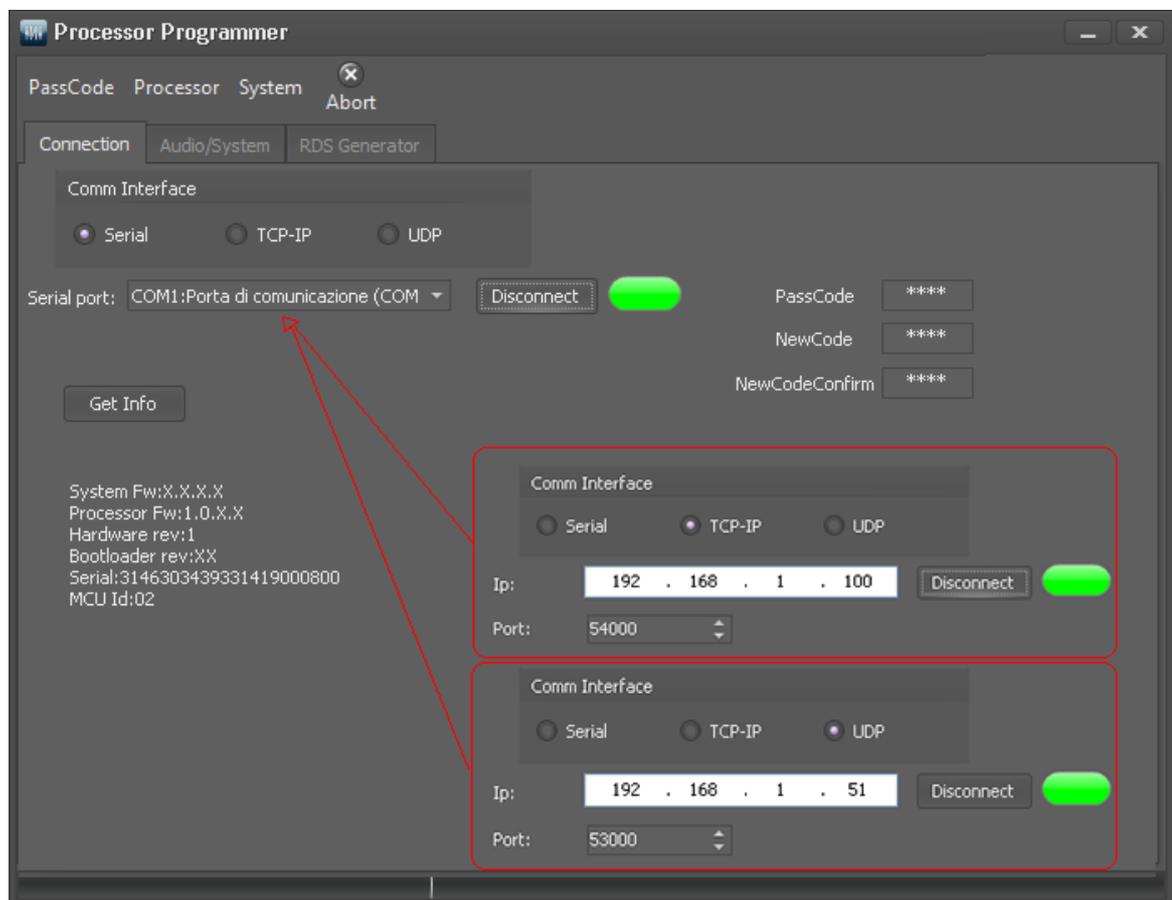
A PC based software Processor Programmer, compatible with 32 and 64 bits Windows Xp, Windows 7, Windows 8.X, Windows 10, is provided for processor remote control and setup.

Connection is done through:

- serial port 9600 baud 8N1
- ethernet port TCP-IP (if optional streaming module is installed)
- ethernet port UDP

#### 3.1 Main window

In the main window the type of connection can be selected, via COM port or through Ethernet port using TCP-IP (needs streaming module) or UDP (needs ethernet module). Once the communication mode is set up and the processor connected, press "Connect". If communication is correct, the program will read all internal settings and device information.



## 3.2 Audio/System

This section contains the audio process controls, setting of the audio input and output sources and system parameters.

### 3.2.1 Audio input-output

This page allows for selection of on air audio input, changing audio output parameters, setting up the audio fallback.

The screenshot displays the 'Audio/System' configuration window. On the left, a bar chart shows 'ANALOGUE CLIP' levels for four inputs: NET, ANA, DIG, and MPX. Below the chart, 'INPUTS' are listed as NET, ANA, DIG, and MPX. The 'CLIP LEVEL' and 'OUTPUT' are also shown. The 'Audio Source OnAir' is set to 'Network'. The right side of the window contains the 'AUDIO Input-Output' and 'System' settings. The 'AUDIO Input-Output' section includes dropdowns for 'Audio Input' (Analog input), 'Analog In Level dB' (0,0), 'Digital In Level dB' (0,0), 'Network In Level dB' (6,0), 'Analog Out Level dB' (0,0), 'AES Out Level dB' (-6,0), and 'Input 30Hz HPF' (unchecked). The 'System' section includes 'Analog Output Mode' (Clipped and filtered), 'Analog Output Deemphasis' (50uS), 'Audio Backup Enabled' (checked), and four audio sources with their respective levels and alarm thresholds. The 'Audio Source OnAir' is set to 'Network'. At the bottom, there are 'read' and 'Update' buttons.

For a detailed description of the following parameters, please refer to [audio input setup](#), [audio output setup](#).

#### [Audio Input](#)

[Analog InputLevel](#)

[Digital InputLevel](#)

[Network InputLevel](#)

[Audio OutputLevel](#)

[Audio Backup Enabled](#)

**Read:** read parameters from the processor

**Update:** send changes to the processor

### 3.2.2 System setup

In this page it is possible to enable and adjust the optional RDS encoder carrier level, the pilot carrier, insert and adjust the network parameters.

The network parameters are related to the optional network module only. If the streaming module was installed, network configuration will be done through the web server of the module.

For a detailed description of the following parameters, please refer to [MPX output setup](#) and [System setup](#)

[RDS Enabled](#), [RDS level](#), [Pilot Level](#), [Pilot Phase](#), [Modulation](#), [Preemphasis](#), [MPX Output Level](#), [MPX Audio Level](#), [NET IP](#), [NET MASK](#), [NET GATEWAY](#), [NET PORT](#)

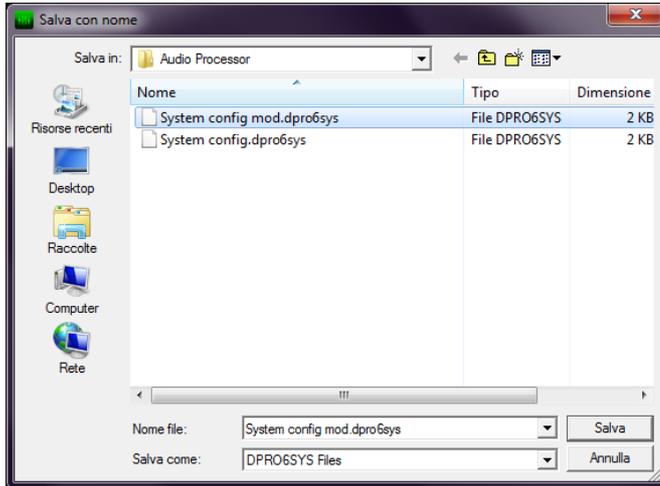
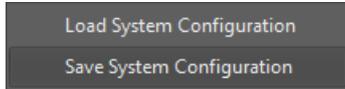
**Read:** read parameters from the processor

