CompactMax-2

CompactMax-3

DVB-S/S2 TO DVB-T2 TRANSMODULATOR

- 0 MI2100 -

PROMAX

SAFETY NOTES

Read the user's manual before using the equipment, mainly "**SAFETY RULES**" paragraph.

The symbol on the equipment means "**SEE USER'S MANUAL**". In this manual may also appear as a Caution or Warning symbol.

WARNING AND CAUTION statements may appear in this manual to avoid injury hazard or damage to this product or other property.

USER'S MANUAL VERSION

Version	Date	Webserver version
3.0	November 2018	1.16.697

SAFETY REQUIREMENTS ⚠

* **The security can be compromised if not applied the instructions in this manual**.

* Remember that voltages higher than **70 V DC** or **33 V AC rms** are dangerous.

* Use this instrument under the **specified environmental conditions**.

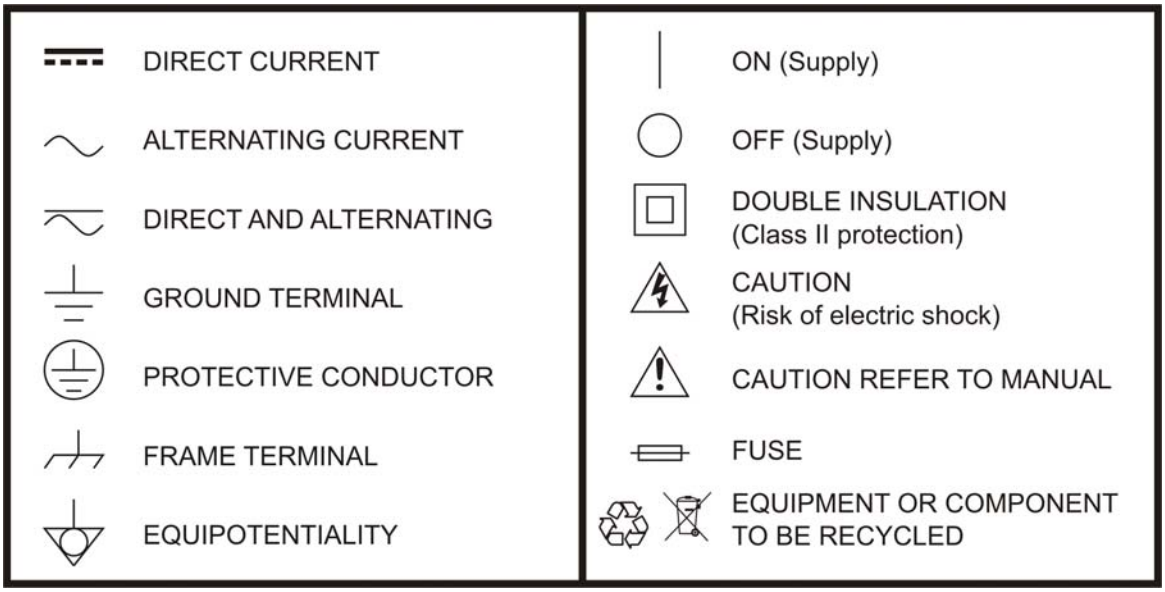
* The user is not allowed to perform changes inside the equipment. Any change on the equipment must be done exclusively by specialized staff.

* Do not obstruct the ventilation system of the equipment.

* Use appropriate low-level radiation cables for input / output signals, especially on high level signals.

* Follow the **cleaning instructions** described in the Maintenance paragraph.

* Symbols related with safety:



Descriptive Examples of Over-Voltage Categories

Cat I Low voltage installations isolated from the mains.

Cat II Portable domestic installations.

Cat III Fixed domestic installations.

Cat IV Industrial installations.

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DVB-S/S2 TO DVB-T2 TRANSMODULATOR

CompactMax-2

CompactMax-3

1 INTRODUCTION

1.1 Description

The **CompactMax** is a compact transmodulation system that allows you to distribute Satellite TV channels (DVB-S or DVB-S2) in Second Generation Digital Terrestrial Television (DVB-T2) format.

The **CompactMax** has 4 satellite inputs and 4 DVB-T2 independent outputs. Two inputs are for free channels and the other two inputs for encrypted channels. There are also two slots to insert a Card Access Module (CAM)* to decrypt these channels and one input for RF loopthrough.

The **CompactMax** extracts the sequence of digital data (Transport Stream) of DVB-S/S2 signal. TS tables are regenerated (PAT, PMTs, SDT and NIT) and PID remapped. Then signal is modulated again in DVB-T2 format, in order to distribute it at frecuencies between 47 and 858 MHz with a resolution of 1 kHz. After going through this process, there are 4 DVB-T2 independent signals that can be inserted into a television distribution network. The output signal has high quality, allowing its way through multiple amplifier stages, drifters, long cables, etc.

The **CompactMax** is managed through a webserver via remote control (LAN or internet) and it is compatible with any standard browser. The webserver is easy to use and has multiple setting options.

The **CompactMax** is integrated into a 19" (1U high) rack-mount case, which fits in any TV head-end installation. It can also be mounted directly on the wall.

Among the practical applications of this transmodulator are:

- Filter services in order to choose what DVB-S/S2 channels will become DVB-T2.
- Restoration of quality in a weak signal.
- To move DVB-T2 channels from one frequency to other.
- To change a programme grid without need to retune every TV on the system.
- To avoid degradation of signal.
- To avoid overlapping on other channels.
- To distribute encrypted programmes as free view in an internal TV network.*
- To use as a TV repeater to cover shadow areas.

***** only available for CompactMax-2

It can be used in hotels, convention centres, hospitals, ships, emblematic buildings, mansions, etc.

