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SIGNUM

USER MANUAL

System: Signum

Release: 1.0

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SUMMARY.

1 Figure Index.

2 Norme di primo soccorso.

Il personale impegnato nell'installazione, nell'uso e nella manutenzione dell'apparecchiatura deve avere familiarità con la teoria e le pratiche di primo soccorso.

2.1 Trattamento degli shock elettrici.

Se la vittima ha perso conoscenza*:*

Seguire i principi di primo soccorso riportati qui di seguito.

- Posizionare la vittima sdraiata sulla schiena su una superficie rigida.
- Aprire le vie aeree sollevando il collo e spingendo indietro la fronte (Figura 1).
- Se necessario, aprire la bocca e controllare la respirazione.
- Se la vittima non respira, iniziare immediatamente la respirazione artificiale (Figura 2)*:* inclinare la testa, chiudere le narici, fare aderire la bocca a quella della vittima e praticare 4 respirazioni veloci.

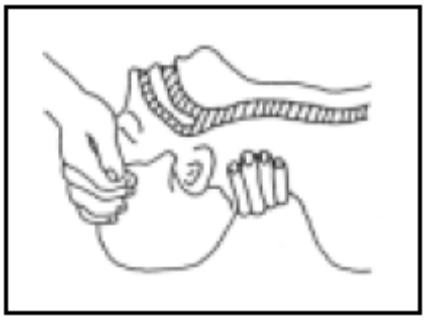


Figura 1: Dettaglio rianimazione – 1.

Figura 2: Dettaglio rianimazione – 2.

- Controllare il battito cardiaco (Figura 3); in assenza di battito, iniziare immediatamente il massaggio cardiaco (Figura 4) comprimendo lo sterno approssimativamente al centro del torace (Figura 5).

Figura 3: Dettaglio rianimazione – 3.

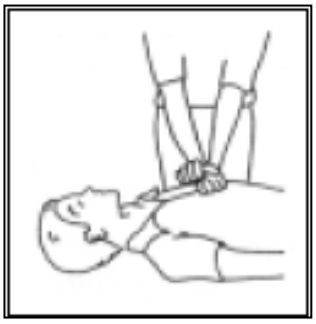


Figura 4: Dettaglio rianimazione – 4.

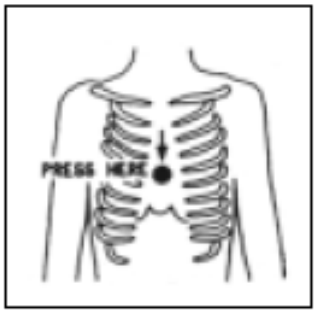


Figura 5: Dettaglio rianimazione – 5.

- Nel caso di un solo soccorritore, questo deve tenere un ritmo di 15 compressioni alternate a 2 respirazioni veloci.

- Nel caso in cui i soccorritori siano due, il ritmo deve essere di una respirazione ogni 5 compressioni.
- Non interrompere il massaggio cardiaco durante la respirazione artificiale.
- Chiamare un medico prima possibile.

Se la vittima è cosciente

- Coprire la vittima con una coperta.
- Cercare di tranquillizzarla.
- Slacciare gli abiti e sistemare la vittima in posizione coricata.
- Chiamare un medico prima possibile.

2.2 Trattamento delle ustioni elettriche.

Vaste ustioni e tagli alla pelle

- Coprire l'area interessata con un lenzuolo o un panno pulito.
- Non rompere le vesciche; rimuovere il tessuto e le parti di vestito che si fossero attaccati alla pelle; applicare una pomata adatta.
- Trattare la vittima come richiede il tipo d'infortunio.
- Trasportare la vittima in ospedale il più velocemente possibile.
- Se le braccia e le gambe sono state colpite, tenerle sollevate.

Se l'aiuto medico non è disponibile prima di un'ora e la vittima è cosciente e non ha conati di vomito, somministrare una soluzione liquida di sale e bicarbonato di sodio*:* 1 cucchiaino di sale e mezzo di bicarbonato di sodio ogni 250 ml d'acqua.

Far bere lentamente mezzo bicchiere circa di soluzione per quattro volte e per un periodo di 15 minuti.

Interrompere qualora si verificassero conati di vomito.

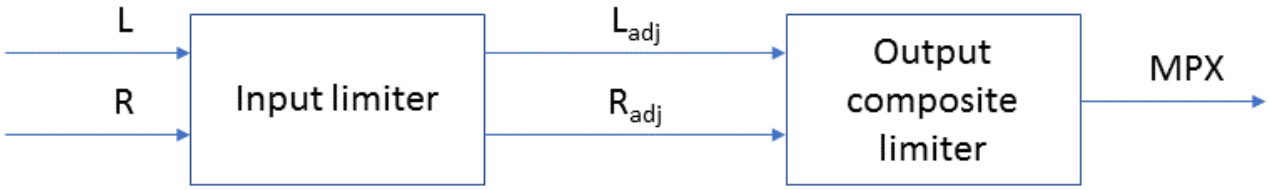
Non somministrare alcolici

Ustioni Meno gravi

- Applicare compresse di garza fredde (non ghiacciate) usando un panno il più possibile pulito.
- Non rompere le vesciche; rimuovere il tessuto e le parti di vestito che si fossero attaccati alla pelle; applicare una pomata adatta.
- Se necessario, mettere abiti puliti e asciutti.
- Trattare la vittima come richiede il tipo d'infortunio.
- Trasportare la vittima in ospedale il più velocemente possibile.
- Se le braccia e le gambe sono state colpite, tenerle sollevate.

3 General Description.

The SIGNUM is the state-of-the-art IRD (Integrated Receiver Decoder) designed for the high-end TV and radio distribution market, where quality and reliability are key features.
The development of digital satellite contribution networks and the need to connect many sites require a cheap but still reliable and performing satellite receiver with integrated decoder; the Elber SIGNUM offers professional performances at an excellent quality/price ratio.
The SIGNUM operates as receiver (optionally dual-tuner), decoder or both; as receiver, it demodulates any DVB-S or DVB-S2 signal with no limitations in terms of modulation scheme and configuration (single / multistream), giving TS output over ASI or IP outputs. As decoder, it accepts TS from the demodulated signal(s), 2 x ASI and TSoIP inputs (when hardware options are installed such as in SIGNUM-BD).
The Video decoder accepts MPEG-2 and H.264 4:2:0 signals, HD and SD, while audio decoding formats supported are MPEG-1 LI/II; BISS 0/1/AND descrambling is also supported. Switching functionalities between all its inputs (RF/ASI/IP/ETI/EDI) are also foreseen.
Thanks to the Low Symbol Rate achievable, it has been optimized for radio applications, giving analogue and digital L+R signals at the outputs of the decoder section.
Moreover, an MPX encoder with RDS function is available in the Signum-D1 model.
The MPX encoder is very performing in terms of audio quality as it is also equipped of a very powerful overshoot limiter composed by a two stages algorithm, as shown in block diagram below, to prevent overshoots at the output signal.
The first one (input limiter) is a look-ahead stage, monitoring and adjusting (reducing) input L and R levels according to parameters set via user interface. The second one (output composite limiter) takes the adjusted L/R coming out of first stage and generates the final MPX signal according to the parameters set.



MPX encoder embeds an RDS encoder generating the 57 KHz subcarrier, modulated by static or dynamic data; static data are fed via user interface, while dynamic data can come from two sources: RS-232 from back panel and directly from the de-encapsulation of a TS data PID, generally fed via satellite. In case of invalid data detection, static data will be used.
Furthermore, a HD-SDI dual output is available with option SIGNUM-BG (hardware option).
The front panel is fitted with a 2” TFT touchscreen, the Ethernet management port, a USB connector for customer authentication and firmware upgrades.
The back-panel hosts all I/O connectors either for baseband and RF signals.

3.1 Product codes and options.

Table 1: Commercial codes and descriptions

Code	Description
SIGNUM-BA	Single tuner IRD DVB-S/S2 CVBS output and analog audio.
SIGNUM-BB	Single tuner IRD DVB-S/S2 CVBS output, analog audio and AES-EBU (software option)
SIGNUM-BC	Single tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU (software option)
SIGNUM-BD	Single tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI (hardware option)
SIGNUM-BE	Single tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI and TSoIP out (hardware option)
SIGNUM-BF	Single tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI and TSoIP in/out (hardware option)
SIGNUM-BG	Single tuner IRD DVB-S/S2 multistream, output HD-SDI, CVBS, analog audio and AES-EBU, two stereo pairs, in/out ASI and TSoIP in/out (hardware option)
SIGNUM-D1	Single tuner IRD DVB-S/S2 multistream, CVBS, analog audio, AES-EBU output. Integrated MPX stereo encoder with RDS generation and performing overshoot limiter.
SIGNUM-2BA	Dual tuner IRD DVB-S/S2 CVBS output and analog audio (HW option).
SIGNUM-2BB	Dual tuner IRD DVB-S/S2 CVBS output, analog audio and AES-EBU (software option)
SIGNUM-2BC	Dual tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU (software option)
SIGNUM-2BD	Dual tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI (hardware option)
SIGNUM-2BE	Dual tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI and TSoIP out (hardware option)
SIGNUM-2BF	Dual tuner IRD DVB-S/S2 multistream, CVBS output, analog audio and AES-EBU; in/out ASI and TSoIP in/out (hardware option)
SIGNUM-2BG	Dual tuner IRD DVB-S/S2 multistream, output HD-SDI, CVBS, analog audio and AES-EBU, two stereo pairs, in/out ASI and TSoIP in/out (hardware option)
SIGNUM-2D1	Dual tuner IRD DVB-S/S2 multistream, CVBS, analog audio, AES-EBU output. Integrated MPX stereo encoder with RDS generation and performing overshoot limiter.

In the following pages, the main configurations block diagrams are shown.