**Update:** send changes to the processor

### 3.3 Loading and saving system

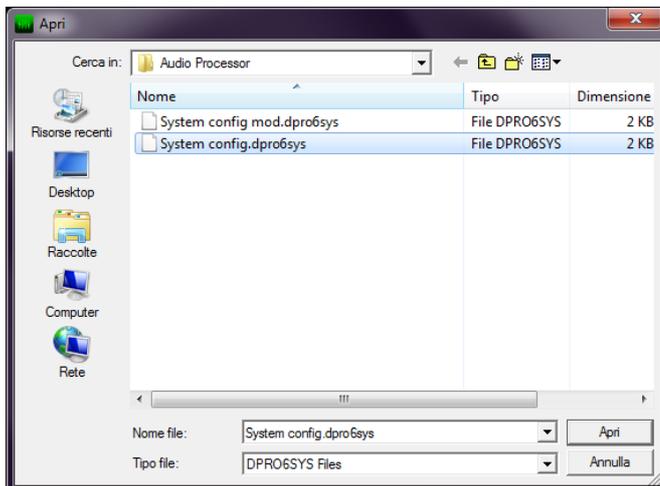
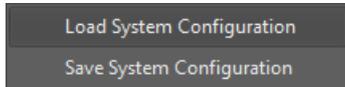
The remote control software allows to load and save the system configuration through the "System" menu, and this includes all parameters listed under "System" and "[Audio Input-Output](#)" tabs.

#### Save System config to Disk



the system configuration will be saved to disk.

#### Load System config from Disk



the system config preset loaded in.

## 3.4 RDS

RDS configuration pages will be visible only if the optional RDS coder was enabled.

### 3.4.1 RDS Flags window

This window contains the configuration parameters of the RDS encoder.

**RDS ENABLED:** enable RDS coder.

**PTY:** Program Type

Set the program type.

Many receivers are equipped to select the received stations based on the format preferred by the listener.

**PI:** Program Identification

Identification code of the station.

The code consists of 4 digits, the first digit indicates the country of origin, the second represents the area of coverage and the last two identify the station into its coverage area.

First digit, the country of origin of the program. You may write it directly into the “PI Code” editbox or select it using the “Country” dropdown list.

A list of some country codes is reported in appendix A.

For the second, according to the coverage area, choose one of the following codes:

0	local coverage, <i>the station is supposed to have one frequency only</i>
---	---

1	International coverage
2	National coverage
3	Supra-regional coverage
4..F	area codes for regional coverage stations

*Note: the local coverage code "0" is intended for stations having one frequency only, so its use is intended just in this case. If the station has more than one frequency, a supra regional (3) or regional code (4 to F) must be used. Using the local coverage code (0), make many receivers to ignore the alternative frequencies tables.*

The two last digits uniquely identify the station into its coverage area and shall be different amongst all other stations broadcasting over the same area.

Some examples:

5001: Italian radio station (5)	local coverage	(0),	program identifier code 01
5202: Italian radio station (5)	national coverage	(2),	program identifier code 02
54AF: Italian radio station (5)	regional coverage	(4),	program identifier code AF

**TP:** Traffic program

This flag indicates that your station, during normal programming, broadcasts traffic programs.

**TA:** Traffic Annonunce

Traffic Annonunce on air.

This flag should be set when traffic related news are being broadcasted.

For this reason, the TA flag can be switched by the external control port.

**MUSIC:** This flag indicates if the station main format is music or speech.

Some receivers use this information to apply a different tone equalization or volume according to whether music or speech is being broadcasted.

It is possible to switch this flag externally, using the external control port.

**ARTIFICIAL HEAD:** This flag indicates that the program was recorded using an artificial head.

This device is a dummy human head with two microphones inserted into the auditory canals, used during the recording process of the performance or live event, to accurately reproduce the original spatiality.

**COMPRESSED:** This flag indicates that the program was compressed.

**ENABLE RADIOTEXT:** Flag to enable radiotext group (2A) transmission.

If disabled, only OA groups will be trasmitted.

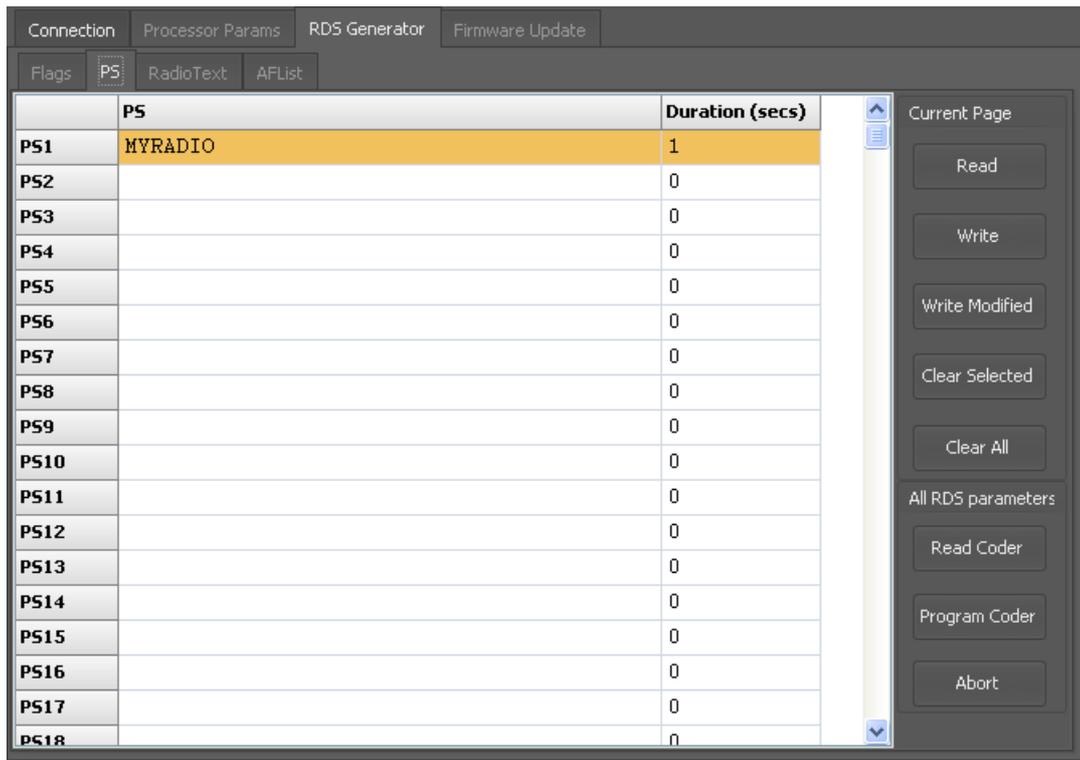
**SWITCH OFF RDS on AUDIO MUTE:** enabling RDS coding to be turned off in the absence of outgoing audio. This avoids the possibility of tuning into a mute frequency, the RDS off function is traced with the flashing of the green LED on the front of the device.

**STATION ID:** This 16-chars string can be assigned to the coder for its identification.

It could be its destination, the site to which the encoder is assigned, or the name of the radio which owns it.

It will not be shown anywhere else, neither transmitted into any RDS block; it is only a label to identify the processor.

### 3.4.2 PS window



In this window, It is possible to enter the program station names, each of which can be up to 8 characters long.

For each string you can set the display duration time in seconds.

A duration time of 0, disables the corresponding string.

**READ:** read all PS strings from the encoder.

Warning: all strings on the grid will be overwritten.