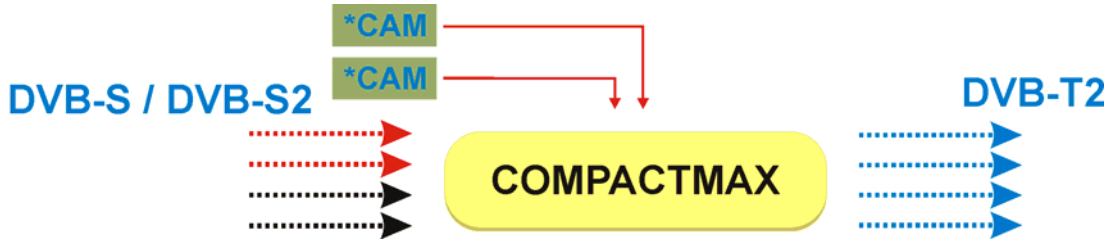

Figure 1.

* only available for CompactMax-2

2 PACKAGE CONTENT

- Main Unit.
- Quick guide.
- Power line.

3 DESCRIPTION

Front view

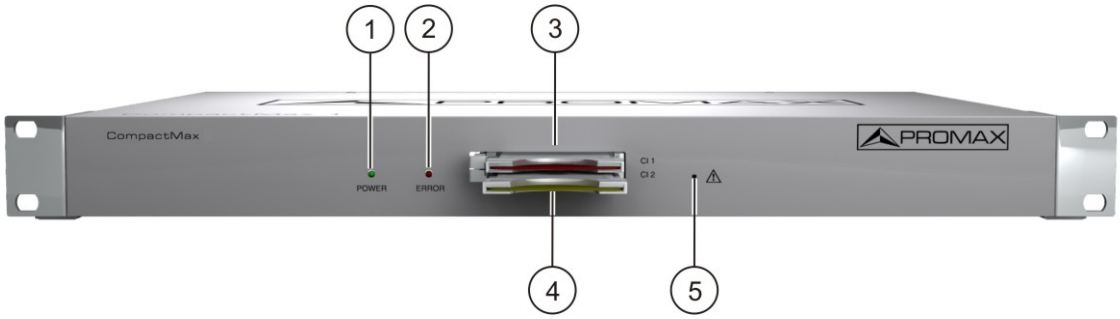

Figure 2.

1. Power On indicator.
2. Error indicator.
3. Common Interface input (CI#1) for decoder card*.
4. Common Interface input (CI#2) for decoder card*.
5. IP address reset.

* only available for CompactMax-2

Rear view

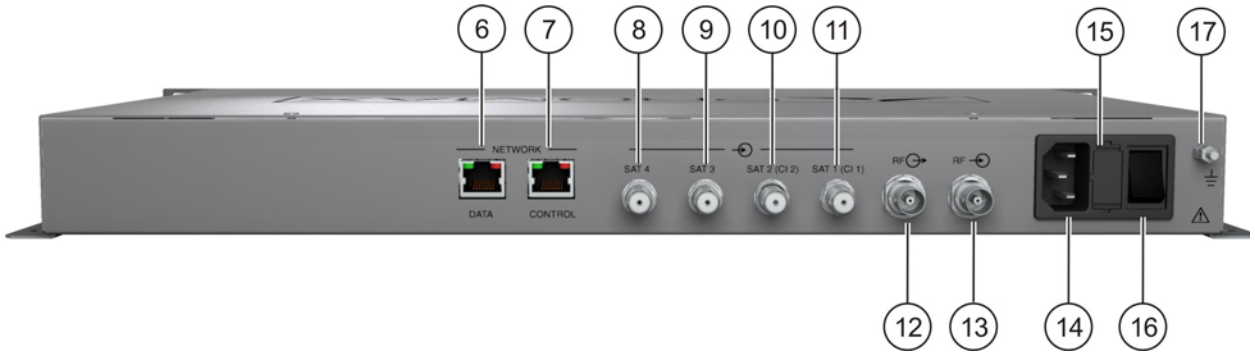

Figure 3.

6. Ethernet connection for data network.

7. Ethernet connection for equipment control (IP by default: 192.168.29.30; user: Admin; password: Admin).

8. Input #4 for satellite signal (DVB-S/S2) free channels.

9. Input #3 for satellite signal (DVB-S/S2) free channels.

10. Input #2 for satellite signal (DVB-S/S2) scrambled channels (connected to CI#2)*.

11. Input #1 for satellite signal (DVB-S/S2) scrambled channels (connected to CI#1)*.

12. Output for terrestrial RF signal (2 x DVB-T2).

13. RF loopthrough input.

14. Power connector (110 - 230 V AC).

15. Fuse holder.

16. On / Off switch.

17 Earth connection.

* only available for CompactMax-2

4 ASSEMBLY INSTRUCTIONS

4.1 Rack mounting

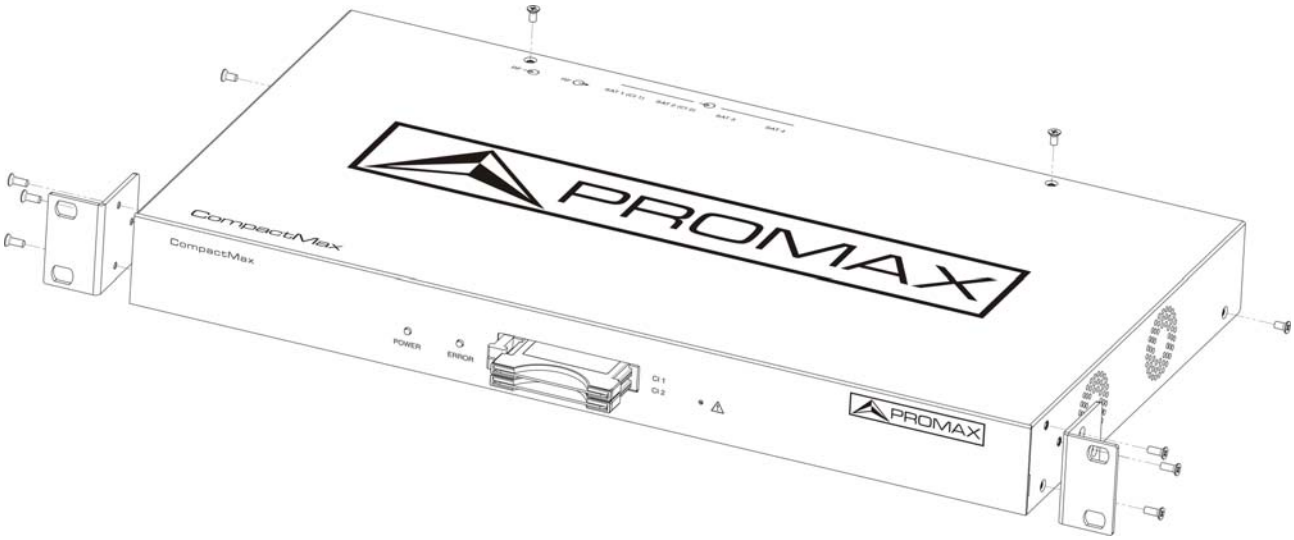

Figure 4.