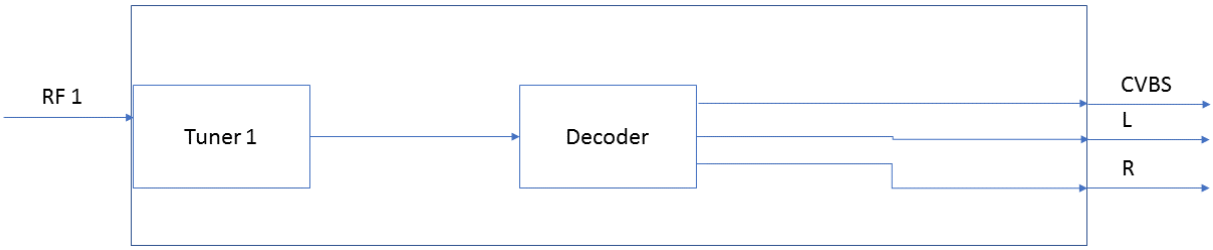


Figure 1: Block diagram SIGNUM-BA/BB/BC

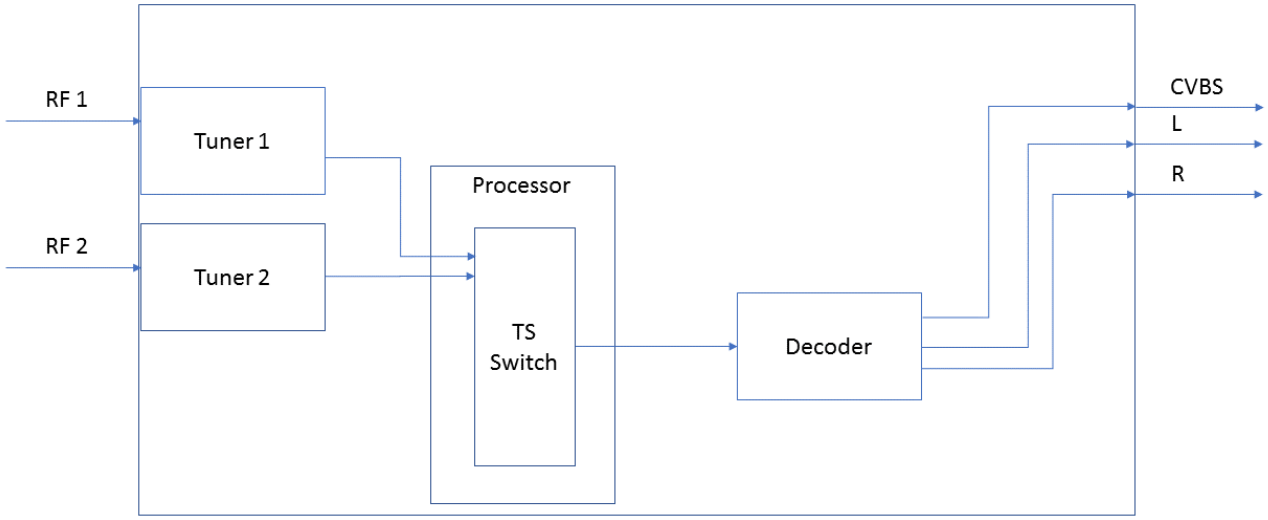


Figure 2: Block diagram Dual Tuner Version Signum-2xx

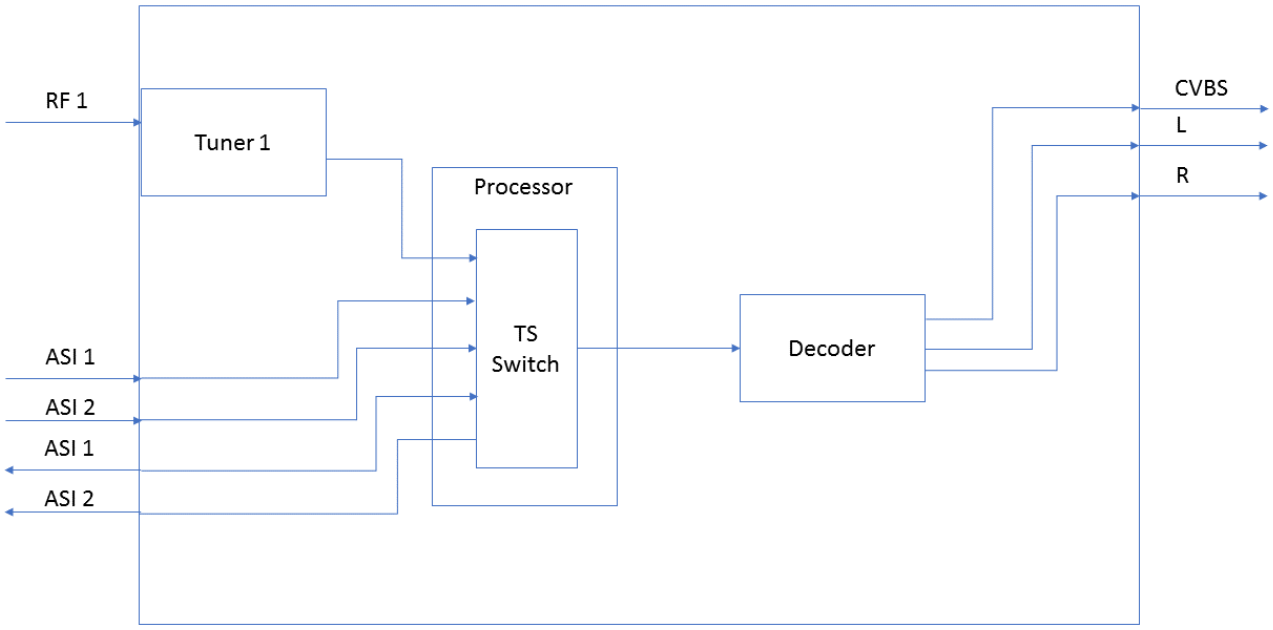


Figure 3: Block diagram SIGNUM-BD

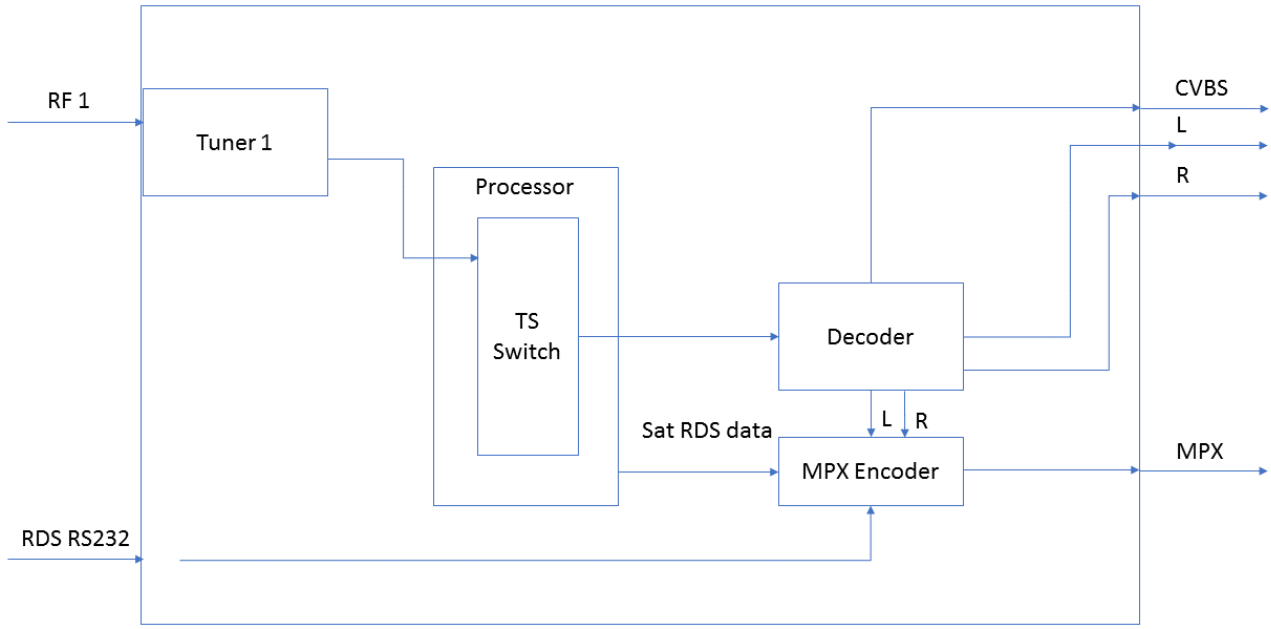


Figure 4: Block diagram SIGNUM-D1

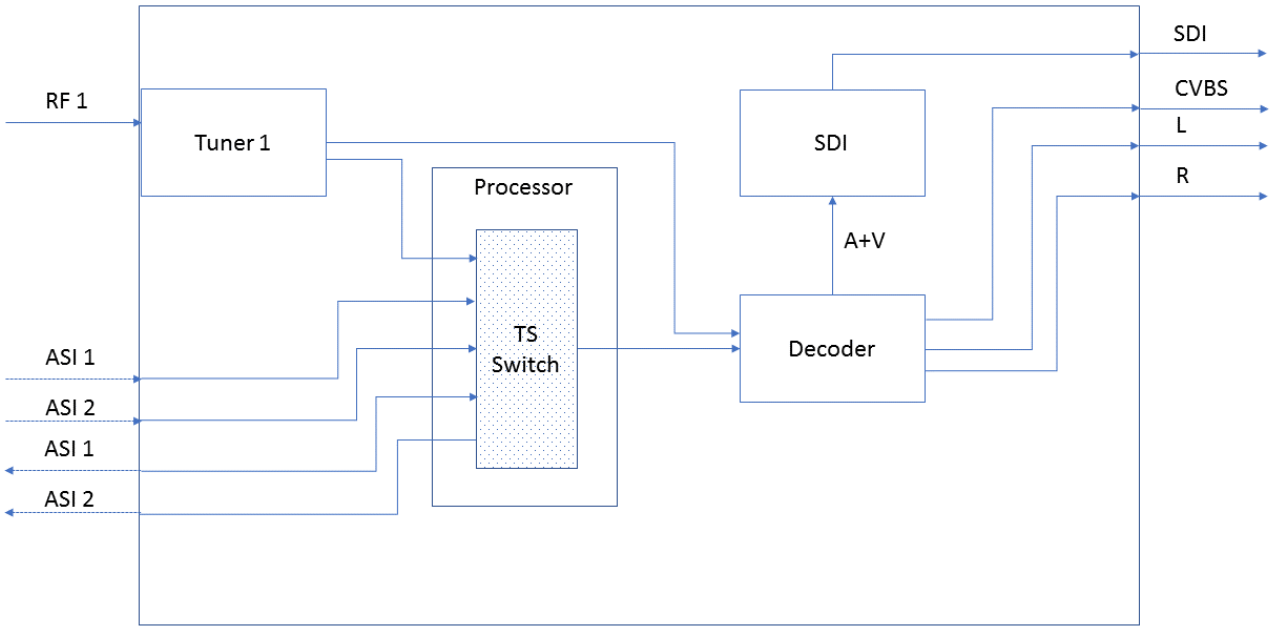


Figure 5: Block diagram SIGNUM-BG

4 Technical Specifications.

4.1 Satellite Receiver Specifications.

Table 2

Standards	ETSI EN 300 421 (DVB-S) ETSI EN 302 307 (DVB-S2)
Inputs	1 or 2 (HW option)
Input Connectors	F(f) 75 Ω
Range of frequency	950-2150 MHz
RF Input Level	-10 to -87 dBm (QPSK 27500 Msym/s)
Symbol Rate	0.256-45 Msym/s
LNB Control	OFF/13V/18V and 22KHz tone management
FEC	As per standard (auto or manual)
Constellation	QPSK, 8PSK, 16APSK, 32 APSK
DVB-S2 Mode	CCM, VCM, ACM, Normal/Short FEC frames Base-Band header processing: ISSY short/long, NPD Mode Adaptation: Multistream reception with ISI selection
PLS	Physical Layer Scrambling supported

4.2 Baseband I/O (HW option).

Table 3

ASI	2 x BNC(f) 75 Ω configurable as Input or Output
IP	1 x RJ-45 Auto Switching 10/100/1000 BASE-T
E1 (ETI)	2 x BNC(f) 75 Ω (E1 In and E1 out)

4.3 Decoder Specifications.

Table 4

Digital Video standard	MPEG-2 HD/SD 4:2:0 H.264 HD/SD 4:2:0
Video Format	PAL B/G, NTSC, SECAM
Video Output	1 x CVBS on BNC(f) 75 Ω connector 2 x HD-SDI on BNC(f) 75 Ω connector (HW option)
Audio Compression	MPEG-1 layer I/II, MP3, MPEG-2 layer II, MPEG-4 AAC-LC or MPEG4 AACplus
Audio Output	2 x analogue (L+R) on XLR 600 Ω connectors 1 x AES/EBU on 120 Ω XLR connector

4.4 Stereo Encoder Specifications (HW option).

Table 5

Sync Input 19 KHz	1 x BNC(f) 75 Ω (required at order)
Sync Output 19 KHz	1 x BNC(f) 50 Ω (required at order)
MPX Output Connector	2 x BNC(f) 50 Ω
MPX Output Level	-3 dBu to +9 dBu
Data for RDS	1 x DB-9(m) RS-232 (In and Out)

4.5 General Specifications.

Table 6

Temperature Range	-10°C ÷ 55°C
Relative Humidity	0 ÷ 95°C not condensing
Management	Front Panel (Display LCD TFT with touchscreen) SNMP Web browser
Firmware upgrade	USB, WEB, FTP
Power Supply	AC: 100-240 V~ 50/60 Hz IEC 320 DC: 10 ÷ 13 V 2 pins connector
Consumption	< 45 W

4.6 Mechanical Specifications.

Table 7

Cabinet	Standard 19” 1U

Width	482.5 mm
Height	43.65 mm
Depth	258.00 mm (with connectors)
Max Weight	7 Kg

5 Installation.

- Once received the goods, check if presence of damages due to the shipment. If any damage is noticed, notify immediately the courier and Elber s.r.l. sending an email to support@elber.it. Do not open the box.
- Unpack the equipment and check if the presence of damages due to the shipment. If any damage is noticed, notify immediately the courier and Elber s.r.l. sending an email to support@elber.it. Do not switch on the equipment.
- The box should contain:
  - The equipment.
  - One AC supply cable.
  - One DC supply cable, equipment adapted connector on one side, free wires at other end (if DC supply option has been purchased).
  - An envelope containing:
    - Reserved web and display passwords.
    - USB pen with Token for display access and user manual.
- Install the equipment in a rack cabinet. A 1U space is required. Verify that there is enough space between other functioning equipment generating high temperatures and that there are no obstructions in the ventilation. (The functioning is guaranteed in a temperature range from -10 ºC ÷ +55 ºC).
- The equipment must be correctly grounded, to guarantee a secure functioning.
- Connect to the correct power tension reading the information on the manual or on the label attached to each equipment, containing the serial number.
- The supply cable plug is the mean of separation of alternating current. Connect the plug to a socket easily accessible.
- The voltage polarized connector is the mean of separation of direct current. Connect the plug to a socket easily accessible.
- The connection to mains supply must be made with a supply cable whose conductors must have a section not less than 1 mm^2, terminated with industrial connector and operating temperature of 70°C.
- An external device for protection against overcurrent is necessary before the connection to the mains supply in direct current. The device should have following features: F 7 A H 250 V
- The connection to mains supply in alternating current must be made with a supply cable H05VV-F whose conductors must have a section not less than 0.75 mm^2, and operating temperature of 70°C.
- Setup the equipment according to the needs consulting the user manual.

6 Local User Interface.

The local user interface is comprehensive of a led for general alarm indication and a TFT graphic display with **TOUCH SCREEN** function.
Parameters modification via TFT is enabled upon password submission or after connection of a USB pen with the right token file installed in its root folder, delivered to the customer together with the equipment.

6.1 Main Menu.

Upon turning on the device, after loading *software embedded*, the display shows the main menu, as in Figure 6. This menu returns the information of the selected service (if any) and enables access to the two main submenu of the device: Advanced and Program.
In case of screensaver or display standby activation, the system will return to the main menu.

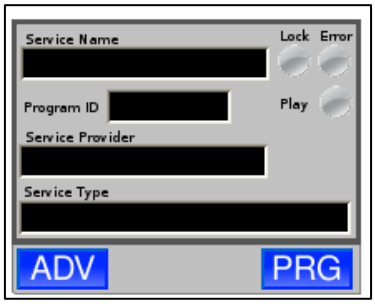


Figure 6: Main Menu

Active areas:

- ADV allows to reach the advanced menu;
- PRG allows to reach the submenu Program of decoder.

The advanced menu (Figure 7) is furthermore split into two sections, one for satellite receiver and one for decoder, showing main parameters and some alarm indications.

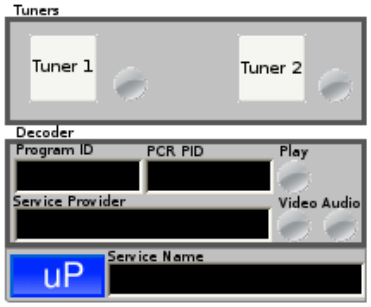


Figure 7: Advanced Menu.

Active areas:

- uP uP
- Tuner section
- Decoder section

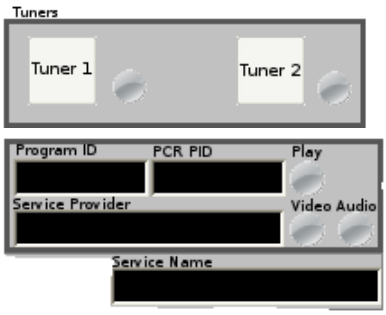


Table 8: Tuners selection.

Item	Description
Tuner 1	Access to Tuner 1 menu and related alarm led
Tuner 2	Access to Tuner 2 menu and related alarm led (If HW option installed)

Table 9: Description of decoder fields.

Item	Description
Program ID	Indication of selected Program Identifier.
PCR PID	Indication of the PCR Program Identifier detected.
Play	Indicates if the service decoding is running (green if yes, red if no).
Service provider	Indication of the provider of the satellite service.
Service Name	Name of the selected service.
Video	Indication of video presence in the selected service. (green if yes, red if no)
Audio	Indication of audio presence in the selected service. (green if yes, red if no)

6.2 uProcessor Menu.

6.2.1 MicroProcessor submenu.

The submenu let a fast access to the elements to be controlled; icons meaning, concerning different sections, is intuitive. Check following paragraphs to see every submenu.

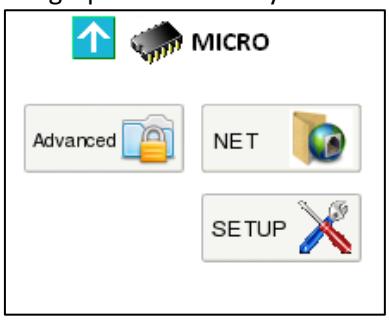


Figure 8: Microprocessor submenu.