**WRITE:**transfer all strings on grid to the coder.

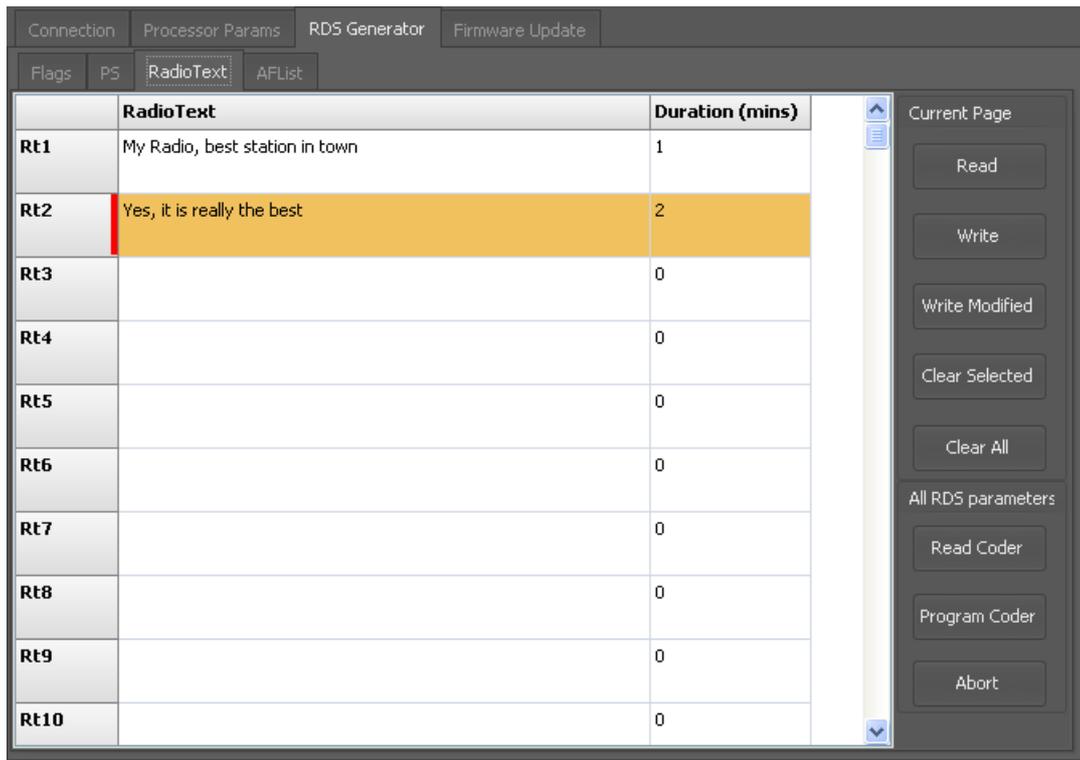
Warning: the strings on the coder will be overwritten.

**WRITE MODIFIED:**transfer only modified entries

**CLEAR ALL:**clear all strings which are on the grid.

**CLEAR SELECTED:**clear all selected strings on the grid.

### 3.4.3 Radiotext window



In this window, It is possible to enter the radiotext strings, each of which can be up to 64 characters long.

For each string you can set the display duration time in minutes.

A duration time of 0, disables the corresponding string.

**READ:** read all radiotext strings from the encoder.

Warning: all strings on the grid will be overwritten.

**WRITE:**transfer all strings on grid to the coder.

Warning: the strings on the coder will be overwritten.

**WRITE MODIFIED:**transfer only modified Radiotext entries

**CLEAR ALL:**clear all strings which are on the grid.

**CLEAR SELECTED:**clear all selected strings on the grid.

### 3.4.4 AF Lists window

Flags			PS			RadioText			AFList		
	Freq	Info									
AF 1	101.0		Af list 1			Current Page					
AF 2	104.4		Af list 2			Read					
AF 3	104.5		Af list 3			Write					
AF 4			Af list 4			Write Current					
AF 5			Af list 5								
AF 6			Af list 6			Clear All					
AF 7			Af list 7			All RDS parameters					
AF 8			Af list 8			Read Coder					
AF 9			Af list 9			Program Coder					
AF 10			Af list 10			Abort					
AF 11			Af list 11								
AF 12			Af list 12								
AF 13			Af list 13								
AF 14											
AF 15											
AF 16											
AF 17											
AF 18											

The RDS encoder allows for method "A" or "B" for alternative frequencies coding.

The choice between the two methods depends on the structure of the network and the number of alternative frequencies.

There is no flag which indicates if the alternative frequencies are transmitted by method "A" or "B": the difference between the two methods is encoded in the way the frequencies are disposed into the list.

*Notes:*

*It is not possible to compile different lists using the A and B simultaneously.*

*"A" method should be used only when the network has a maximum of 25 frequencies and does not differentiate regional programming.*

*"B" method is used when the alternative frequencies are more than 25 or when, within the same network, there is a program differentiation, such as local news or advertising, only on certain frequencies.*

*The lists must be compiled starting from the first and should be filled leaving no empty lists in between: any empty list will be automatically removed upon coder programming.*

## 3.4.4.1 Editing

Flags	PS	RadioText	AFList
			<b>Freq</b>
			<b>Info</b>
AF 1		101.0	Af list 1
AF 2		104.4	Af list 2
AF 3		104.5	Af list 3
AF 4			Af list 4
AF 5			Af list 5
AF 6			Af list 6
AF 7			Af list 7
AF 8			Af list 8
AF 9			Af list 9
AF 10			Af list 10
AF 11			Af list 11
AF 12			Af list 12
AF 13			Af list 13
AF 14			
AF 15			
AF 16			
AF 17			
AF 18			

Context Menu:

- Clear list
- Sort Frequencies
- Build B List
- Insert
- Remove

Current Page:

Read

Write

Write Current

Clear All

All RDS parameters

Read Coder

Program Coder

Abort

The frequencies must be inserted starting from the first list "Af list 1", cell AF1.

Right-clicking on the list, a popup menu will appear allowing to:

**Clear list:** the current list will be cleared

**Sort frequencies:** the frequencies inserted into the current list will be sorted in ascending order

**Insert:** insert a new frequency at the selected cell position

**Remove:** remove the frequency at the selected cell position

#### 3.4.4.2 A Method

This is the simplest method and it is indicated for all those stations which have a maximum of 25 alternative frequencies and do not provide regional - differentiated programming.

To implement this method, simply insert in AF List 1 all frequencies of the station in ascending order.

No other list must be filled.

Example:

88.1

91.3

104.1

104.5

#### 3.4.4.3 B Method

This method is used where the number of alternative frequencies used in a network exceeds 25, or where it is required to indicate frequencies which belong to different areas which at times carry different programs.

Each transmitter and associated repeater stations broadcast the same set of different AF lists in sequence.

The number of AF lists within a network is in general identical to the number of transmitters and repeater stations in the network so as to provide a unique list for each transmitting station. In this protocol the alternative frequencies for the VHF/FM transmitters are individually addressed by transmitting the tuning frequency paired with one alternative frequency within one block.

Each list starts with the tuning frequency for which the list is valid.

All remaining pairs (up to 12) give the tuning frequency together with a valid AF.

Usually, the tuning/AF pair has to be entered in ascending order if the AF is not a regional variant of the tuning frequency, on the contrary the order has to be reversed.

If the number of AFs of a station is larger than 12, the list must be split into two or more lists. These lists are transmitted directly one after the other, and the receiver must combine the lists again.

If a transmitter frequency is used more than once within a network the respective AF lists are transmitted separately. In order to indicate that these lists with the same tuning frequency belong to different stations, the lists must be separated by AF lists of other stations.