4.2 Wall Mounting

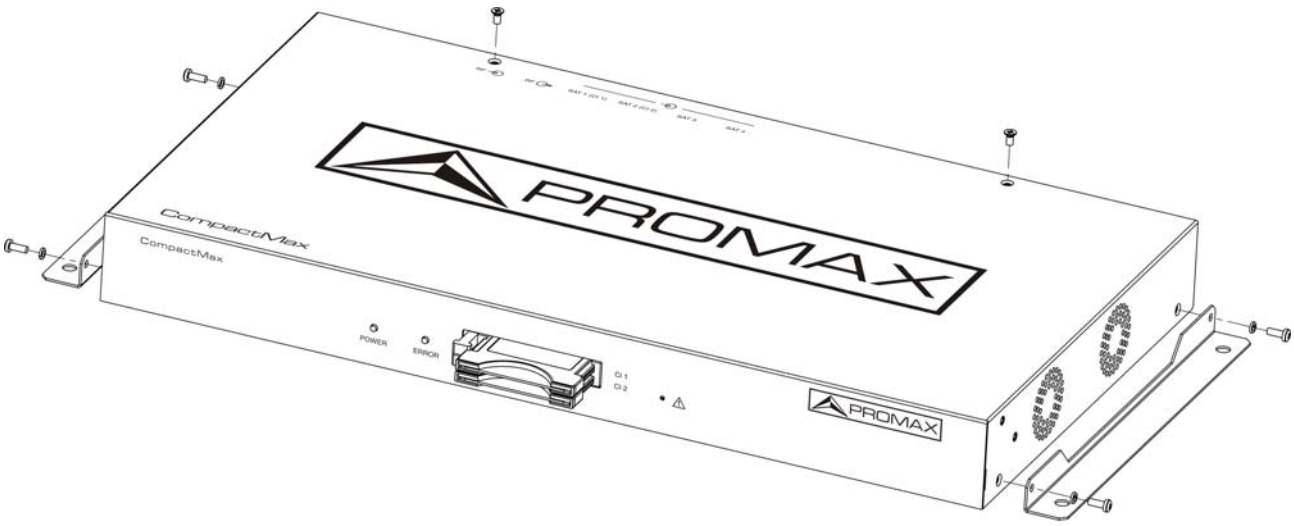

Figure 5.

5 WEBSERVER OPERATION

5.1 Introduction

The transmodulator is controlled and configured via Ethernet using a standard browser. The webserver application provides access to the setting parameters of the modulator. To use it you need just a standard browser and an internet connection. In this way remote control can be done from any PC computer using the integrated webserver which does not require installation of any additional software.

The webserver application allows the user to work remotely on the instrument in a more comfortable way, whether to check status of signal output, to set parameters, to change selected services, for general maintenance, etc. User can also dynamically change the programme grid without need to retune every TV on the system.

Next screenshots belongs to CompactMax-2.

5.2 Login

The default IP of this device is 192.168.29.30.

1. In first place, check the IP address of the PC. It must be in the same IP range of the device. This means, an IP like 192.168.29.xxx (xxx can be 0 to 255 except 30 to avoid conflict with module IP address). Add a new IP or change the current one to meet this requirement.
2. Check connections. The Ethernet cable must be connected to the control input (see description chapter). It is recommended to try a ping on the command-line interface to confirm they are on the same network range and communication between them is possible.
3. Now use a web browser to run the webserver application from the PC. Write the IP address (by default 192.168.29.30) on the URL bar and press ENTER.
4. If connection is successful, the browser will display a login screen (see description chapter). Enter the Username and Password (by default both are "Admin") then click on 'Login' to enter the webserver application.

NOTE: After communication is established, the user can set a new IP address on the module to suit the range of its own Ethernet network or PC.

NOTE: Write down the new IP address if you change the default IP address, as it is required each time you want to communicate. If you neither do not know nor remember the IP of the module, press the IP address reset button (see description chapter) to set the device to the default IP.

- **Recovering the default IP**

If you do not remember or do not know the module IP follow the steps below:

1. Press the reset button of the IP address (see figure 2 – (5)).
2. The error LED will flash. Press and hold the button until the LED stops blinking.
3. At this time the IP adress has changed to the default IP (192.168.29.30).
4. This change is temporary and if you turn the equipment off you will lose this configuration. To save changes, connect the webserver application and click on “Store fields” in the “Versions/Store” tab.

5.3 Screen description

After logging, the following screen displays.