6.2.2 Menu Setup - System Time.

This menu let the user set right time and date, used by the system for alarm logging. Information about system time is preserved by the battery of the *Real Time Clock*.

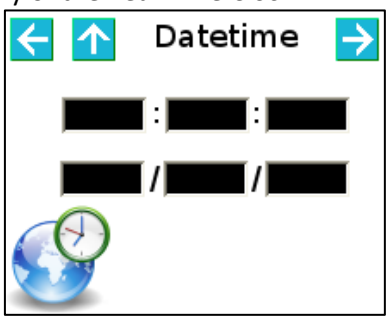


Figure 9: System time setting menu.

Active areas:

- Directional arrow “UP” to go back to main menu.
- Directional arrows “LEFT” and “RIGHT” to browse microprocessor menu.
- Every text box which opens a virtual keypad to enter information.

Figure 10: Virtual keypad.

6.2.3 Menu Setup - Touch Screen Calibration.

This menu let the user calibrate the Touch Screen function. It's recommended to use the stick provided with the equipment to touch the red cross, three times as required by the system, after **Calibrate** button pushing.

Figure 11: Touch Screen Calibration menu.

Active areas:

- Directional arrow "UP" to go back to main menu.
- Directional arrows "LEFT" and "RIGHT" to browse microprocessor menu.

6.2.4 Menu Setup - Reset.

This menu let the user reset each microcontroller and FPGA of the equipment.

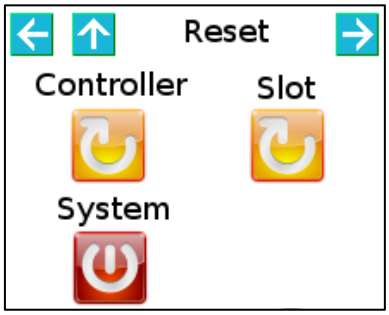


Figure 12: Reset menu.

Active areas:

- Directional arrow "UP" to go back to main menu.
- Directional arrows "LEFT" and "RIGHT" to browse microprocessor menu.
- Reset icons.

SLOT reset will restart decoder section; CONTROLLER reset just reboot system supervisor, SYSTEM reset is the complete reset of the equipment.

6.2.5 Menu Net - Network parameters.

This menu let the user modify management port network parameters; in detail, it is possible to set IP address, Subnet Mask and Gateway IP address. MAC Address is read-only.

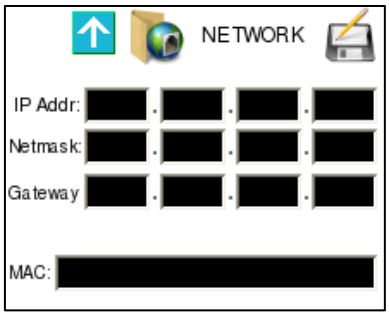


Figure 13: Network parameters menu.

Active areas:

- Directional arrow “UP” to go back to main menu.
- Directional arrows “LEFT” and “RIGHT” to browse microprocessor menu.
- Every text box, which opens the virtual keypad to insert characters.

6.2.6 Menu Misc - General information 1/2.

This menu shows general purpose information, such as:

- Model
- Serial Number
- Part Number

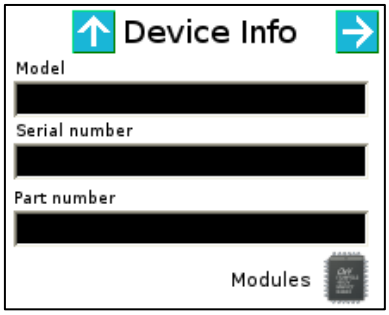


Figure 14: General info menu 1/2.

Active areas:

- Directional arrow “UP” to go back to main menu.
- Directional arrow “RIGHT” to browse microprocessor menu.
- Modules icon to check microprocessor software versions.

6.2.7 Menu Misc - General information 2/2.

This menu shows general purpose information, such as:

- Customer name (two rows)
- Installation site (Loc.)

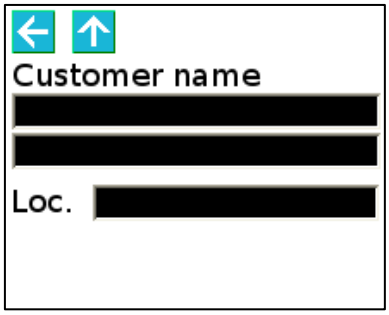


Figure 15: General info menu 2/2.

Active areas:

- Directional arrow “UP” to go back to main menu.
- Directional arrows “LEFT” and “RIGHT” to browse microprocessor menu.

6.2.8 Menu Misc - Modules.

6.2.8.1 Menu Misc - Modules - Controller.

This menu shows controller general purpose information such as:

- Model
- Version
- Revision

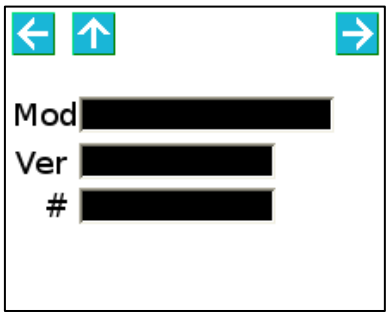


Figure 16: General purpose information controller.

Active areas:

- Directional arrow “UP” to go back to main menu.
- Directional arrows “LEFT” and “RIGHT” to browse microprocessor menu.

6.3 Menu Tuner.

This is the satellite receiver part. To open this menu, it is necessary to click on one of the two virtual buttons indicating Tuner 1 or Tuner 2 (if HW option installed) shown in Figure 17.

Figure 17: Tuners' selection

When access is granted, the following Menu will appear:

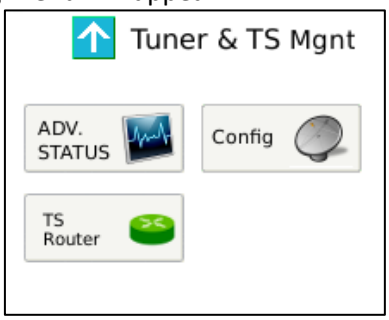
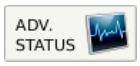


Figure 18: Menu Tuner.

Active Areas:

- Directional arrow "UP" to return to higher level menu.
- The ADV. STATUS icon.
- The Config icon.
- The TS Router icon (HW option)

6.3.1 Adv. Status submenu.

It is marked by the 

icon. Enables to monitor quality, level and other characteristics of the received signal. This submenu is divided in two screens:

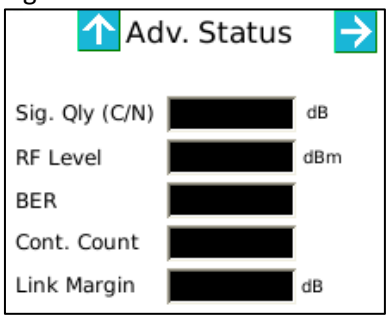


Figure 19: Adv. Status submenu n.1

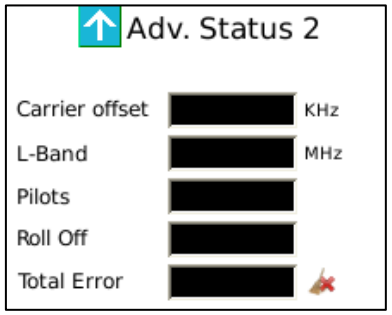


Figure 20: Adv. Status submenu n.2

Active areas:

- Directional arrow "UP" to return to higher level menu.
- Directional arrow "RIGHT" to browse through menus.

Table 10: Description of the parameters of the status of the satellite receiver.

Item	Description
Sig. Qly (C/N)	Indication of Carrier to Noise ratio shown in dB.
RF Level	Indicates the received signal level, shown in dBm.
BER	Indication of the error rate. (*Bit Error Rate*).
Cont. Count	Indicates the number of Continuity counter on received stream.
Link Margin	Indication of the margin on the link shown in dB.
Carrier offset	Indicates the offset of carrier frequency shown in KHz.
L-Band	Indication of the frequency on L-band, shown in MHz.
Pilots	Indicates the presence of the pilot carriers.
Roll-off	Indication of the roll-off factor detected
Total error	Indicates the total number of relevant errors.
	Button to reset the above error counter

6.3.2 Configuration submenu.

Marked by the 

icon. Enables the configuration of the receiver with the desired parameters by the user.

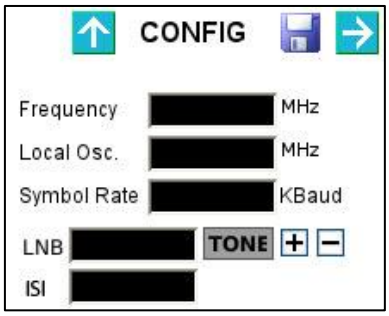


Figure 21: Submenu configuration.

Table 11: Description of the parameters of the configuration of the satellite receiver.

Item	Description
Frequency	Enables to configure the Frequency of the signal in satellite band, shown in MHz.
Local osc.	Enables to configure the frequency of the LNB local oscillator to calculate automatically L-band frequency, shown in MHz.

Symbol Rate	Enables the configuration of the Symbol rate, shown in KBaud.
LNB	Enables to configure the polarization of the LNB, amongst the following values: • 13V • 13V 22 KHz • 18V • 18V 22 KHz • OFF
ISI	Optional choice, Input Stream Identifier (ISI)

Active Areas:

- Directional arrow "UP" to return to higher level menu.
- The boxes to enter the desired values.
- The buttons to change the modality of functioning of LNB. The TONE icon to change its state into TONE if the selected modality includes such an option.
- Disk icon which is visible only when one or more values are modified, to save & apply the modifications done by the user.

6.3.3 TS Router and Switch Submenu (HW option).

Can be accessed through the TS Router icon.

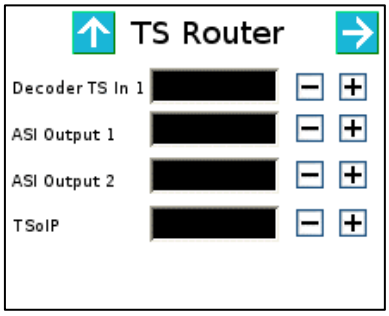


Figure 22: TS router submenu.

This submenu enables the user to configure the inputs and outputs assignments/connections according to its need.
Active Areas:

- Directional arrow "UP" to return to higher level menu.
- Directional arrows "LEFT" and "RIGHT" to browse through menus.
- The buttons to select the type of signal on the considered input or output.
- Checkboxes for reversibility and automatic switching enabling

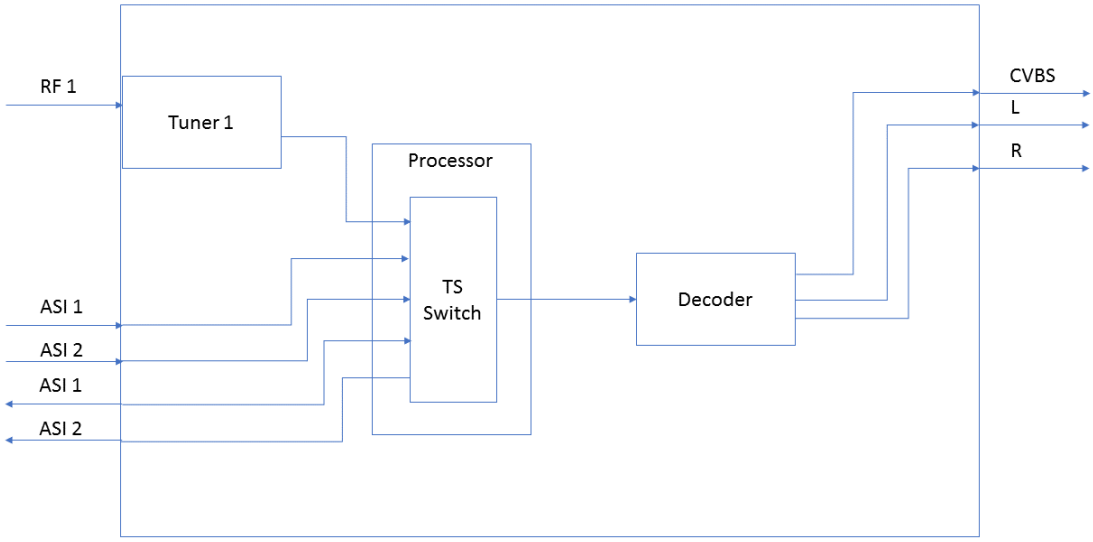


Figure 23: TS matrix block diagram.

The block diagram shows some of the I/O connections for TS inside the equipment.

Table 12: TS router parameters description

Item	Description
Decoder TS in 1	It is the Decoder input (the signal to be decoded)
ASI Output 1	It is the ASI 1 back panel connector, if configured as output
ASI Output 2	It 2 is the ASI 2 back panel connector, if configured as output
TSoIP	It is the IP output

The signal to be assigned can be:

- TS Switch (if SW option installed)
- ASI 1
- ASI 2
- TSoIP
- Demodulator 1 (i.e. the signal coming from Tuner 1)
- Demodulator 2 (if HW option installed)

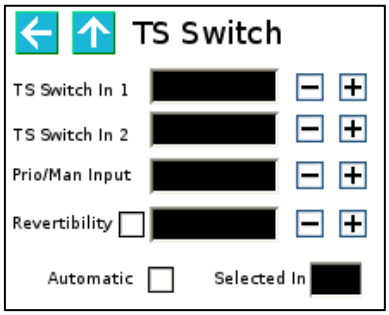


Figure 24: TS Switch submenu

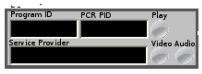
The TS Switch is another feature of the equipment; it is possible to select two TS coming from the different sources available and assign them to the TS Switch.

Table 13: TS switch parameters description

Item	Description
TS switch in 1	Logical assignments to TS Switch input 1 (dem 1, dem 2, ASI 1, ASI 2)
TS switch in 2	Logical assignments to TS Switch input 2 (dem 1, dem 2, ASI 1, ASI 2)
Prio/Man input	Setting of the priority input (in case checkbox "Automatic" is checked) or the forced input (otherwise)
Revertibility	In case Automatic checkbox is checked, this checkbox enables the reversibility of the signal, that is the priority. The text box beside let the user configure the reversibility time in ms, that is the time

	after which the "safe condition" of the priority input is validated and the system can switch.
Automatic	If checked, the TS switch is enabled; otherwise, its output is the Prio/Man input selected
Selected in	Indication of the source selected by the system.