To simplify the programming of a B list, put into the first line AF1 the main tuning frequency, then enter on the other lines (AF2 to AF13) a maximum of 12 alternative frequencies, then press the button "Build B list."

If you, in future, wish to add some new frequencies to the list, simply enter them at the bottom and press the button "Build B list again."

Flags	PS	RadioText	AFList
		<b>Freq</b>	<b>Info</b>
AF 1		90.0	
AF 2		104.5	
AF 3		93.5	
AF 4		105.2	
AF 5		106.7	
AF 6		104.9	
AF 7			
AF 8			
AF 9			
AF 10			
AF 11			
AF 12			
AF 13			
AF 14			
AF 15			
AF 16			
AF 17			
AF 18			

Af list 1
Af list 2
Af list 3
Af list 4
Af list 5
Af list 6
Af list 7
Af list 8
Af list 9
Af list 10
Af list 11
Af list 12
Af list 13

Current Page

Read

Write

Write Current

Clear All

All RDS parameters

Read Coder

Program Coder

Abort

The main frequency (90.0MHz) is put in the first AF cell (AF1) and all alternatives are following from AF2 to AF6.

Flags	PS	RadioText	AFList
		<b>Freq</b>	<b>Info</b>
AF 1		90.0	Main Freq
AF 2		90.0	Main Freq
AF 3		93.5	
AF 4		90.0	Main Freq
AF 5		104.5	
AF 6		90.0	Main Freq
AF 7		104.9	
AF 8		90.0	Main Freq
AF 9		105.2	
AF 10		90.0	Main Freq
AF 11		106.7	
AF 12			
AF 13			
AF 14			
AF 15			
AF 16			
AF 17			
AF 18			

Af list 1
Af list 2
Af list 3
Af list 4
Af list 5
Af list 6
Af list 7
Af list 8
Af list 9
Af list 10
Af list 11
Af list 12
Af list 13

Current Page

Read

Write

Write Current

Clear All

All RDS parameters

Read Coder

Program Coder

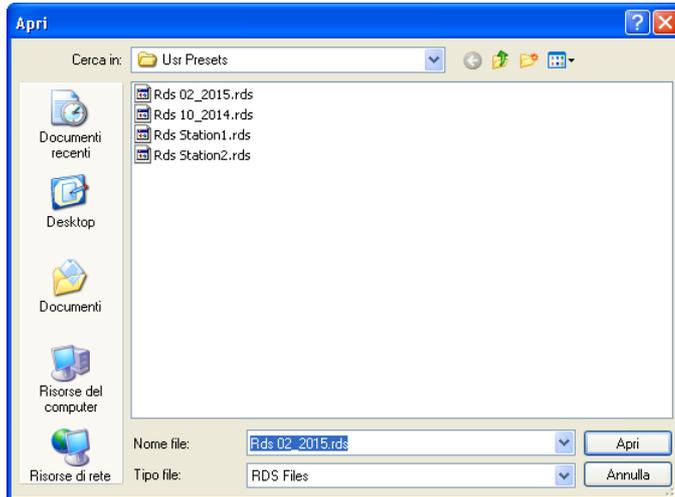
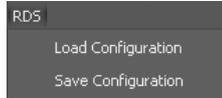
Abort

Right click on the list and select the "Build B List" command: the list will be compiled using "B" method.

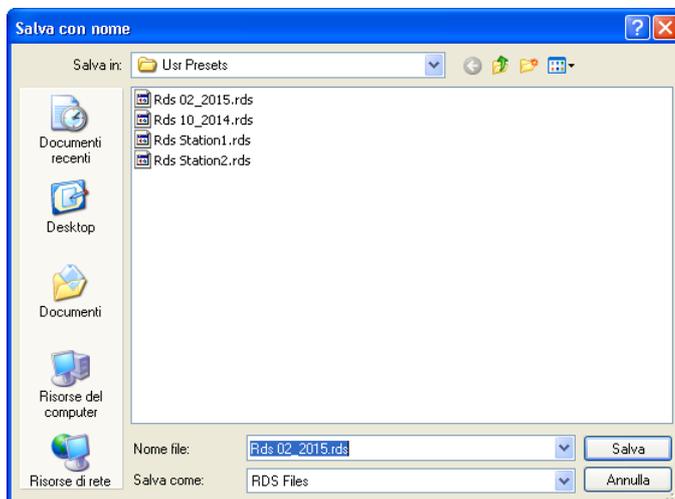
### 3.4.5 Loading and saving RDS coder configuration

The remote control software allows to save and reload a complete RDS coder configuration through the File>RDS menu:

#### Load Configuration

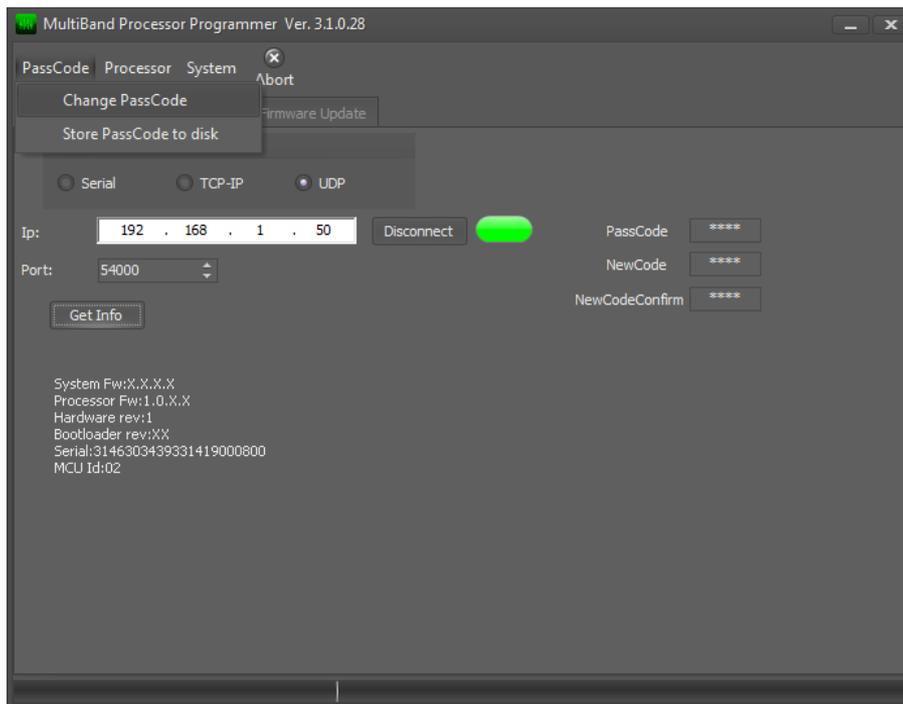


#### Save Configuration



The \*.rds file will contain the whole RDS encoder configuration, it can be stored as a backup or used to transfer the configuration to other devices.