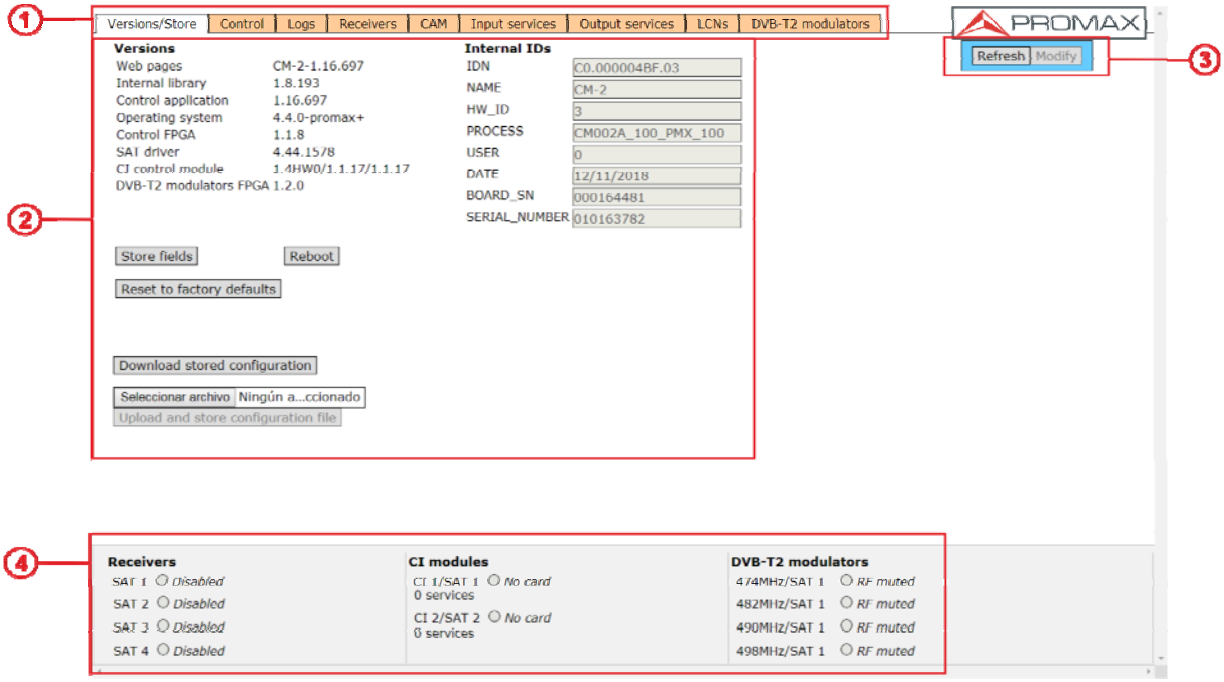

Figure 6.

Each screen has 4 specific areas:

1. **Tab area**: Each tab access to a specific set of parameters.
2. **Setting Parameters area**: Set of parameters according to the tab selected.
3. **Edit options**: Options to edit parameters.
4. **Status area**: Transmodulator current state.

In the following sections, each of these areas is described in detail.

5.4 Status Area

The status area shows the current state of input and outputs in the transmodulator.

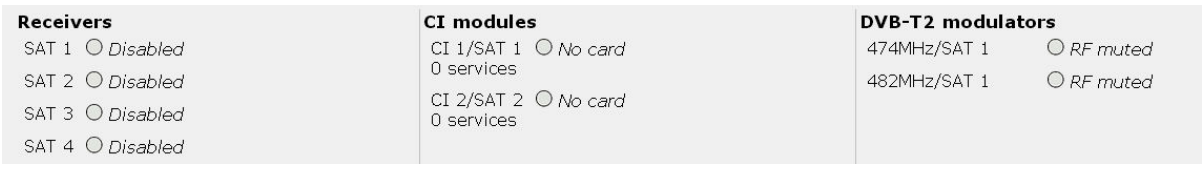

Figure 7.

- **Receivers**: It shows the status (enabled/disabled) for the 4 satellite receivers. The radio button shows which one is working and its status: green (ok) / red (error).
- **CI modules***: It shows the status (initialized/no card) for the CAM module inserted in the common interface (CI) slot. It also shows the satellite receiver selected and the number of selected services for each card. The radio button shows which one is working and its status: (green (ok) / red (error).
- **DVB-T2 modulators**: It shows the status of the RF output (RF muted/…), output frequency and signal source. The radio button shows which one is working and its status: (green (ok) / red (error).

5.5 Edit options

Depending on the selected tab, edition options may vary.

Edit options are:

- **Refresh**: It reloads data on the webserver application from data received from the transmodulator.
- **Modify**: Changes on the weserver are applied on the transmodulator.
- **Expand**: It expands the data tree.
- **Collapse**: It collapses the data tree.
- **Reset logs**: It clears the log table.

* only available for CompactMax-2

5.6 Setting parameters

Setting parameters are grouped in these tabs:

- **Versions/store**: Information about firmware and hardware and options to store/ reset/ reboot.
- **Control**: Network, password and language settings.
- **Logs**: Information about transmodulator operation.
- **Receivers**: Satellite receivers settings.
- **CAM*:** Conditional Access Module (CAM) settings.
- **Input Services**: Information about services captured from satellite receivers.
- **Output Services**: Selection of services to be released on the RF output.
- **LCNs**: Selection of logical channel number (LCN) for each service selected.
- **DVB-T2 modulators**: RF output settings to distribute in DVB-T2 standard.

In next chapters each one of these options are explained in detail.

* only available for CompactMax-2

5.6.1 Versions / Store

This window gives information about firmware versions and options to store/reset/reboot.