6.4 Decoder Menu.

Click the  icon to access:

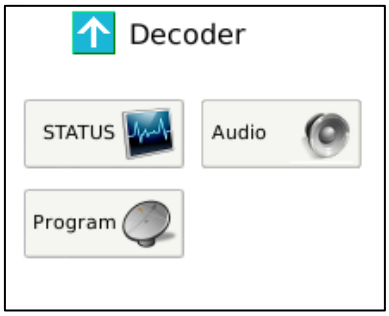


Figure 25: Decoder Menu.

Active Areas:

- Directional arrow "UP" to return to higher level menu.
- The  icons to access the submenu.

6.4.1 Submenu Status.

Marked by the  icon. By clicking on it the state of audio and video services is shown as per follows.

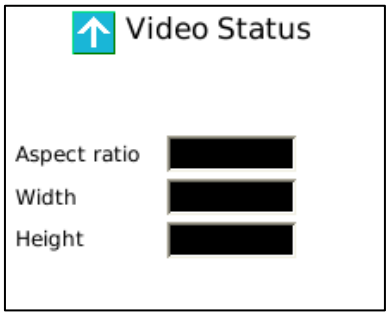


Figure 26: Submenu status n.1

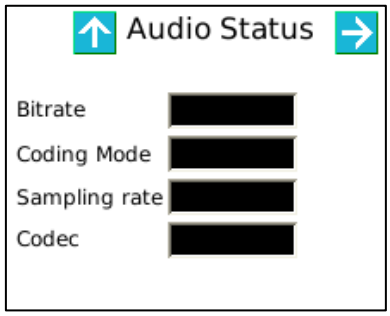


Figure 27: Submenu status n.2 & n.3

Table 14: Status of decoder menu description.

Item	Description
Aspect ratio	Indication of video format type (4/3, 16/9) eventually decoded.
Width	Indication of the video format: width in pixel.
Height	Indication of the video format: height in pixel.
Bitrate	Indication of the bitrate from the audio channel eventually decoded.
Coding mode	Indication of the relevant audio coding type.
Sampling rate	Indicates the frequency sampling of the audio signal, in KHz.
Codec	Indication of the relevant audio codec type.

Active Areas:

- Directional arrow "UP" to return to higher level menu.
- Directional arrows "LEFT" and "RIGHT" to browse through menus.

6.4.2 Audio submenu.

Marked by the 

icon, it lets configure the audio outputs. The visualized menu is:

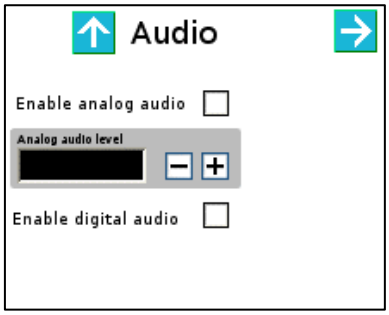


Figure 28: Audio submenu.

Table 15: Configuration of audio outputs configuration description.

Item	Description
Enable analog audio	Allows enabling the analogue audio output by the relative checkbox.
Analog audio level	Allows to set up a gain over the analogue audio output signal.
Enable digital audio	Allows enabling the digital audio output by the relative checkbox.

Active areas:

- Directional arrow “UP” to return to higher level menu.
- Directional arrow “LEFT” to browse through menus.
- The buttons to set up the level of nominal output of analogue audio.
- The *checkbox* to enable the analogue or digital audio output. (OPTIONAL)

6.4.2.1 MPX submenu (HW and SW option).

The MPX submenu is available in Signum-D1 model.

Active areas:

- Directional arrow “UP” to return to higher level menu.
- Directional arrows “LEFT” and “RIGHT” to browse through menus.
- The buttons.
- The text boxes
- The *checkboxes*

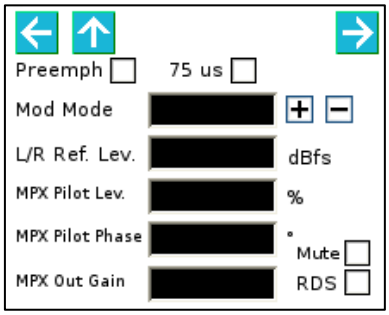


Figure 29: MPX submenu

Table 16: MPX parameters

Tag	Type	Description
Preemph	Checkbox	If checked, pre-emphasis of MPX signal is enabled
75us	Checkbox	If checked, 75us pre-emphasis of MPX signal is enabled; if unchecked, 50us is enabled.
Mod Mode	Text box	Setting of MPX encoder input

Tag	Type	Description
	(Spin buttons)	• Stereo (L+R) • Swapped Stereo (R+L) • Mono L/R (L+R without 38 KHz DSB carrier) • Mono L (L+L) • Mono R (R+R)
L/R Ref Level	Text Box	Setting of Left and Right audio channels reference level in dBfs, before the limiter stage. The value set is the level giving 75 KHz deviation or 0 dBu. Set the value, if limiter is enabled, checking minimization of MPX Overshoot meters.
MPX Pilot Level	Spin button	Setting of MPX Pilot carrier level in % compared to the MPX global level (typ. 9%)
MPX Pilot Phase	Spin button	Setting of MPX Pilot carrier phase (typ. 0°)
MPX Out Gain	Spin button	Setting of MPX output Gain, post limiter
Mute (RDS out only)	Checkbox	If checked, MPX out is composed by RDS subcarrier only (i.e.: to be fed to external stereo encoder); requires external sync.
RDS	Checkbox	If checked, the RDS carrier is enabled at output

6.4.2.2 *Input Limiter.*

The input limiter is a software option which operates on the L and R channels coming from the decoder, modifying the L and R levels to prevent compressions and distortions in the composite MPX signal, composed by the MPX encoder.

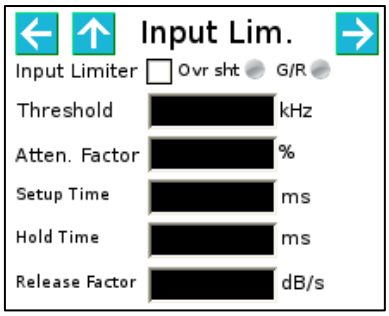


Figure 30: Input limiter submenu

Active areas:

- Directional arrow “UP” to return to higher level menu.
- Directional arrows “LEFT” and “RIGHT” to browse through menus.
- The text boxes
- The *checkboxes*

Table 17: input limiter parameters

Tag	Type	Description
Input limiter	Checkbox	Enabling of L/R Look-ahead input limiter algorithm if checked.
Ovrsht	Led	Indication of overshoots detection
G/R	Led	Indication of Gain reduction occurrence.
Threshold	Text box	Setting of maximum deviation input limiter.
Atten. factor (%)	Text box	Setting of tolerance in the compression reduction gain curve
Setup time	Text box	**Expert parameter:** Setting of advance gain reduction time-window.
Hold Time	Text box	**Expert parameter:** Setting of compression peak holding time
Release factor (dB/s)	Text box	**Expert parameter:** Setting of gain reduction release curve

6.4.2.3 *Output Limiter.*

The output limiter is a software option which operates on the L and R channels pre limited by the input limiter, modifying the composite MPX level to prevent compressions and distortions in the output MPX signal.

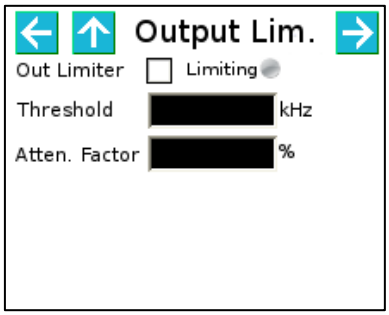


Figure 31: Input limiter submenu

Active areas:

- Directional arrow "UP" to return to higher level menu.
- Directional arrows "LEFT" and "RIGHT" to browse through menus.
- The text boxes
- The *checkboxes*

Table 18: Output limiter parameters

Tag	Type	Description
Out limiter	Checkbox	Enabling of MPX output limiter algorithm if checked.
Limiting	Led	Indication of limiting occurrence.
Threshold	Text box	Setting of maximum deviation tolerated by output limiter.
Atten. factor (%)	Spin button	Setting of tolerance in the compression reduction gain curve

6.4.3 Program submenu.

Clicking on 

icon, information about the services present in the TS delivered to the decoder are shown .

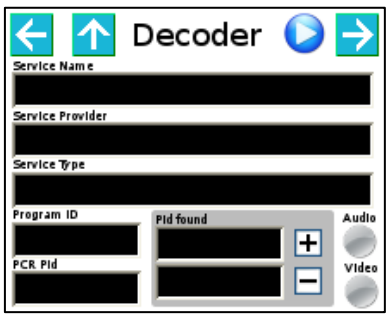


Figure 32: Program submenu.

Table 19: Parameters of the decoder description.

Item	Description
Service name	Indicates the name of the service.
Service provider	Indicates the name of the service provider.
Service type	Indication of the service type.
Program ID	Indicates the Program Identifier of the service.
PCR Pid	Indicates the PID of the PCR.
Pid found	Indication of the PID for audio and video.
Audio	Indicates the presence of audio.
Video	Indicates the presence of video.

Active areas:

- Directional arrow “UP” to return to higher level menu.
- The buttons to visualize the *Elementary Stream* present in the chosen service.
- Directional arrows “LEFT” and “RIGHT” to browse through menus.
- The icon to start playing the service.

7 WEB Interface.

The SIGNUM is equipped with a WEB interface for an easy monitoring and configuration of the equipment, accessible via the front panel through RJ-45 connector with a *Web browser* (Mozilla Firefox[preferred], Internet Explorer, Google Chrome, Opera, Safari etc.). To check the device IP address, please refer to 6.2.5.
Note: Default IP Address is **192.168.10.150**

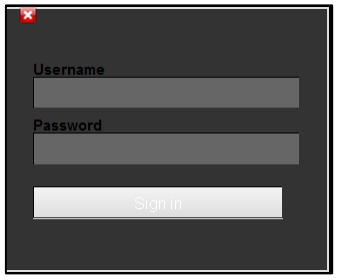


Figure 33: Web interface initial page.

After connection to the web server, user is asked to provide credentials to accede to the interface, as shown in Figure 33. The default passwords are tied to the customer’s name and they are provided together with the equipment in a sealed envelope.

Table 20

User Name	Password	Rights
admin	According on customer name	R/W and software upgrade
puser	According on customer name	R/W (no upgrade)
user	According on customer name	Read-only

7.1 Tab Status.

Once access is achieved, the general status page will show up; the screen is divided in two sections: the upper part shows general information about the equipment, while the lower, furtherly split into two subsections, shows the Tuner and the Decoder Status.

7.1.1 Controller-Status.

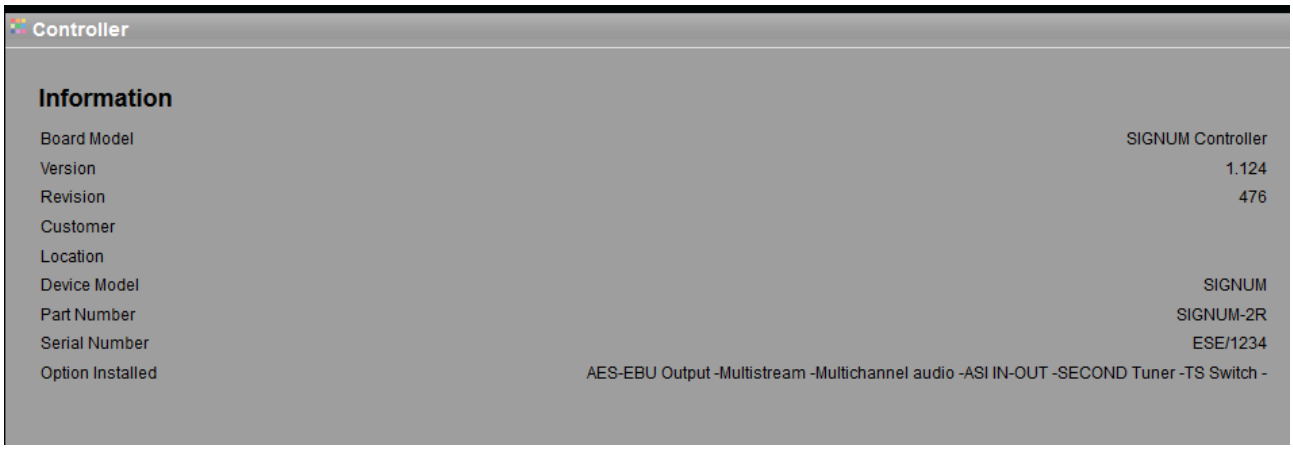


Figure 34: Web Status section – General information.

Table 21: Controller information.

Field	Description
Board Model	Model of the controller card

Version	Firmware Version
Revision	Firmware Revision
Customer	Name of client
Location	Installation site (at user's care)
Device Model	As per name
Part Number	Warehouse code
Serial Number	As per name
Option installed	Shows the hardware and software options activated.

7.1.2 Status-Tuner.

7.1.2.1 Status Tuner1 or Tuner2

The web tuner section provides an immediate overview of the received signal status.

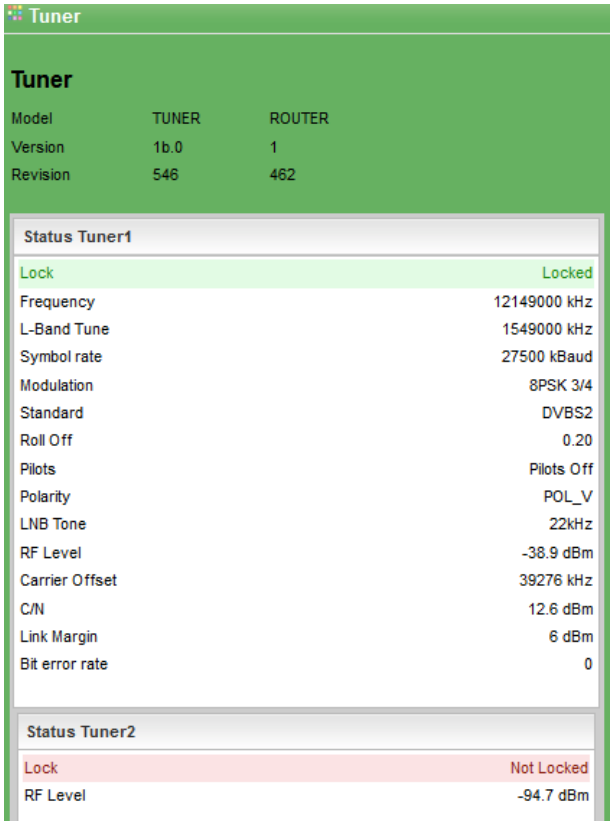


Figure 35: Web Tuner section, signal locked.