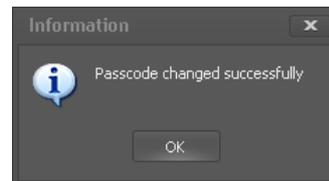
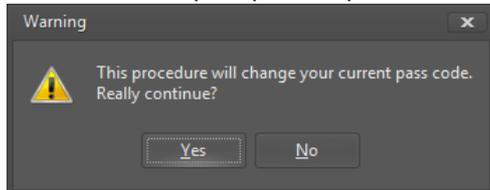
## 3.5 Passcode setup



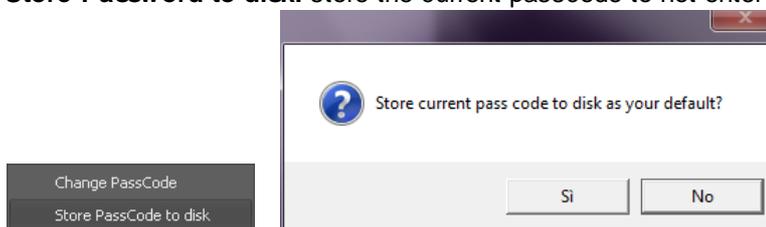
To protect the device from unauthorized operation, a security code can be set. The default code is 0000 (security disabled), but it can be changed through the following procedure:

Put the current Passcode into the PassCode edit box (0000 by default).  
Put a new code into the "New Code" and, the same again, into the "New Code Confirm" editor.  
Go to Menu->PassCode->**Change Passcode**

The user will be prompted for passcode change confirmation, then the passcode will be changed.



**Store Password to disk:** store the current passcode to not enter it each time the program is used.



# Section

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RD Link

# 4

## 4 RD Link

RD-Link is a software which allows the connection of the RDS coder to the radio automation system to allow for dynamic radiotext and radiotext Plus, TA and Clock-Time to be implemented.

At the time of writing this document, the software is already compatible with several radio automation systems, but other interfaces may be included on customer request in order to extend the compatibility to other systems.



### 4.1 Radiotext Plus

Radio text plus is a complementary service that, united with classic radiotext, enables tagging of specific radiotext parts so that they can be isolated and used by some specialized receivers. You can then, for example, have the complete station playlist aired for the listening period.

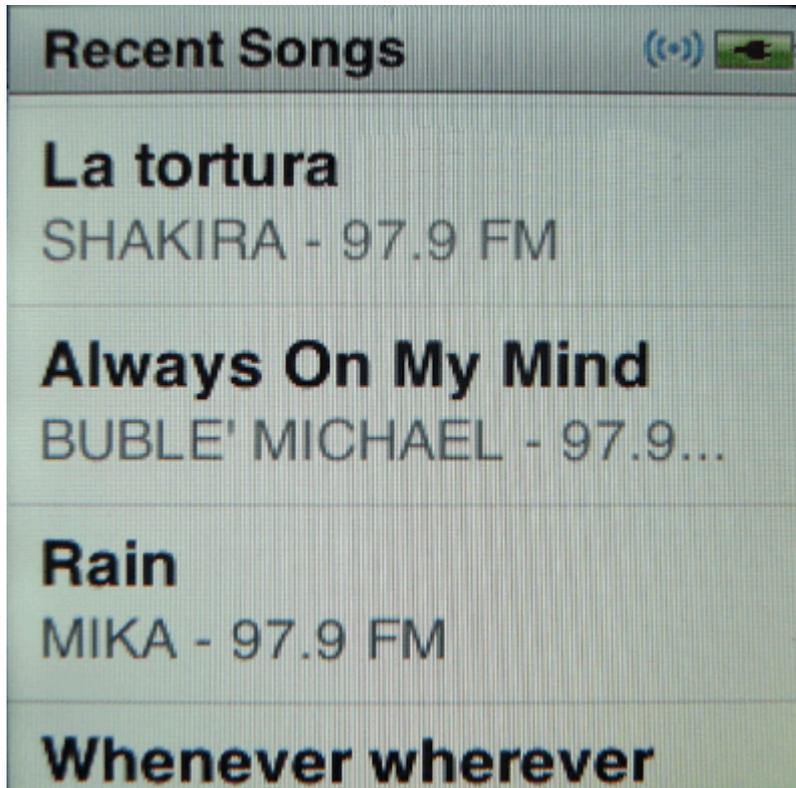
**An example of normal radiotext tagged with radiotext plus (RT+).**

The normal radiotext carries the string: "SHAKIRA - La tortura"



A receiver with Radiotext Plus decoding capabilities will "know", for example, which part of the whole text is the artist's name and which is the song title.

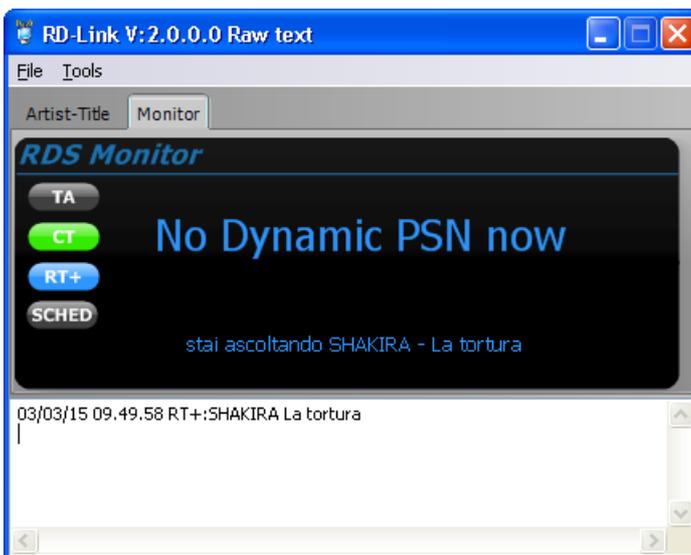
In this case, the song title and artist's name are used to compile the playlist aired by the station we are listening.



In the case below, the radiotext string is "You are listening to Shakira with La tortura Feat. Alejandro Sanz" and both normal radiotext and tagged radiotext are shown: first string is the artist name, the second is the song title, last string is the normal radiotext.



## 4.2 Monitor



On the **Monitor** window the dynamic PS and Radiotext strings are shown in the same way as they are being transmitted.

It is shown also the status of TA,CT, RT+ flags and scheduler.

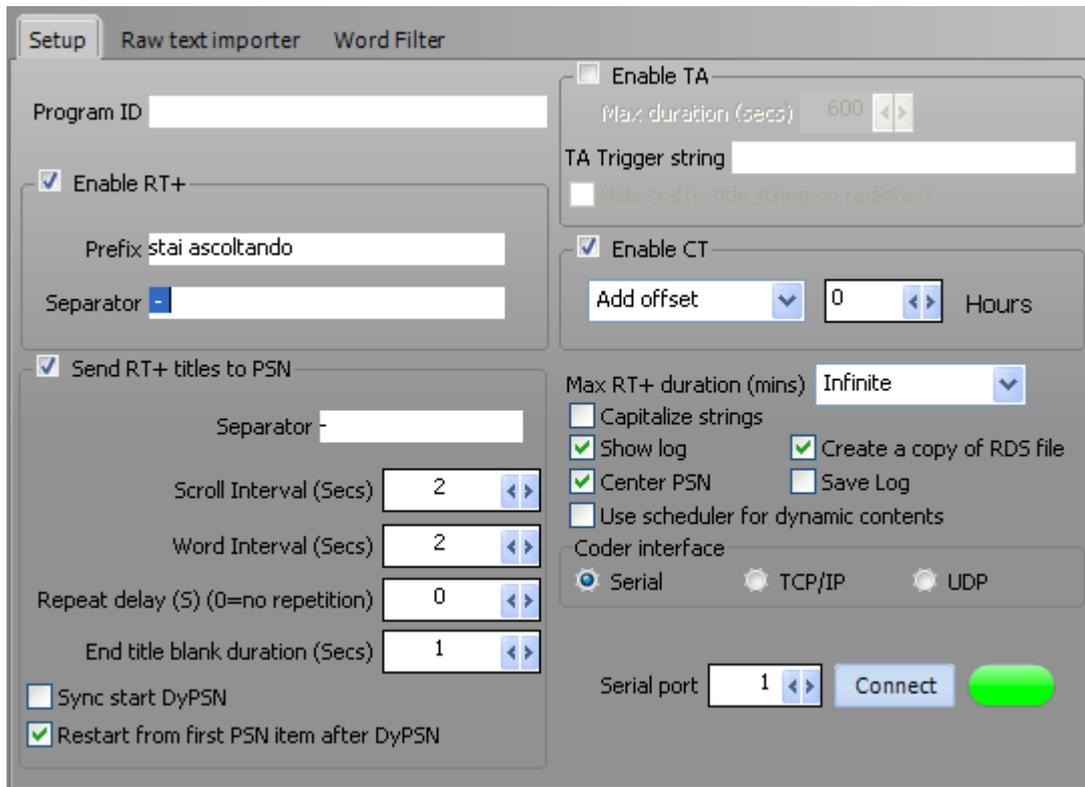
- |           |   |
|-----------|---|
| <b>TA</b> | Orange : TA flag active during traffic news on air.<br>Gray: TA flag disabled   |
| <b>CT</b> | Green: transmission of Clock/Time block 4A, for remote clock visualization and synchronization, is enabled<br>Gray: CT is disabled. |