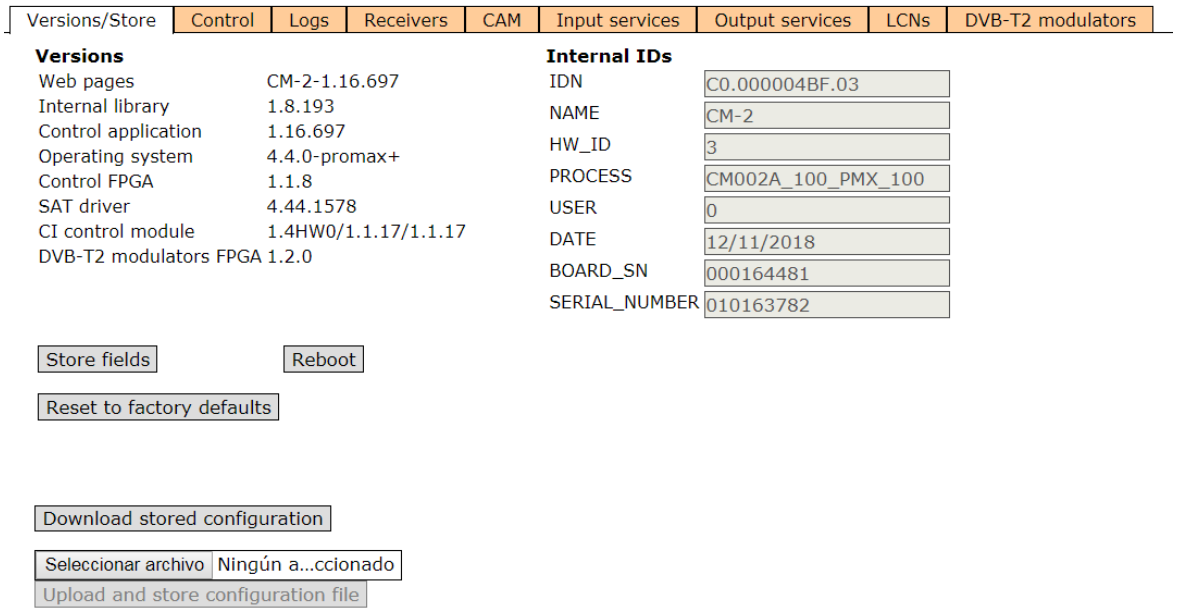

Figure 8.

- **Versions**: It shows information about firmware and hardware versions for different components of the transmodulator.
- **Internal IDs**: It shows information about the identification number of the equipment, model name and serial number among others.
- **Store fields**: It applies and saves all changes made in the webserver on the transmodulator.
- **Reboot**: It reboots the transmodulator.
- **Reset to factory defaults**: It recovers and applies factory settings on the transmodulator.
- **Download stored configuration**: It downloads current configuration as a file, from transmodulator to PC.
- **Upload and store configuration file**: It uploads and stores the configuration file selected by the user, from PC to transmodulator.

5.6.2 Control

This window has some settings to connect to a data network, to change the password and the menu language.

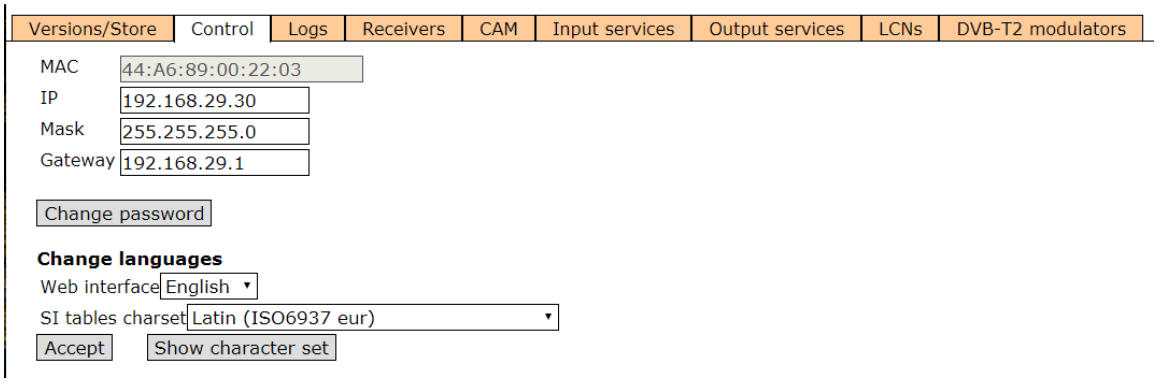

Figure 9.

- **MAC**: Physical address of the transmodulator.
- **IP**: IP address of the transmodulator in the network (IP by default 192.168.29.30). To recover IP by default press the physical button on the transmodulator (see description chapter).
- **Mask**: Network parameter.
- **Gateway**: Network parameter.
- **Change password**: It allows the user to change the password to access the webserver application (user and password by default: "Admin").
- **Change language**: It allows the user to select the language of the webserver application. Available languages are English and Spanish.
- **SI tables charset**: It allows the user to select the group of characters for the data received from the transport stream. To see all the characters of the selected table click on "Show character set".

5.6.3 Logs

This window gives information about the transmodulator operation. Each event happening in the modulator is captured and shown on this window. Each event has a description, a tag and an identification number.

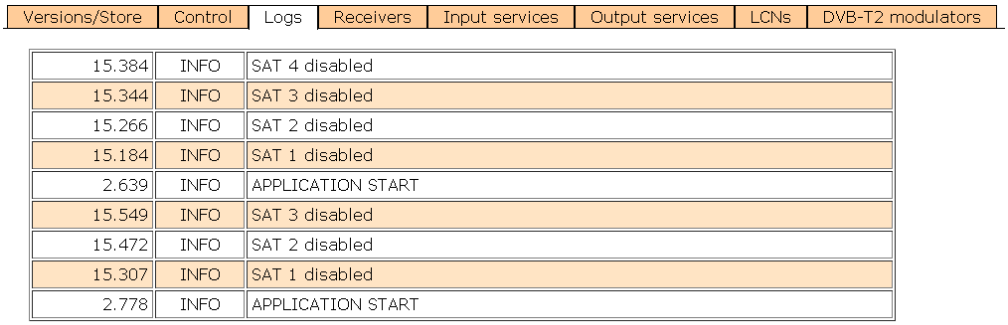

Figure 10.

5.6.4 Receivers

This window has some settings to tune the satellite signal. When the satellite signal is locked, it shows information about it.