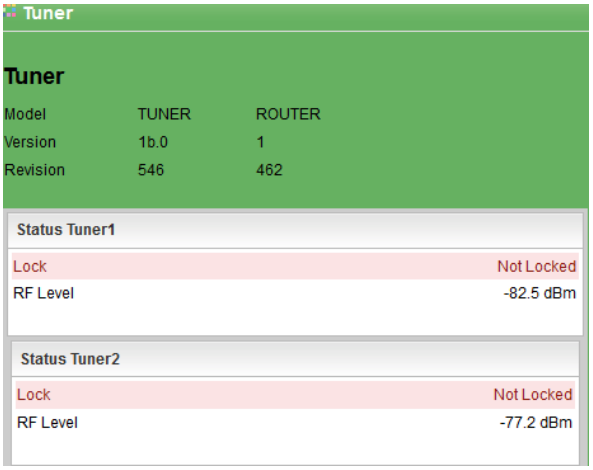


Figure 36: Web Tuner section, signal unlocked.

Table 22: Receiver information.

Field	**Description**
Lock	Locked/Unlocked status.
Frequency	Indication of the frequency set on the receiver, shown in KHz.
L-Band Tune	Indication of the resulting frequency in L band.
Symbol rate	Indication of the symbol rate, shown in KBaud.
Modulation	Indication of the constellation detected.
FEC rate	Indication of the detected FEC code.
Standard	Type of detected transmission standard.
Roll off	Indication of the roll-off factor.
Pilots	Indication of the pilot carriers' presence.
Polarity	Indicates the polarization of the transmission.
LNB tone	Indicates the enabling of 22KHz tone for the LNB polarization.
RF level	Indicates the level of the received signal shown in dBm.
Carrier offset	Indicates the offset of detected frequency shown in KHz.
C/N	Indication of the signal/noise ratio shown in dBm.
Link Margin	Link margin indication (dB).
Bit Error Rate	Indication of the Bit Error Rate.

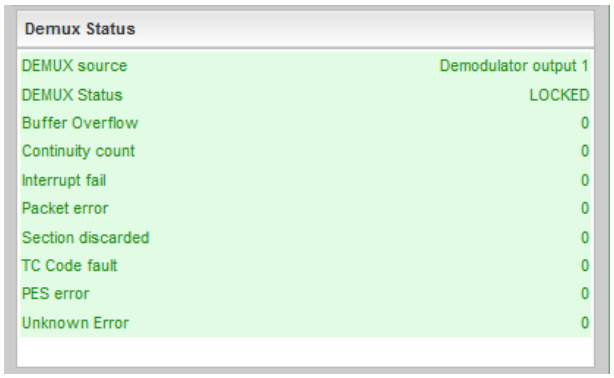


Figure 37: Web demux section, signal locked.

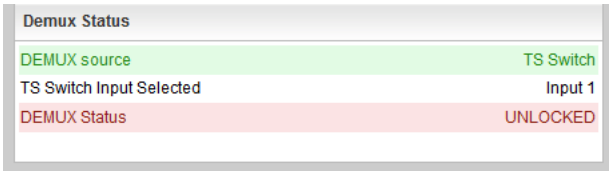


Figure 38: Web demux section, signal unlocked.

Table 23: Demux information.

Demux Source	Shows the decoder input selected
TS Switch input selected	If demux input selected is TS Switch, this row shows the input selected by the TS switch
Demux Status	Indication of locking status
Buffer Overflow	Counter for data buffer filling events
Continuity count	Counter of the continuity errors on Transport Stream.
Interrupt fail	Counter of failed events.
Packet error	Counter for packets received with errors.
Section discarded	Counter for TS sections discarded.
TC code fault	Counter for Time Code processing section errors.
PES error	Counter for the elementary stream packets with errors detected.
Unknown error	Counter for unclassified errors detected.

7.1.3 Status-Decoder.

The web Decoder Section provides the information regarding the decoder status.

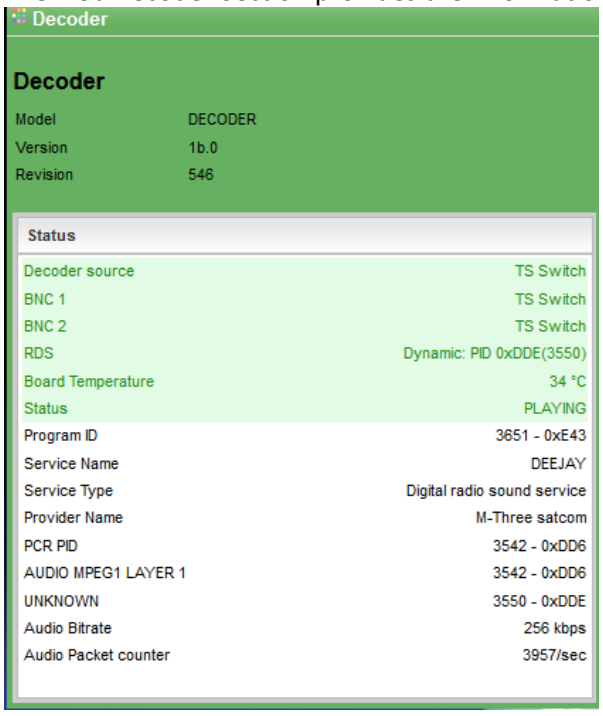


Figure 39: Web Decoder section, signal locked

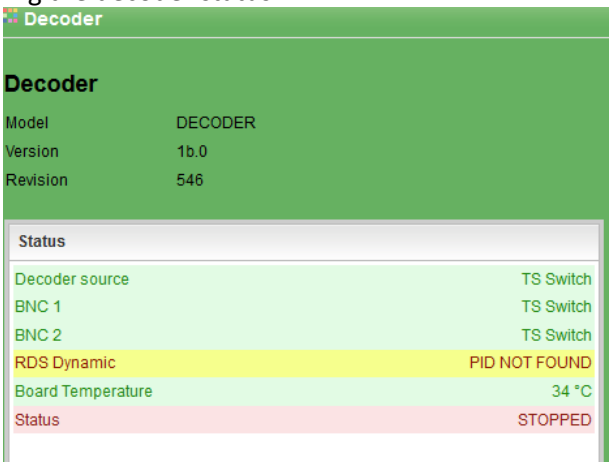


Figure 40: Web Decoder section, signal unlocked

Table 24: Description of decoder status parameters.

Field	Description
Decoder Source	Indication of decoder source
BNC 1	Indication of the output signal assigned to ASI 1 (if option installed and connector configured as output)

Field	Description
BNC 2	Indication of the output signal assigned to ASI 2 (if option installed and connector configured as output)
RDS	Shows the setting of RDS between Static and Dynamic (indicating also TS data PID used for RDS data encapsulation; if errors are detected, static data will be used)
Board Temperature	Indication of the temperature detected by the on-board sensor.
Status	Indicates the status of the decoder. (green if playing, or in execution, red if stopped)
Program ID	Indication of the selected service PID number both in dec and hex format.
Service Name	Indication of the selected service name.
Service type	Indication of the selected service type.
Provider Name	Indication of the selected service satellite.
PCR PID	Indication of the selected service PCR PID both in dec and hex format.
Video	Indication of the selected service video PID, both in dec and hex format, and relative coding.
Audio	Indication of the selected service audio PID, both in dec and hex format, and relative coding.
Private PES	Indication of any private PID linked to the service, both in dec and hex format.
Width	Indication of video format, width in pixel.
Height	Indication of video format, height in pixel.
Frame rate	Indicates the picture frame rate in Hz.
Video Packet Counter	Indicates the number of video packs per second.
Audio Bitrate	Indicates the audio channel bitrate.
Audio Packet Counter	Indicates the number of audio packets per second.

7.2 Tab Controller.

The Web tab regarding the *Controller* is composed by six *sections*:

1. Customer.
2. Network.
3. Temperature Management
4. Traps Manager
5. Tools.
6. Password Management.

7.2.1 Controller – Customer.

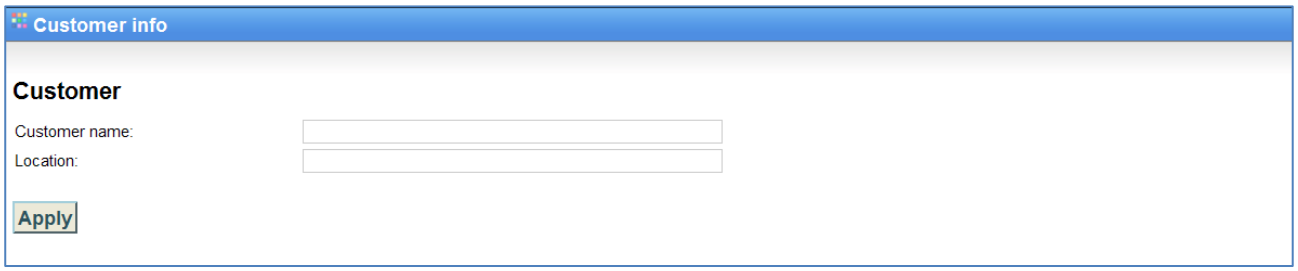


Figure 41: Web Controller section – Customer info.

Table 25: Information of the equipment for the client.

Tag	Description	Rights
Customer name	Name of client	read-only
Location	Installation site	R/W

7.2.2 Controller – Network.

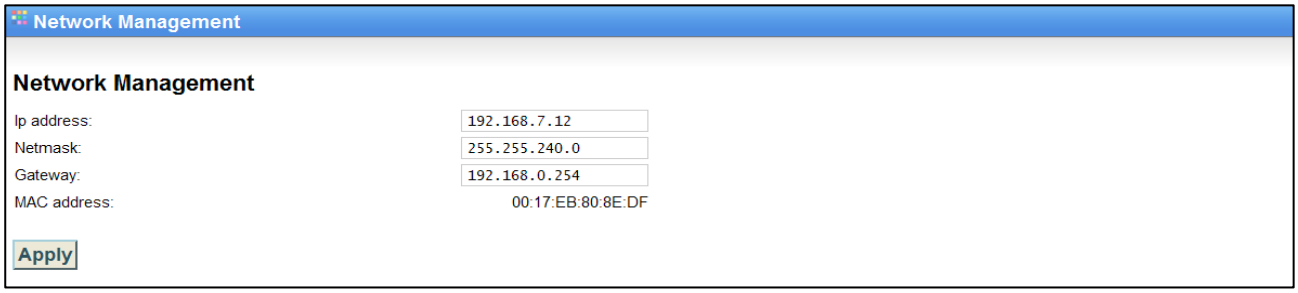


Figure 42: Web Controller section – network parameters.

This Page let the user check and modify the management network interface parameters.

Table 26: Network parameters

Tag	Rights
IP address	R/W
Netmask	R/W
Gateway	R/W
MAC address	read-only

7.2.3 Controller – Temperature Management.

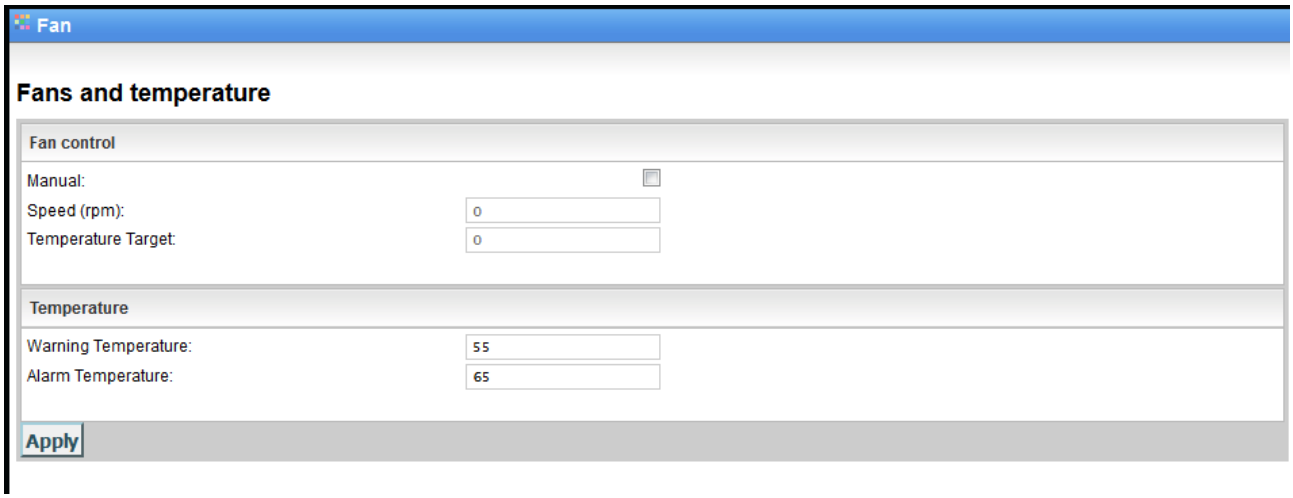


Figure 43: Web Controller section – Temperature Management

This Page let the user configure the cooling fan management.

Table 27: Cooling fan parameters

Tag	Description	Rights
Manual	If checked, the fan Speed can be set by the user. If unchecked, system automatically regulates the fan speed to meet temperature target.	R/W
Speed	Indication or setting of fan speed in rpm	R/W
Temperature Target	Setting of Target Temperature in case of automatic behaviour	R/W
Warning Temperature	Let the user set the warning threshold for temperature	R/W
Alarm Temperature	Let the user set the alarm threshold for temperature (must be greater than the warning temperature)	R/W

7.2.4 Controller – Traps Management.

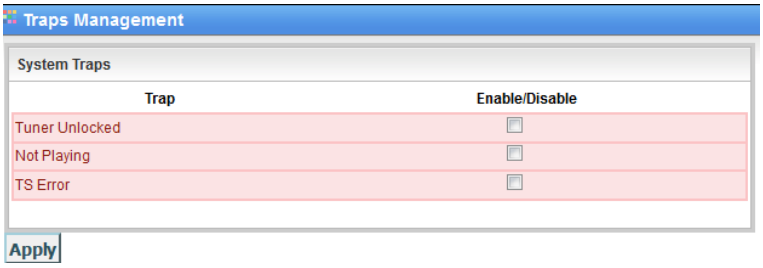


Figure 44: Web Controller section – Traps Management

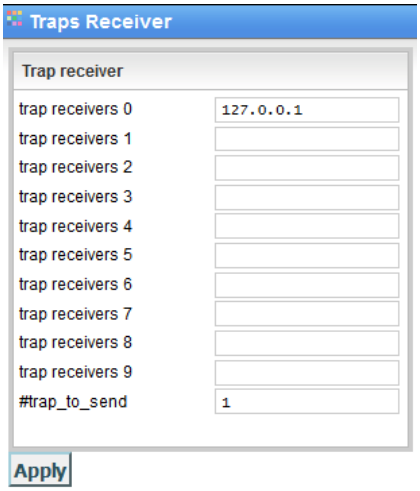


Figure 45: Web Controller section – SNMP Traps Receivers.