**RT+** Blue: the radiotext string actually shown is tagged using radiotext plus.  
Gray: Radiotext Plus is disabled.

**SCHED** Green:scheduler is enabled, Radiotext Plus is enabled  
Red:scheduler is enabled, but actually Radiotext Plus is disabled by the scheduler  
Gray: scheduler disabled, Radiotext plus tagging is controlled by the flag [Enable RT](#)

## 4.3 Configuration

Open configuration menu (**Tools->Configuration**), and the following window will appear:



### 4.3.1 Setup

#### 4.3.1.1 Program ID

It is possible to assign a name to the executable window in order to recognize it quickly, when multiple executables are running at the same time to control different coders (eg different programs belonging to the same publishing group).

#### 4.3.1.2 Radiotext Plus and dynamic PSN

**Enable RT +:** Enable radiotext plus

The strings sent by radio automation system will be passed to radiotext only if this flag is enabled. You can also add a prefix and a separator to the string which will be put on-air. Please note that the maximum length of radiotext string in block 2A, is 64 characters. If the total length of the string, including prefix and separator, will be longer than this limit, it will be truncated automatically.

**Send RT + titles to PSN:** Enable sending radiotext titles on PSN.

With this function, the song titles will also be sent on the PSN (maximum length is 8 characters ). This function should be used with caution as it can cause driver distraction and in some countries is expressly prohibited. You are advised to check your local regulations before to activate it.

To limit driver distraction, single character scrolling has been reduced to a minimum, as the program tries to convey mainly whole 8 characters blocks.

**Separator:** separator to be inserted between title and artist. A different separator can be chosen with respect the one used for radio text.

**Scroll interval (secs):** scroll time interval of a single character.

All strings which will not fit 8 characters, will be displayed by scrolling one character at a time using this interval.

**Word interval (secs):** display time of a single word.

A word which has a length less than or equal to 8 characters, will be displayed for the time selected.

**Repeat delay (secs):** The title will be displayed again on the PSN , after this time (in seconds) is elapsed. If the entered value is 0, the title will be displayed once at the beginning of the new song, then the coder will send the PSN strings stored internally until the next song.

**End title blank duration (secs):** if set to any value other than 0, an empty PSN will be displayed for the selected duration, once the dynamic PSN is ended and before to putting on-air the internal PSN strings.

**Sync start DyPSN:** if enabled, it will start the dynamic PSN only at the end of the internally stored strings.

Eg internally stored strings are:"MY RADIO", "THE BEST", "IN TOWN" (loop).

Without Sync Start: "MY RADIO", "**BEATLES**", "**HELP**", "THE BEST", "IN TOWN", "MY RADIO", "THE BEST", "IN TOWN"(loop) (dynamic PS strings are bolded).

With Sync Start: "MY RADIO", "THE BEST", "IN TOWN", "**BEATLES**", "**HELP**", "MY RADIO", "THE BEST", "IN TOWN"(loop) (dynamic PS strings are bolded).

**Restart from first PSN item after DyPs:** if enabled, after a dynamic PSN is transmitted, it will restart the display of internal strings from the beginning.

Eg internally stored strings are:"MY RADIO", "THE BEST", "IN TOWN" (loop).

Without restarting: "MY RADIO", "**BEATLES**", "**HELP**", "THE BEST", "IN TOWN", "MY RADIO", "THE BEST", "IN TOWN"(loop) (dynamic PS strings are bolded).

With restarting: "MY RADIO", "**BEATLES**", "**HELP**", "MY RADIO", "THE BEST", "IN TOWN"(loop) (dynamic PS strings are bolded).

#### 4.3.1.3 TA - Clock time

**Enable TA:** the TA flag will be switched on during traffic news.

**Max duration:** maximum traffic news duration. Once this time is elapsed, the TA flag, if it was previously set on, will be automatically switched off.

**TA Trigger string:** it is the name, as passed to the program by the radio automation system, of the traffic news audio file. If traffic news are live, this could be the name of the file used as traffic news liner. The name is case insensitive.

**Hide traffic title string on radiotext:** if enabled, it will not send the string associated with the traffic news file to radiotext or PSN.

**Enable CT:** enable sending CT (clock time).

---

Enabling this function, it will be sent the 4A block for radio alarm clocks synchronization and date-time visualization.

As the PC system clock will be used, it is recommended to keep the system clock synchronized using any time server.

*The 4A block transmission will be suspended when PC is shut off or the PC-Coder communication is broken.*

**Add offset:** offset for the time currently sent.

#### 4.3.1.4 Communication interface and additional settings

**Max RT Duration:** maximum radiotext duration.

This control sets the maximum time for the same Radiotext Plus string visualization. If this period is exceeded, the coder will start to send the internally stored RT strings, returning to dynamic RT+ once a new string is received.

**Show log:** show program activity log.

**Center PSN:** auto center the strings displayed on PSN, if they are shorter than 8 characters.

**Use scheduler for dynamic contents:** enable scheduler for dynamic radiotext plus and PSN activation, if they are supposed to be active only on some week days or at a specified time,