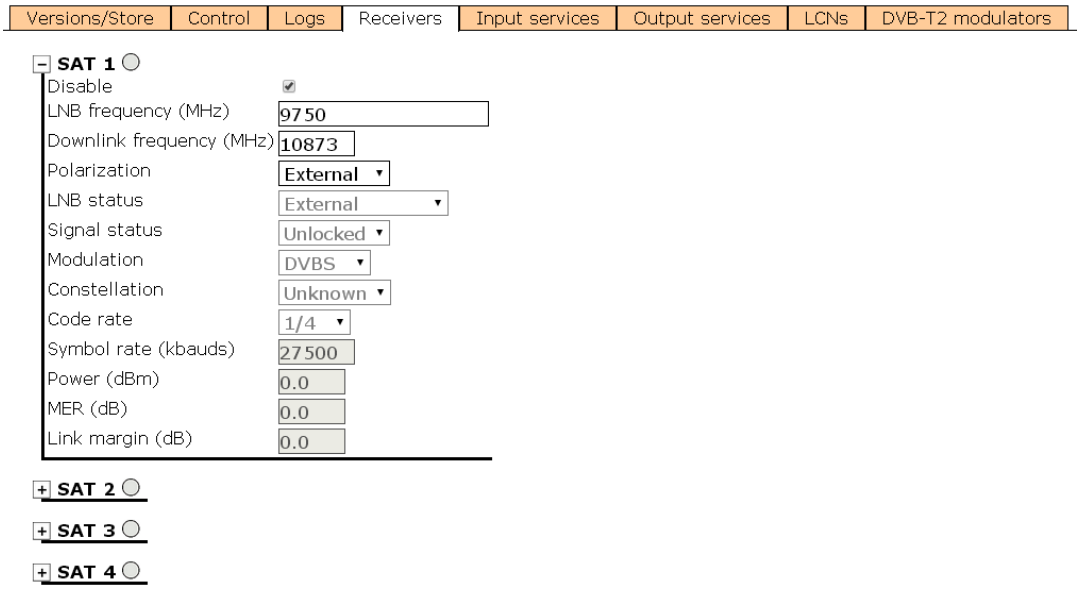

Figure 11.

In first place, select satellite inputs (from 1 to 4) to work on and then expand the data tree. Setting parameters are:

- **Disable**: Check or uncheck to enable / disable the SAT input.
- **LNB frequency (MHz)**: Oscillator frequency of the antenna (in MHz). If you have a Universal LNB, generally are 9750 MHz for LOW band and 10600 MHz for HIGH band.
- **Downlink frequency (MHz):** Tuning frequency of the satellite.
- **Polarization**: LNB voltage and band. Select from the available values:
  - 13(VL): Vertical polarization Low Band.
  - 18(HL): Horizontal polarization Low Band.
  - 13~(VH): Vertical polarization High Band.
  - 18~(HL): Horizontal polarization High Band.
  - External: External polarization.

The rest of parameters are automatically detected by the transmodulator when the signal is locked.

5.6.5 CAM*

In this window user can browse through the CAM module menu.

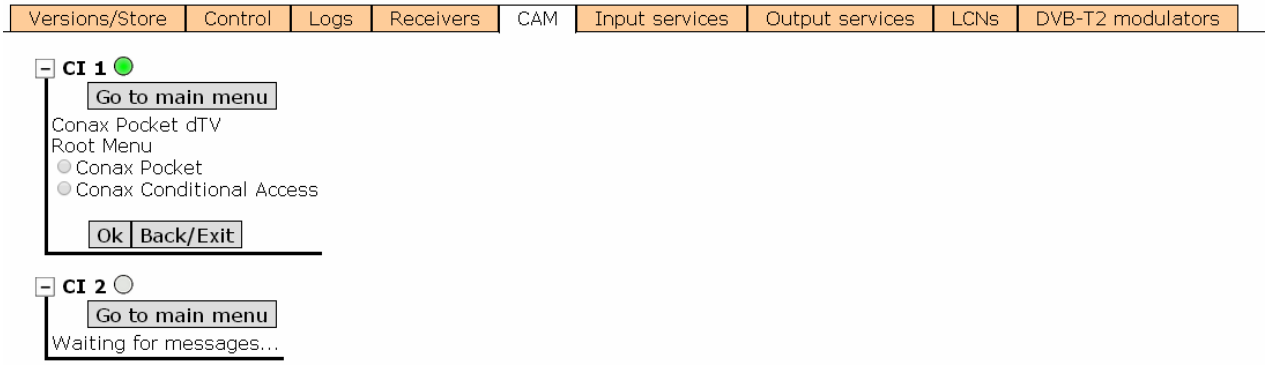

Figure 12.

Each time an option is selected, user should wait until the module access the next menu or option. Each CAM module has its own menu settings.

* only available for CompactMax-2

5.6.6 Input Services

This window gives information about services captured from satellite receivers.

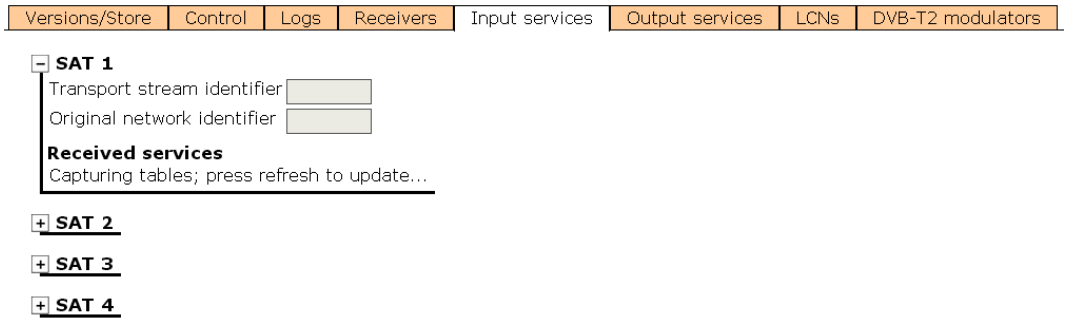

Figure 13

Select the same satellite inputs than selected in the "Receivers" tab.

Then expand the data tree to check information about the services captured.

Available information is:

- **Transport stream identifier**: It is a number that identifies the transport stream.
- **Original network identifier**: It is a number that identifies the network from where the signal comes.
- **Received services**: It shows all services detected and its tables. Each table shows all the metadata carried in the corresponding PSI/SI tables in a tree diagram so user can deploy its content to the detail.

5.6.7 Output Services

This window gives information about services to be released on the RF output.