This frame let the user accede to SNMP traps management; for every possible alarm it allows to enable or disable the traps sending. Moreover, it is possible to set their destination address (up to 9) and the number of times the trap message should be sent.

7.2.5 Controller – Tools.

The ''Reset Command'' subsection enables the user to reset separately the relative subsections, the whole system and TFT calibration. Moreover, it is possible to reset eventual decoding or demodulation errors.
The ''Import Export Configuration'' subsection allows the user to import and export the configurations.
The USB Token subsection allows to generate a password to copy on USB pen; after connecting such pen to the relative port on the front panel (refer to par 8.1), user will have access granted to modify the display parameters.

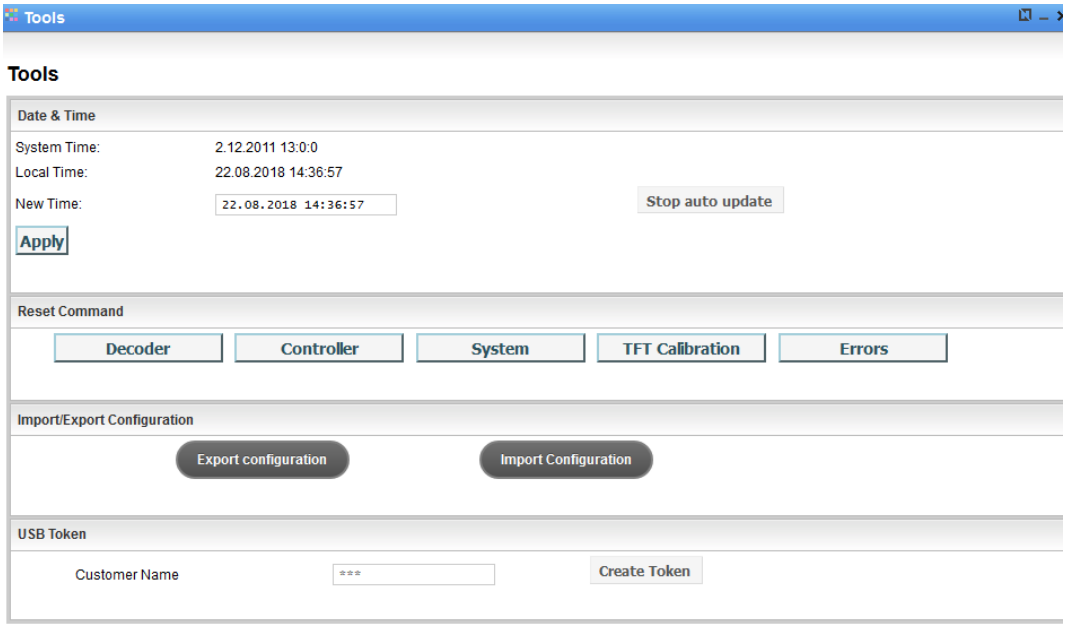


Figure 46: Web Controller section – general instruments.

Table 28: General instruments.

Tag	Description	Rights
System Time	Time of the system.	Read-only
Local Time	Local time.	Read-only
New Time	Box for modifying local time.	R/W
Start/Stop auto update	The button let the user start or stop time auto update	R/W
Decoder	Reset button for decoder section.	R/W
Controller	Reset button for controller section.	R/W
System	Reset button for the whole system.	R/W
TFT Calibration	Button to enable the touchscreen calibration function.	R/W
Errors	Reset button for the relevant errors.	R/W
Export Configuration	The button let the user export the equipment configuration in a file *.ecfg that can be uploaded in another Signum the clone the configuration	R/W
Import Configuration	The button let the user import the equipment configuration from a file .ecfg	R/W
Customer Name	Indication of customer name	Read-only
Create Token	The button let the user generate the token file (token.pwd) to be used to get R/W access to the TFT if copied in a USB pen and connected to the front panel	R/W

7.2.6 Controller – Password management.

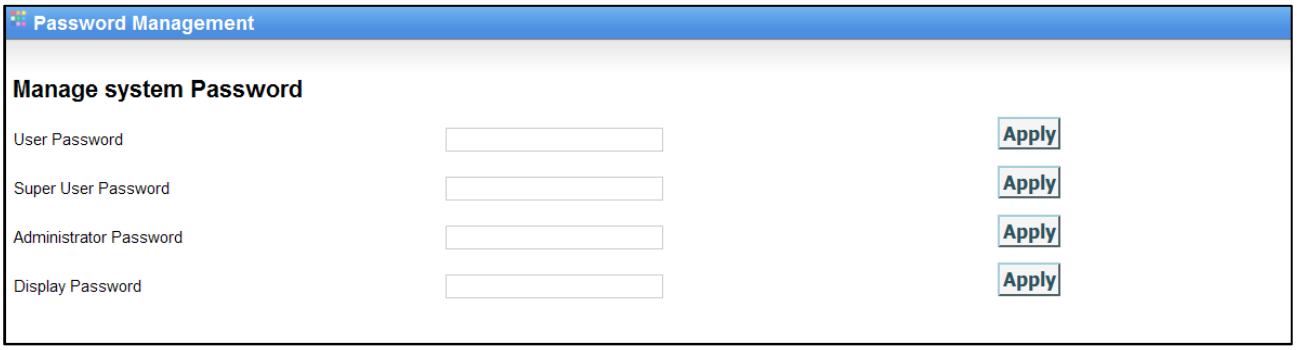


Figure 47: Web Controller section – password management.

Such *section* allows the modification of the access passwords of the web interface. The password should have at least six characters and cannot have more than fifteen characters.

The password level that a user can change depends on the type of access he has used when logging in. The user ‘’user’’ cannot change password. The user “puser” can change its own and “user” passwords. “admin” can change all passwords.

7.3 Tab Decoder.

The Web tab regarding the Decoder is composed of two frames:

1. Tuner.
2. Decoder.
3. TS Management (if relative HW option is available)

7.3.1 Tuner.

The Tuner section let the user configure the satellite parameters as can be seen in Figure 48.

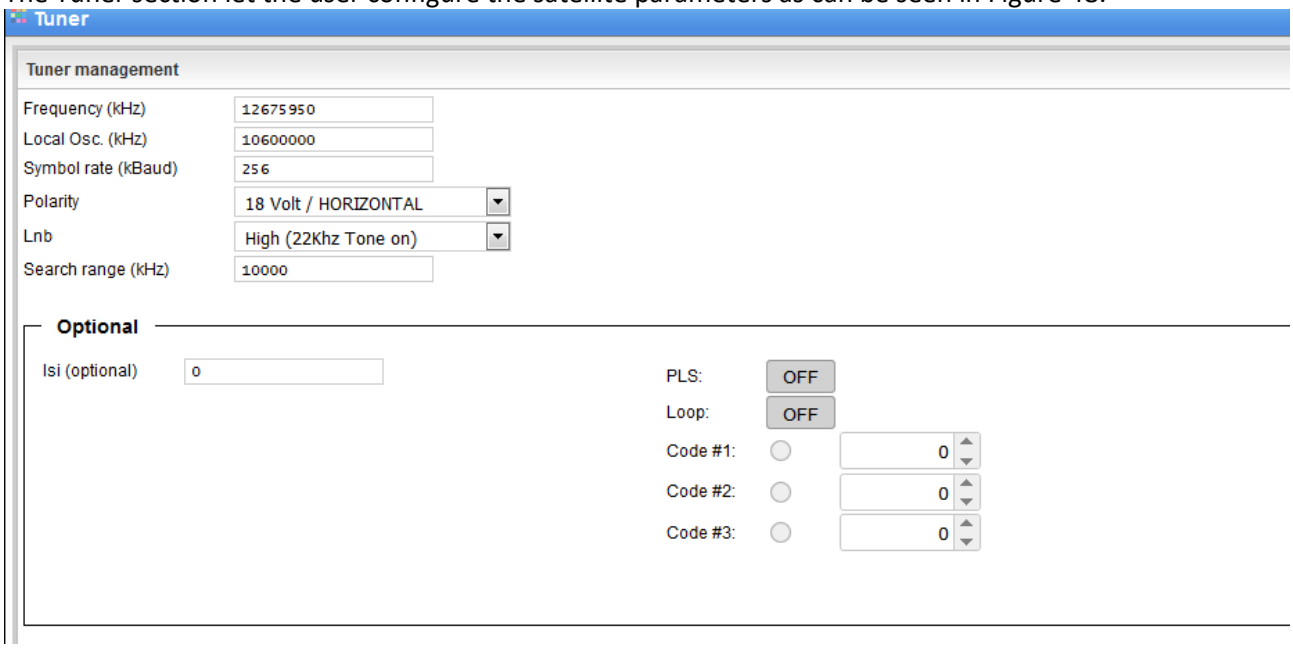


Figure 48: Web Decoder section – Tuner parameters

Table 29: Parameters of tuner configuration.

Tag	Description
Frequency (KHz)	Allows to configure the frequency of the signal in satellite band. (shown in KHz)
Local Osc. (KHz)	Allows to configure the frequency of the LNB oscillator.
Symbol Rate (kBaud)	Allows to configure the Symbol Rate.
Polarity	Allows to configure the LNB power supply 18V/Horizontal 13V/Vertical Not use.
LNB	Allows to modify the LNB band: Low (22KHz Tone Off) High (22KHz Tone On) LNB OFF
Search Range (KHz)	Allows to modify the search band of the tuner.
ISI (optional)	Allow to configure the Input Stream Identifier of a DVB-S2 Multistream signal, if the option is enabled.
PLS	Allows to enable/disable the Physical Layer Descrambling
Loop	Allows to set the “loop option” for scrambling code application. System will apply every code in round robin to find the right one
Code #1	Configuration of scrambling code 1
Code #2	Configuration of scrambling code 2
Code #3	Configuration of scrambling code 3

When Signum is Dual Tuner, a second section related to tuner # 2 is shown below the first one. Same parameters are available.

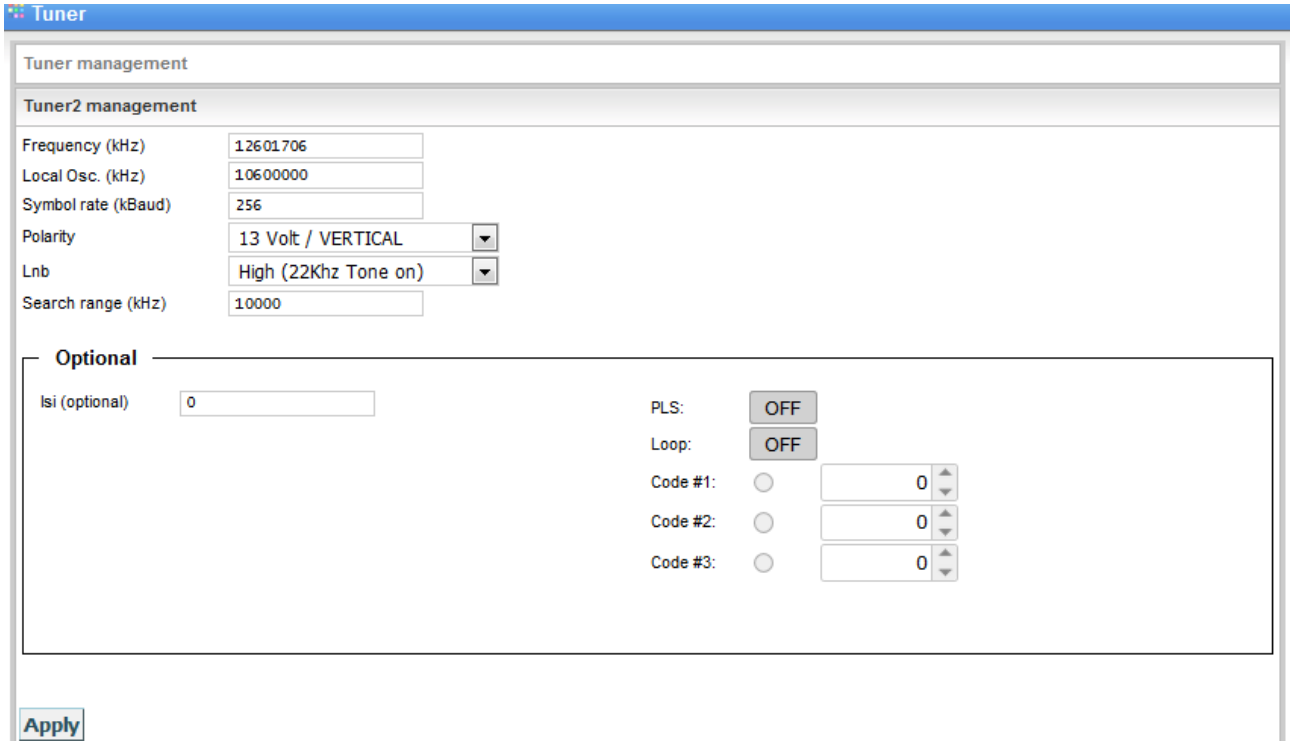


Figure 49: Web Decoder section – 2nd Tuner parameters

7.3.2 Decoder.

This window shows a table with all the selected TS services listed by Program Number, indicating the following information (organized in columns, as shown in Figure 50):

- Service Name
- Service Type
- Provider
- Program Number
- PCR PID
- Scrambling information

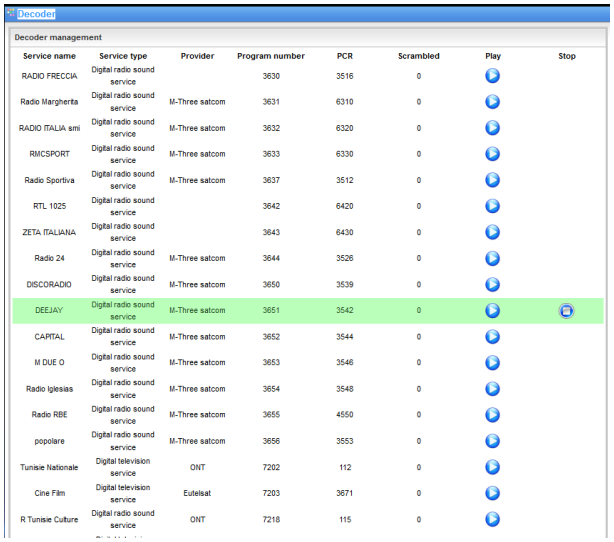


Figure 50: Web Decoder Section: Decoder (when Locked).