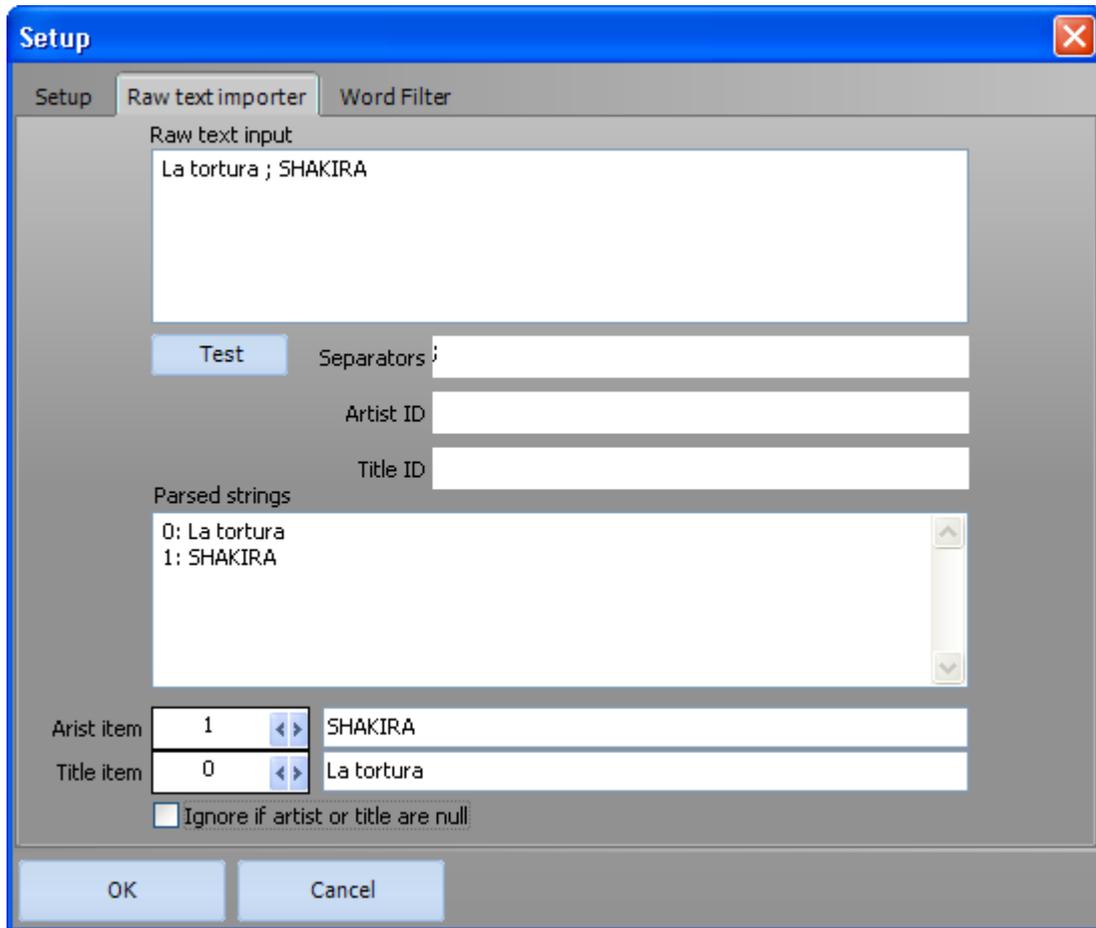
**Create a copy of RDS file:** creates an identical copy of the title file written by the automation system to be read by other applications (eg: streaming encoder).

**Save log:** save a daily program activity log on a file eg: "log\_18-06-2014.txt"

**Coder interface:** communication interface selection, RS232, TCP/IP or UDP.

### 4.3.2 Raw Text Importer

Raw text importer allows to read plain text files generated by the radio automation system.



The contents of the currently selected file (from the main window menu **File-> Raw TextFile**) is displayed in the **Raw Text Input**.

The artist and title fields may be separated in two ways:

**using separators:** the strings read from the file will be divided using the characters entered in the "Separators" editor.

In the above example, the input string "SHAKIRA;La tortura" is divided, using the separator ";".

This will produce two output lines (line 0:La tortura, line 1: SHAKIRA).

Then, using the controls "Artist item" and "Title item", set which line must be used as title and which one as the artist name.

**using identifiers eventually included in the raw file:** if the raw file was already marked with labels such as:

CurrArtist = Michael Jackson

CurrTitle = Thriller

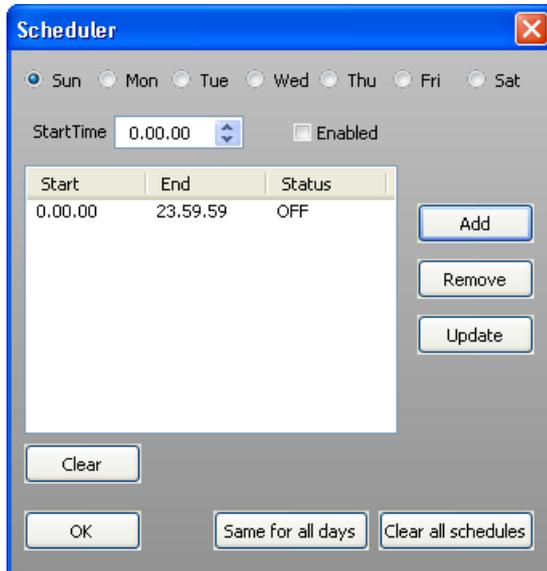
you can simply enter in the editors "Artist ID" and "Title ID" the two identifiers "CurrArtist =" and "CurrTitle =" (without quotes).

The program will then automatically isolate strings related to artist name and song title.



## 4.4 Scheduler

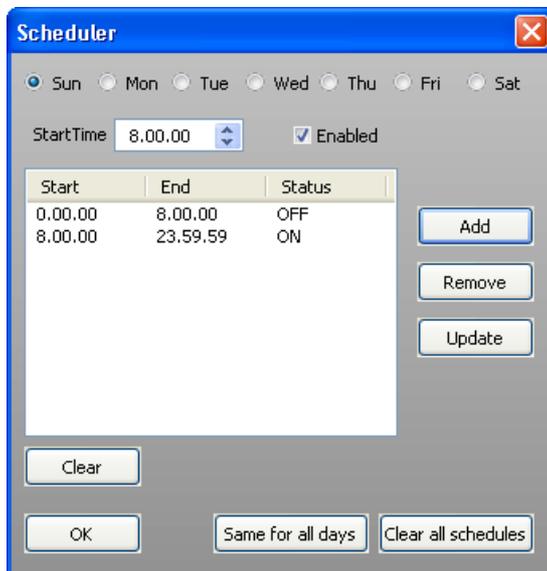
The dynamic content scheduler (**menu Tools->Scheduler**) allows to activate the Radiotext Plus and dynamic PSN only in predetermined time intervals.



For example, we want to use dynamic RT+ and PSN only from 8.00 to 12.00 and from 18.00 to 23.00 every day except on Sundays where it will be active for the entire day.

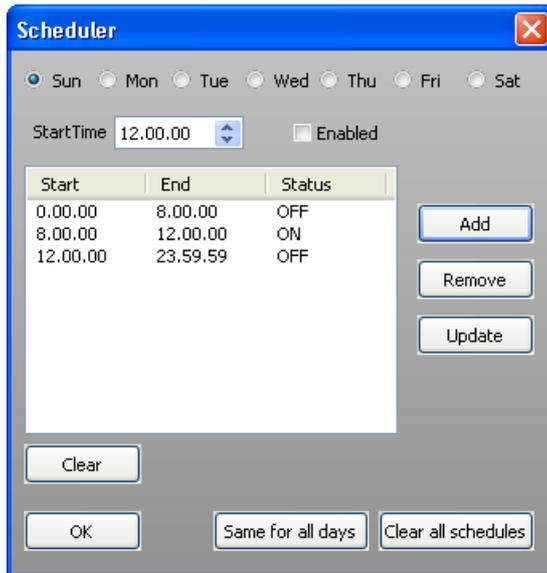
So an event must be created, scheduled for 8:00 am (set into "**Start Time**" box), having "**Enabled**" status checked.

Pressing the "**Add**" the button, the event will be added to the events list.

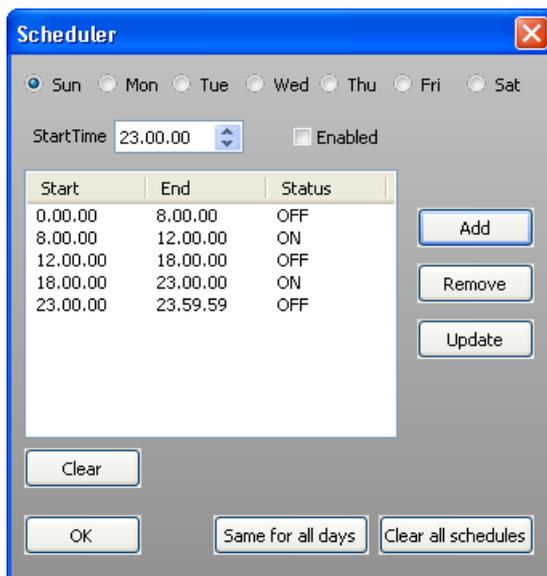


We have that the dynamic content will be disabled from 00.00 to 8.00 then, for the event we created, from 8.00 onwards it will be enabled.