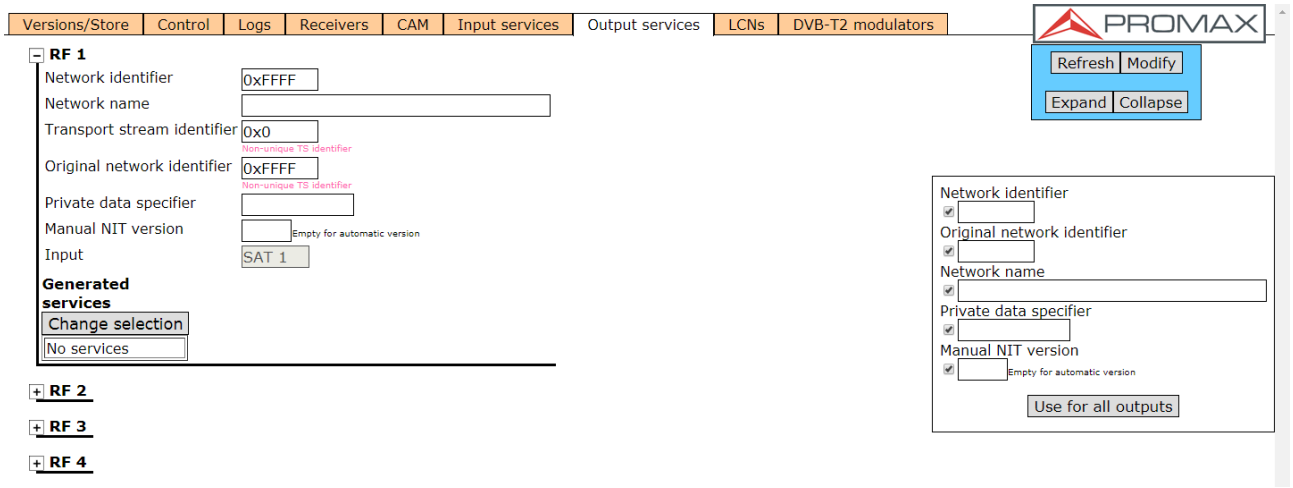

Figure 14.

Select the RF output (RF 1 to 4) to work on and then expand the data tree to set the parameters in order to release services at the output:

- **LCNs Network identifier**: It is the number that identifies the network where the signal is distributed.
- **Network name**: It is the name that identifies the network where the signal is distributed.
- **Transport stream identifier**: It is a number that identifies a specific transport stream.
- **Original network identifier**: It is a number that identifies the network from where the signal comes.
- **Private data specifier**: Data that the receiver uses to properly identify the LCN value.
- **Input**: Select the SAT input (from 1 to 4) to select services. Click on "Change selection" to change the input SAT.
- **Generated services**: It shows services generated from the selected transport stream. User can select services by clicking on "Change selection" button.

If the user wants the same settings at all RF outputs, just fill the fields at the right box and click on "Use for all outputs".

5.6.8 LCNs

This window allows user to select the logical channel number (LCN) for each service selected.

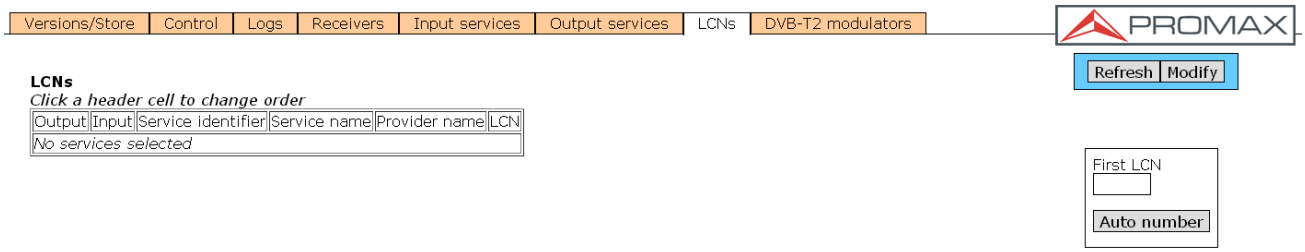

Figure 15.

- **LCN**: Logical channel number is the number that specifies the index to sort services on the digital terrestrial television receiver.

There is also one option to auto number all services by filling the "First LCN" box and clicking on "Auto number".

5.6.9 DVB-T2 Modulators

This window shows RF output settings in order to distribute services in DVB-T2 format. 4 DVB-T2 independent outputs are available.