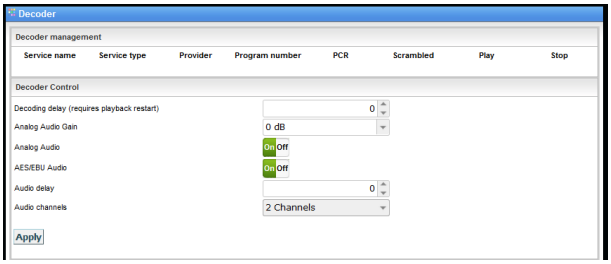
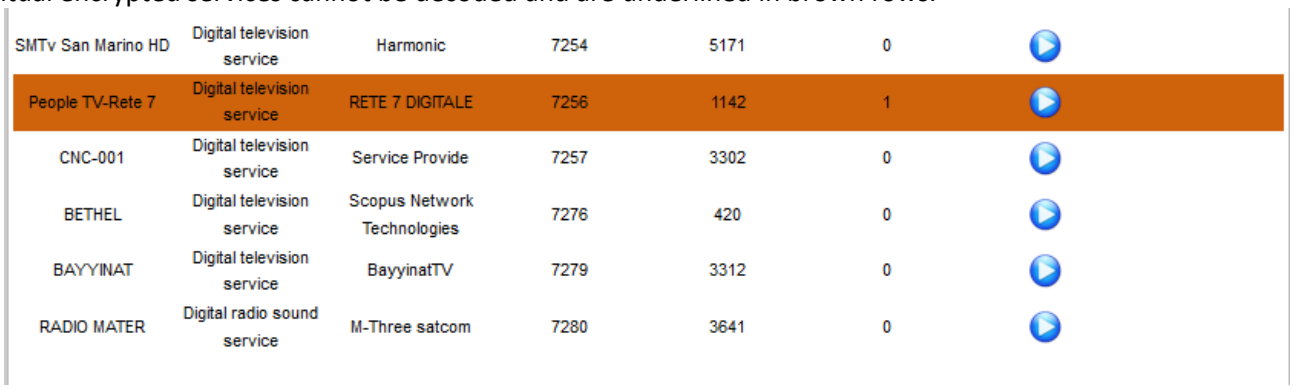


Figure 51: Web Decoder Section: Decoder (when unlocked).

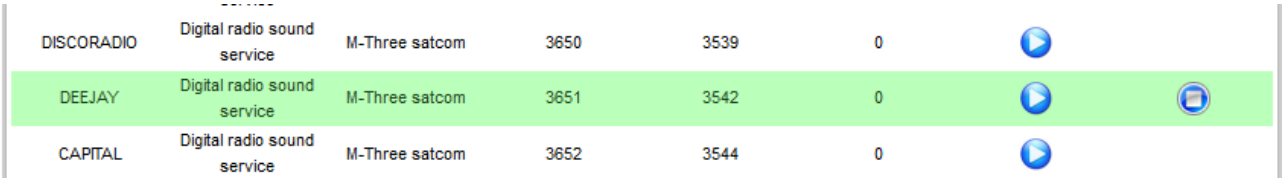
Eventual encrypted services cannot be decoded and are underlined in brown rows.



SMTv San Marino HD	Digital television service	Harmonic	7254	5171	0	
People TV-Rete 7	Digital television service	RETE 7 DIGITALE	7256	1142	1	
CNC-001	Digital television service	Service Provide	7257	3302	0	
BETHEL	Digital television service	Scopus Network Technologies	7276	420	0	
BAYYINAT	Digital television service	BayyinatTV	7279	3312	0	
RADIO MATER	Digital radio sound service	M-Three satcom	7280	3641	0	

Figure 52: Web Decoder Section: example of an encrypted service appearance.

The green row in the table indicates the service to be decoded.



DISCORADIO	Digital radio sound service	M-Three satcom	3650	3539	0	
DEEJAY	Digital radio sound service	M-Three satcom	3651	3542	0	
CAPITAL	Digital radio sound service	M-Three satcom	3652	3544	0	

Figure 53: Web Decoder Section: example of selected service appearance.

To select the service to be played, it's necessary to click on the Play icon ; to stop playing session, related icon has to be pushed.

Table 30

Tag	Description
Decoding delay (requires playback restart)	Let the user add a delay in the decoded stream (in ms). As stated, the playback will have to be restarted.
Analog Audio Gain	Let the user modify the Analog audio level
Analog Audio	Let the user switch on/off the Analog audio
AES/EBU Audio	Let the user switch on/off the Digital audio (if SW option available)
Audio delay	Let the user add a delay in the decoded audio stream (in ms).
Audio Channels	If related HW option is available, user may select between 2 and 4 audio channels.

7.3.2.1 MPX-RDS.

When the MPX Encoder SW and HW option is included (Model Signum-D1), the related configuration form is present in the lower part of the page, as shown in Figure 54.
The MPX encoder accepts L/R audio signals from decoder and RDS data; RDS data can be fed locally (static RDS) via web interface or taken from two alternative sources: the satellite TS, decrypting a Data PID, or the external RDS RS-232.

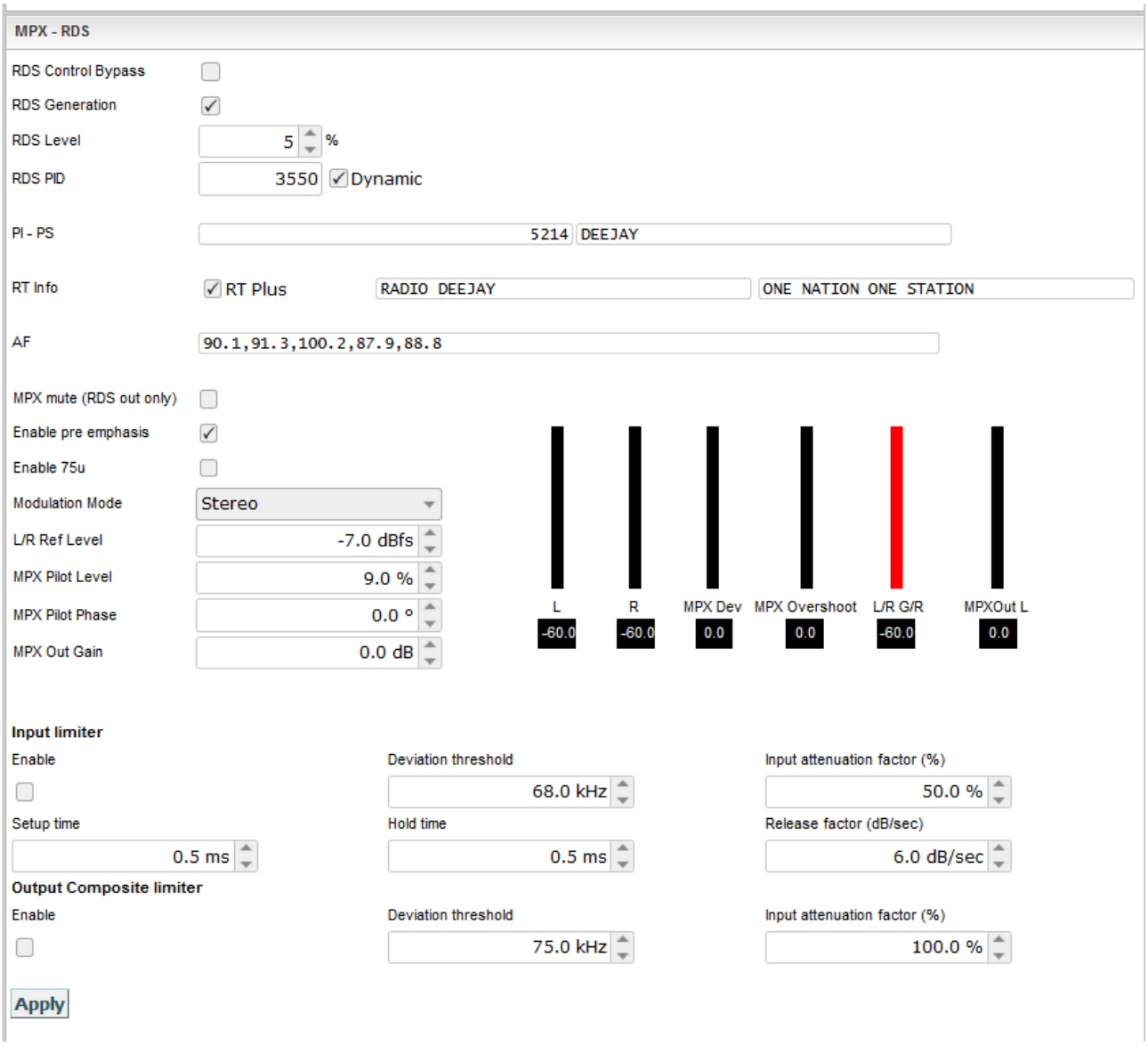


Figure 54: Web Decoder Section: MPX

Table 31:RDS encoder parameter

Tag	Type	Description
RDS Control Bypass	Checkbox	If checked, the RDS data are taken from external RS-232 (back panel connector); if not checked, RDS data are taken from web interface (if static) or from Satellite TS data PID (if Dynamic)
RDS Generation	Checkbox	If checked, the RDS carrier is enabled at output
RDS Level	Spin button	Setting of RDS carrier level in % respect the MPX global level (typ. 3% to 5%)
RDS PID	Text Box	Setting of TS PID to be decrypted to recover RDS data from satellite; valid if "Dynamic" checkbox is checked
Dynamic	Checkbox	If checked, all following information are taken from satellite TS PID selected

Tag	Type	Description
PI	Text Box	Setting of Program Identifier RDS parameter
PS	Text Box	Setting of Program Service RDS parameter
RT Info	Text Box	Setting of Radio Text (RADIO DEEJAY in above example)
RT Plus	Checkbox	Enabling of Radio Text Plus (second text box, "ONE NATION ONE STATION" in above example)
AF	Text Box	Setting of Alternative Frequency list, separated by commas, no spaces admitted and frequency in format xx.y or xxx.y mandatory
MPX mute (RDS out only)	Checkbox	If checked, MPX out is composed by RDS subcarrier only (i.e.: to be fed to external stereo encoder); requires external sync.
Enable Preemphasis	Checkbox	If checked, pre-emphasis of MPX signal is enabled
Enable 75u	Checkbox	If checked, 75us pre-emphasis of MPX signal is enabled; if unchecked, 50us is enabled.
Modulation Mode	Combo box	Setting of MPX encoder input • Stereo (L+R) • Swapped Stereo (R+L) • Mono L/R (L+R without 38 KHz DSB carrier) • Mono L (L+L) • Mono R (R+R)
L/R Ref Level	Spin button	Setting of Left and Right audio channels reference level in dBfs, before the limiter stage. See L and R Meters to check audio levels from decoder. The value set is the level giving 75 KHz deviation or 0 dBu. Set the value, if limiter is enabled, checking minimization of MPX Overshoot and maximization of MPX deviation meters.
MPX Pilot Level	Spin button	Setting of MPX Pilot carrier level in % respect the MPX global level (typ. 9%)
MPX Pilot Phase	Spin button	Setting of MPX Pilot carrier phase (typ. 0°)
MPX Out Gain	Spin button	Setting of MPX output Gain, post limiter

Table 32: Input Limiter parameters

Tag	Type	Description
Enable	Checkbox	Enabling of L/R Look-ahead input limiter algorithm if checked.
Setup time	Spin button	**Expert parameter:** Setting of advance gain reduction time-window.
Deviation threshold	Spin button	Setting of maximum deviation input limiter.
Hold Time	Spin button	**Expert parameter:** Setting of compression peak holding time
Input attenuation factor (%)	Spin button	Setting of tolerance in the compression reduction gain curve
Release factor (dB/sec)	Spin button	**Expert parameter:** Setting of gain reduction release curve

Table 33: Output composite limiter

Tag	Type	Description
Enable	Checkbox	Enabling of MPX output limiter algorithm if checked.
Deviation threshold	Spin button	Setting of maximum deviation tolerated by output limiter.
Input attenuation factor (%)	Spin button	Setting of tolerance in the compression reduction gain curve

7.3.3 TS Management.

This window allows the user to configure the TS routing matrix. The matrix is composed by up to 5 rows, depending on HW options installed, to which the user is asked to assign the signal coming from different subsections, if available, shown in the cascade tile in Figure 55.

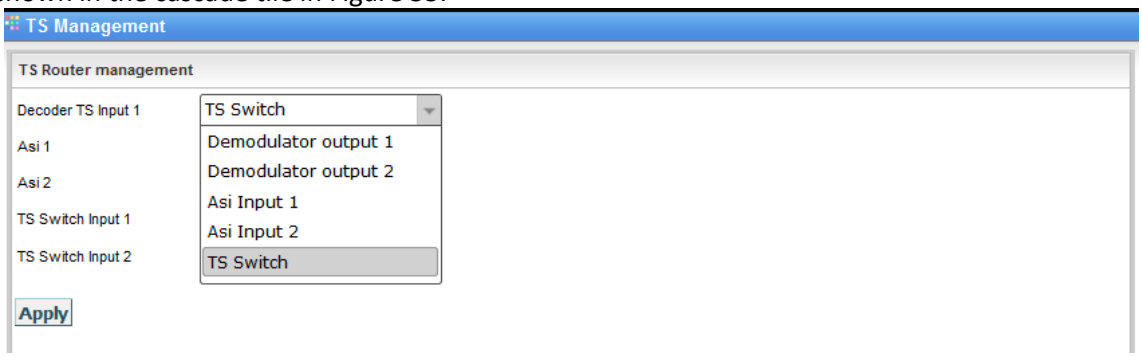


Figure 55: Web Decoder Section: TS management.