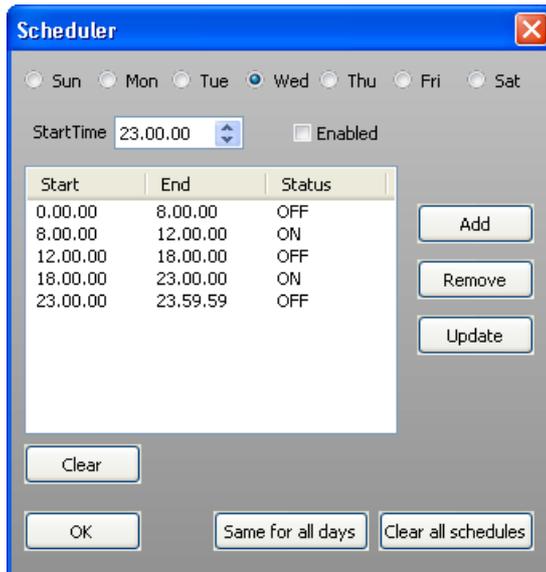
Now the dynamic content disabling event should be added: put 12:00 into the "**StartTime**" box, uncheck the "**Enabled**" checkbox and push "**Add**" button.



The dynamic content has to be re-enabled from 18:00 to 23:00, so one enabling event has to be added at 18:00 and a disabling event at 23:00. In the following picture is represented the complete programming.



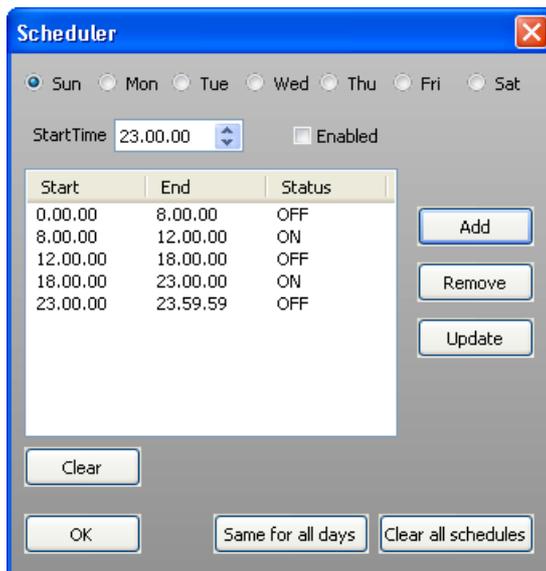
Summarizing: firstly the dynamic content enabling was added at 8:00hr, then the disabling event at 12:00hr, the re-enabling at 18:00hr and the disabling at 23:00hr. Since this scheduling will be the same for almost the whole week, it can be simply copied to the other days, pressing the **"Same for all days"** button.



Once copied, it can be verified that, changing the week day selection at the top of the window, the scheduling is the same for all days.

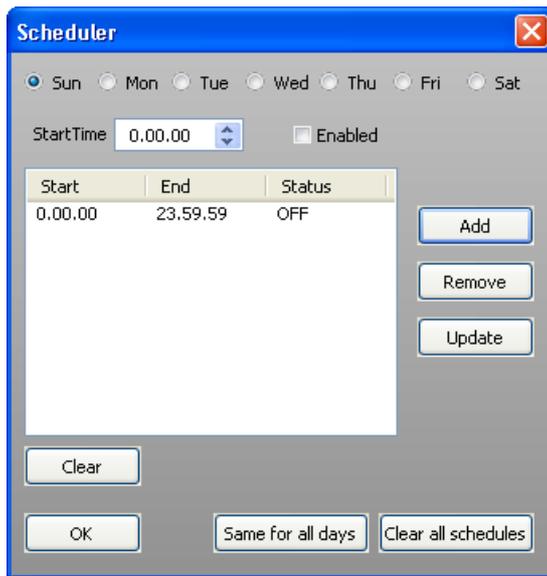
Done this, you will then modify the Sunday scheduling only, where the dynamic content will be enabled for the whole day.

Select the week day, on the top of the window, "**Sun**"



Press the "**Clear button**" to delete all scheduler entries for the current day.

Once all entries have been deleted, just add an event starting at 00:00, with "**Enabled**" checkbox checked to enable the dynamic content .



Programming is completed. Press "**OK**" button to save and exit from the current window.

Follows a short description of the other controls on the window:

**Remove:** removes the currently selected entry

**Update:** updates the currently selected entry with new time and/or status informations.

**Clear all schedules:** deletes all entries over all days.

# Section

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Streaming audio module

# 5

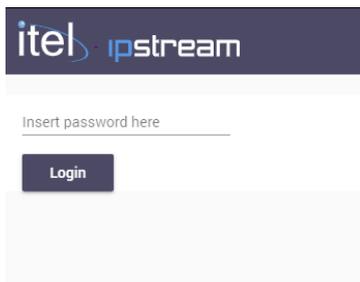
## 5 Streaming audio module

The module adds audio streaming decoding capabilities for receiving streaming HLS / MP3 / AAC + shoutcast servers by HTTP/HTTPS using TCP / IP connectivity. The module also allows playback of audio files from an USB key.

The audio output is transferred in digital format to audio processor / stereo encoder, thus achieving the highest audio quality.

### 5.1 Decoder audio Stream

Connect the apparatus to your LAN and turn it on. Open a web browser on a PC from which the apparatus can be reached and type on the web browser's address bar: <http://192.168.1.100>. The audio module internal webserver should then load the login default page.



No password set by default, click on the login button and enter the main page.

Go to the "Streaming settings" menu and set one or more URLs from which to receive the audio stream.

Save current configuration by pressing the "Apply settings" button.

The module adds audio streaming decoding capabilities for receiving streaming MP3 / AAC + / HLS shoutcast servers or by using TCP / IP connectivity. The module also allows playback of audio files from an USB key.

The audio output is transferred in digital format to audio processor / stereo encoder, thus achieving the highest audio quality.

An helpful guide for all settings appears on the side of the configuration page.

On the audio processor, now select the audio input "[NetAudio](#)" and the streaming audio received by the module should be put on-air.

Adjust, if necessary, the input level of audio input "netaudio." If you intend to use any audio processing during streaming audio playback, this setting can also be omitted since the processor will provide for automatic leveling.

The preset for the network input can be chosen into the next window, after "netaudio" input has been selected into the current.

If you want to use more than a single audio source, for using the integrated automatic audio fallback, proceed to its selection and its associated audio processing preset.

Finally, turn the [audio fallback](#) on.

## 5.2 Quick setup

The default IP address is **192.168.1.100**.

*If the IP is unknown, connect the the processor directly to a PC network card, then use the supplied utility "module\_finder.exe" to recover its IP address.*

Connect the apparatus to your LAN and turn it on. Open a web browser on a PC from which the apparatus can be reached and type on the web browser's address bar: `http://192.168.1.100`.

The audio module internal webserver should then load the default page.

Go to the "CONFIG" menu and set one or more URLs from which to receive the audio stream.

Save current configuration by pressing the "SAVE & REBOOT" button, wait for the restart of the module.

Configure the network settings of the module: SETUP -> NETWORK

Save by pressing the "SAVE & REBOOT" button, wait for the restart of the module.