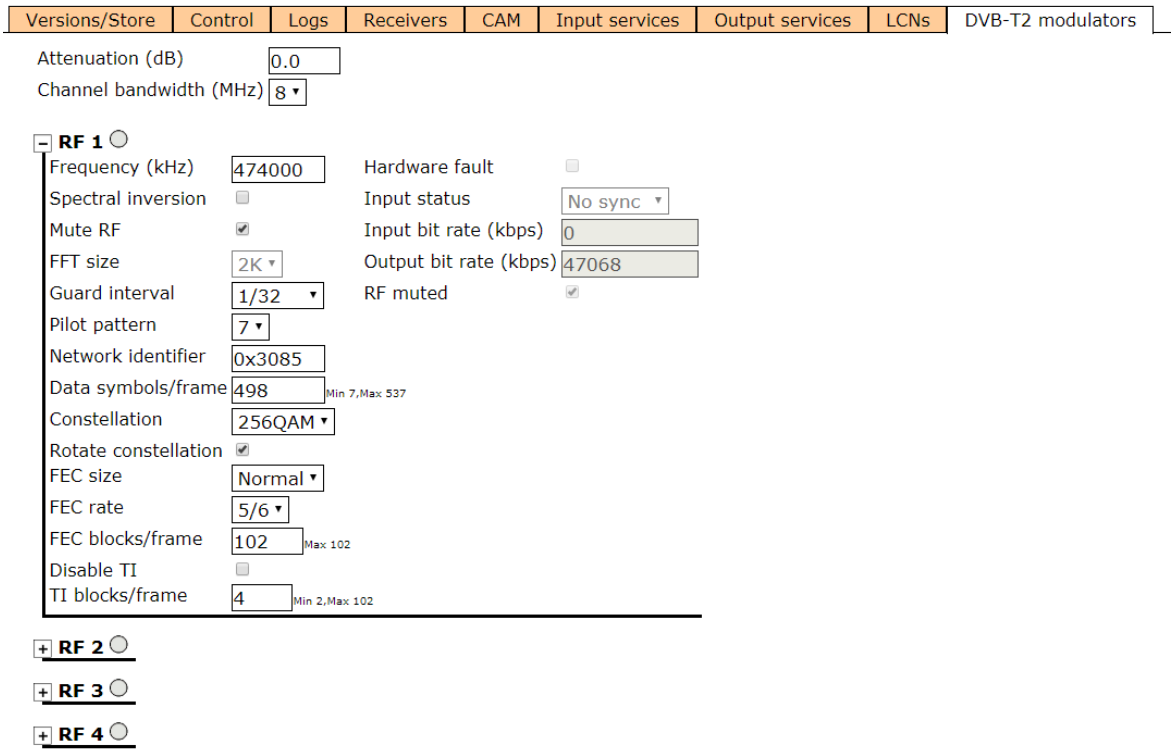

Figure 16

For all outputs:

- **Attenuation (dB)**: Attenuation at the ouput.
- **Channel bandwidth (MHz)**: Output cannel bandwidth (6, 7 or 8 MHz).

Select the RF output (RF 1 to 4) to work on and then expand the data tree to set the parameters in order to release services at the output. It should be used the same outputs than selected at the "Output services" tab.

- **Frequency**: Service frequency at output.
- **Spectral inversion**: Check to invert spectrum signal.
- **Mute RF**: It disables output signal.
- **Guard Interval**: It defines signal guard interval: 1/4, 1/8, 1/16, 1/32.
- **Pilot Pattern**: Pilot pattern selection (1-8).
- **Network identifier**: Identifier code for using network.
- **Data symbols/frame**: It defines number of data symbols, from 7 to 537.
- **Constellation**: It defines constellation modulation: 256QAM, 64QAM, 16QAM.

- **Rotate Constellation**: Check to rótate constellation.
- **FEC size**: Size for correction system (FEC): short or normal.
- **FEC rate**: 1/2, 2/3, 3/4, 3/5, 4/5, 5/6.
- **FEC blocks/frame**: It defines FEC block number, up to 102.
- **Disable TI**: Check to disable Time Interleaving.
- **TI blocks/frame**: In case of using TI, select TI blocks from 2 (min) to 102 (max).
- **Hardware fault**: If system detects a hardware error, this checkbox is checked automatically.
- **Input status**: It shows input status.
- **Input bit rate (kbps)**: It shows input bit rate (kbps).
- **Output bit rate (kbps)**: It shows output bit rate (Kbps).
- **RF muted**: If modulator RF output is switched off by the user or by the system then this checkbox will be checked.

6 SPECIFICATIONS

Specifications	CompactMax-2
SATELLITE INPUTS	4 satellite inputs
LNB	
Typical LO frequencies	9750 MHz, 10600 MHz
Supply	External/+13 (vert.pol.)/+18V (hor.pol.), 5 W each satellite input (max.)
22 kHz signalling	Low/high frequency band
Indicators	Over/under load/current and malfunction
IF frequency range	950 MHz to 2150 MHz (LNB LO freq ±downlink freq)
Input power range	-70 to –20 dBm typ., -50 dBm nominal, -5 dBm max
Input Impedance	75 Ω
Input return loss	> 10 dB
Noise figure	14 dB maximum
DVB-S	Up to 62 Msymb/s
DVB-S2	Up to 45 Msymb/s
DVB-T2 OUTPUTS	4 DVB-T2 outputs
Carrier frequency	47 MHz to 858 MHz in 1 kHz steps
Output level	-20 dBm ± 1 dB, 50 ohms
Output attenuation	0 to 30 dB in 0.1 dB steps
MER	38 dB minimum, >40 dB typical
Channel bandwidth	8, 7, 6, MHz with selectable spectral inversion 2k only
FFT size	2k only
Guard Interval	1/32, 1/16, 1/8, 1/4, 1/128, 19/128, 19/256
Pilot pattern	PP1-PP8
Number of PLPs	1
Constellation	16QAM, 64QAM, 256QAM (rotated or not)
FEC	Short, Normal; rates 1/2, 3/5, 2/3, 3/4, 4/5, 5/6
T2-frame duration	125 ms
CONDITIONAL ACCES	Two Common Interface DVB-CI compliant slots*
TS PROCESSING	- Selection of arbitrary number of services from the received TS (bit rate of the input services selected < DVB-T2 output bit rate) - NULL packet deletion and PCR restamping - Regeneration of the PAT, PMT, SDT, NIT tables - User-defined NID, ONID, Network Name, LCNs with associated private data specifier, Service Name, Provider Name and TS ID
REMOTE CONTROL	1000 Mbps Ethernet connector to access a webserver User-defined IP address
MECHANICAL FEATURES	
Dimensions	430 x 43 x 260 mm L x H x W
Weight	2.85 kg
Size	4,807 cm^3
POWER SUPPLY	110 – 230 V AC
OPERATING TEMPERATURE	From 0 to 45 ºC
NOTE: Equipment specifications are set in these environmental operating conditions. Operation outside these specifications are also possible. Please check with us if you have specific requirements.	

* only available for CompactMax-2

7 MAINTENANCE

7.1 Instructions for Returning by Mail

Instruments returned for repair or calibration, either within or out of the warranty period, should be sent with the following information: Name of the Company, name of the contact person, address, telephone number, receipt (in the case of coverage under warranty) and a description of the problem or the service required.

You should retain all packaging materials on a permanent basis if necessary to return the equipment to the Technical Assistance Service.

7.2 Cleaning Recommendations

CAUTION:	To clean the cover, take care the instrument is disconnected.

CAUTION:	Do not use scented hydrocarbons or chlorized solvents. The cover should be cleaned by means of a light solution of detergent and water applied with a soft cloth. Dry thoroughly before using the system again.

CAUTION:	Do not use for the cleaning alcohol or its derivatives, these products can attack the mechanical properties of the materials and diminish their useful time of life.