So, if like in figure above, customer choose to assign TS Switch to Decoder TS Input 1, it means that the decoder section will decode the TS coming from the Switch.
Further details:

- *Demodulator output 1* is the tuner 1 output stream.
- *Demodulator output 2* is the tuner 2 output stream (if option present)
- *ASI input 1* is the TS connected to the back panel ASI 1 connector (if option present)
- *ASI input 2* is the TS connected to the back panel ASI 2 connector (if option present)
- *TS Switch* is the TS selected by the internal switch (if option present)

Figure 56: Web Decoder Section: TS Switch management.

Table 34: TS Switch parameters

Tag	Type	Description
Automatic	Combo Box	To set the switch modality between automatic and manual.
Priority/Manual input	Combo Box	To set the input priority. In case of "Manual" input modality, the switch forces at its output the input selected. In case of "automatic" modality, it indicates the higher priority input.
Reversibility	Combo Box	To enable the reversibility function, that means the switch capability to come back to priority input when come out from a fault condition (after eventual wait time set in next field)
Revertibility Wait Time (ms)	Spin button	To set the waiting time of the switch to validate one input and, consequently, the time to switch to it if the reversibility is enabled.

7.4 Tab Upgrade.

The Web tab regarding the upgrade is composed of one *frame*:

- Machine upgrade

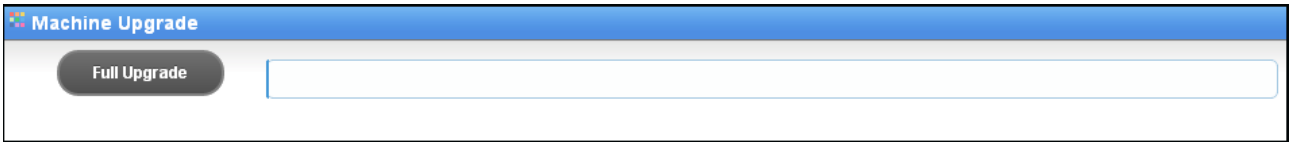


Figure 57: Web upgrade section – firmware update.

7.5 Tab Log.

The equipment offers an operation log service that can be checked in this tab of the web interface.
In left part of the web page, the form concerning available logs is present, grouped by:

- Daily report
- Last day
- Last week
- Last month

In order to avoid large memory usage, it is recommended to delete old records using **Erase until** form and selecting desired interval (Figure 59).

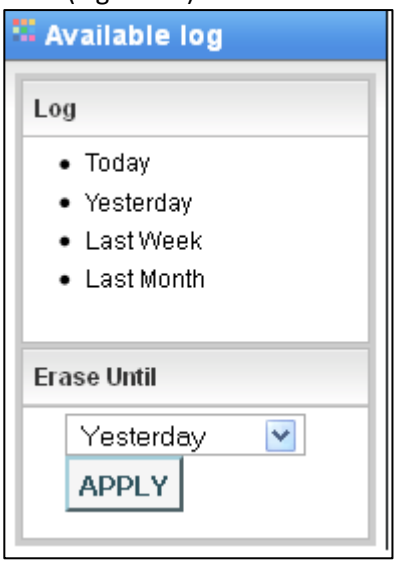


Figure 58: Web Log section – available log.

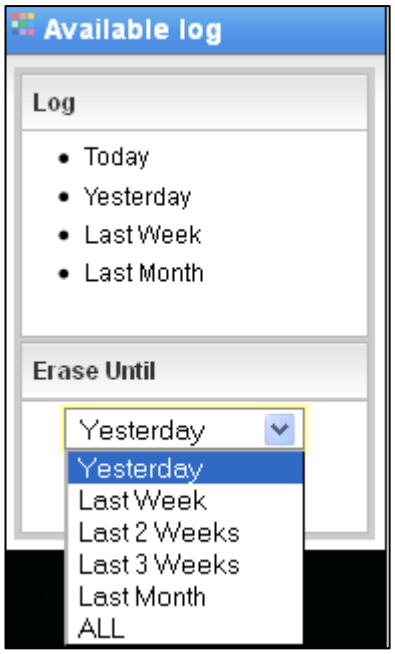


Figure 59: Web Log section – "Erase until" combo box

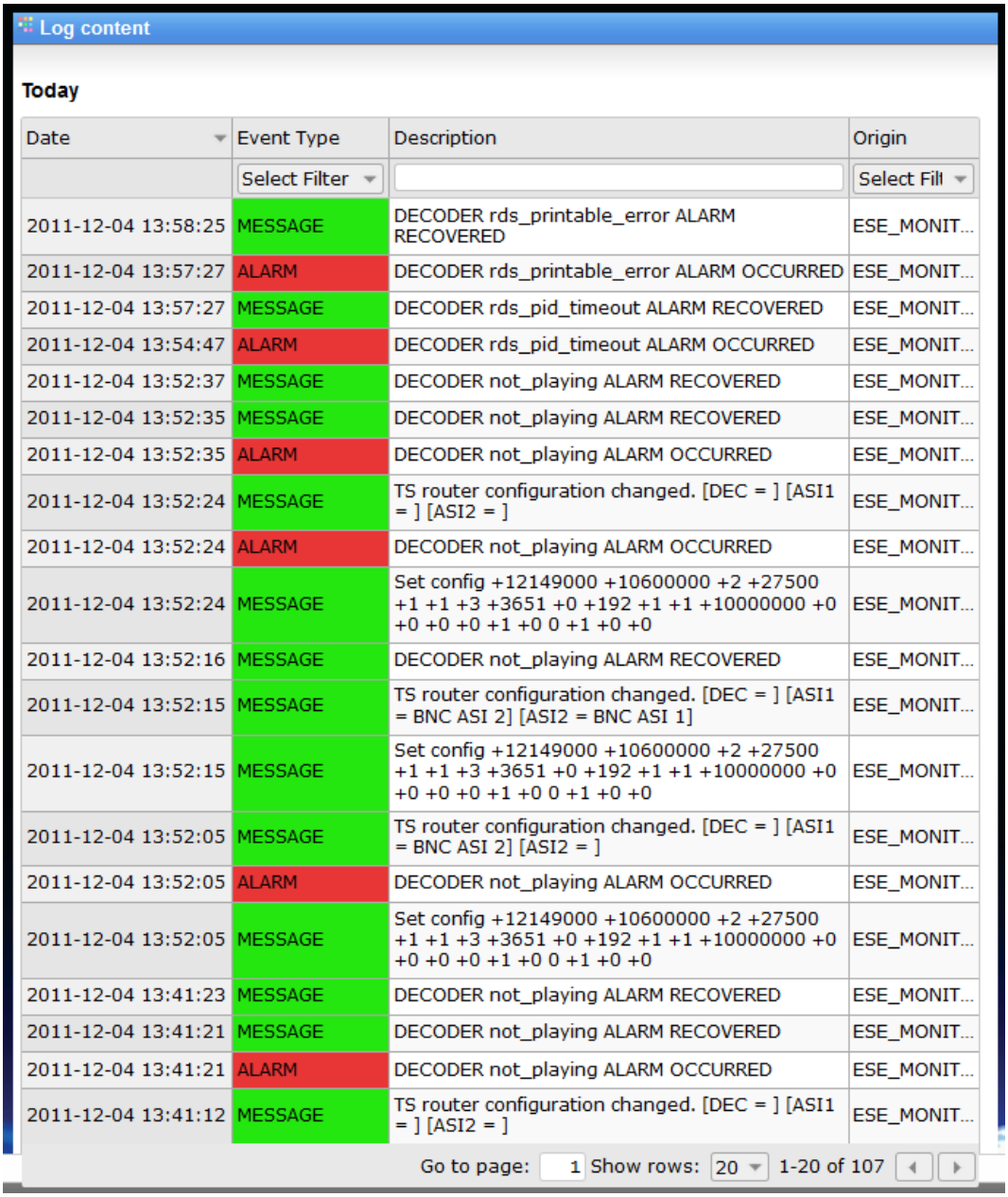


Figure 60: Web Log section - Records

The central part of the page shows the log records, organised in a table that can be managed, filtered and resized in terms of number of rows per page.
There are two types of events classifying the records, highlighted with different colours:

1. Messages
2. Alarms

Every record has a date, a description and on origin; the alarm event is also indicated in appendix to its description with tag OCCURRED, while the return from an alarm condition is a Message with the appendix RECOVERED. The records can be sorted for each field and then filtered by type, description and origin
Log can be saved with many different formats for further elaborations and storage; files formats available are: .xls, .xml, .csv, .tsv, .html, .json

8 Panels.

8.1 Front Panel.

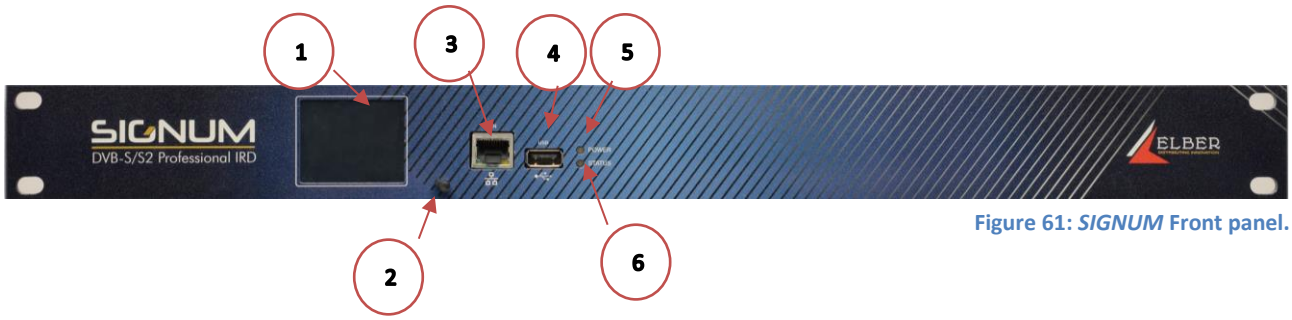


Figure 61: *SIGNUM* Front panel.

Table 35

N°	Description	Function
1	TFT touchscreen	User interface.
2	Stick	Pen for touchscreen usage.
3	Connector RJ-45	Ethernet port 10/100 BaseT for Management.
4	Connector USB	Upgrade firmware; token connection for R/W access to TFT menu
5	Green Led	Power Supply
6	Status Led	Green: ok Yellow: warning Red: alarm

8.2 Back Panel.

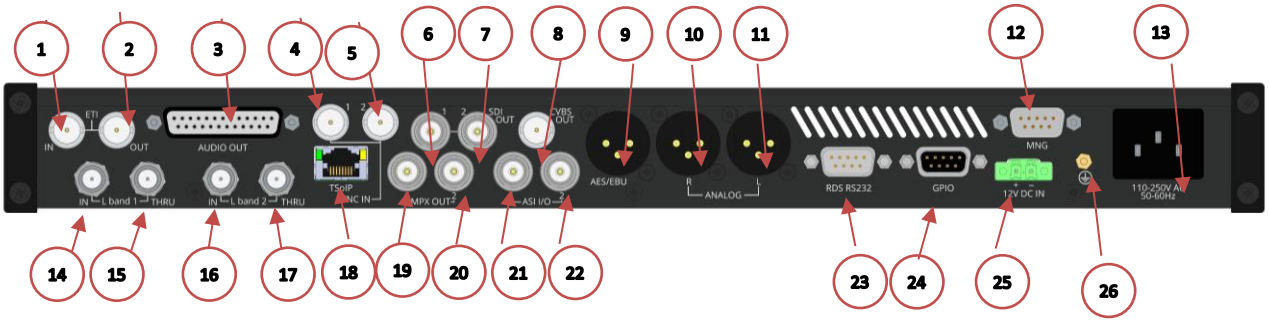


Figure 62: *SIGNUM* Back Panel.

Table 36: Back Panel Connectors Description

ID	Name	Description	Function
1	ETI IN	Connector BNC(f)	**HW option**; E1 Input for ETI (DAB/DAB+), 75 Ω.
2	ETI OUT	Connector BNC(f)	**HW option**; E1 Output for ETI (DAB/DAB+), 75 Ω.
3	AUDIO OUT	Connector DB25(f)	**HW option**; 2nd audio channel Tascam pinout, Analog and digital
4	SYNC IN 1	Connector BNC(f)	**HW option**; 19 KHz or 10 MHz or PPS Sync signal Input 1, 75 Ω.
5	SYNC IN 2	Connector BNC(f)	**HW option**; 19 KHz or 10 MHz or PPS Sync signal Input 2, 75 Ω.
6	SDI OUT 1	Connector BNC(f)	**HW option**; SDI output 1, 75 Ω.
7	SDI OUT 2	Connector BNC(f)	**HW option**; SDI output 2, 75 Ω.
8	CVBS OUT	Connector BNC(f)	Output CVBS, 75 Ω.
9	AES/EBU	Connector XLR(m)	Digital audio output, 120 Ω.
10	ANALOG R	Connector XLR(m)	Analog audio output right channel, 600 Ω.
11	ANALOG L	Connector XLR(m)	Analog audio output left channel, 600 Ω.
12	MNG	Connector DB9(m)	RS-232/RS-485 management (software option)
13	110-250V AC	IEC320 plug	Power Supply 110-250 V~
14	IN L band 1	Connector F(f)	Input signal connection sat (L Band 950-2050 MHz) tuner 1, 50 Ω.
15	THRU L band 1	Connector F(f)	Sat input signal pass-through tuner 1, 50 Ω.
16	IN L band 2	Connector F(f)	**HW option**; Input signal connection sat (L Band 950-2050 MHz) tuner 2, 50 Ω.
17	THRU L band 2	Connector F(f)	**HW option**; Sat input signal pass-through tuner 2, 50 Ω.
18	TSoIP	Connector RJ45	**HW option**; Transport Stream over IP (input and output)
19	MPX OUT 1	Connector BNC(f)	**HW option**; FM MPX output 1, 75 Ω.
20	MPX OUT 2	Connector BNC(f)	**HW option**; FM MPX output 2, 75 Ω.
21	ASI I/O 1	Connector BNC(f)	**HW option**; Input / Output ASI 1, 75 Ω.
22	ASI I/O 2	Connector BNC(f)	**HW option**; Input / Output ASI 2, 75 Ω.
23	RDS RS232	Connector DB9(m)	Serial line RS232 for RDS data input to RDS Encoder and/or for RDS UECP or raw data output from satellite reception
24	GPIO	Connector DB9(f)	Alarm connector
25	12V DC IN	2 Pin Connector	Power Supply input DC 10 – 13 Volt
26		Screw	Ground connection