

# CompactMax-4

## DVB-S/S2 TO ISDB-T TRANSMODULATOR



- 0 MI2101 -





## 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.

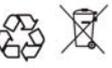
## USER'S MANUAL VERSION

Version	Date	Webserver version
1.0	September 2018	1.13.672

## 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:

	DIRECT CURRENT		ON (Supply)
	ALTERNATING CURRENT		OFF (Supply)
	DIRECT AND ALTERNATING		DOUBLE INSULATION (Class II protection)
	GROUND TERMINAL		CAUTION (Risk of electric shock)
	PROTECTIVE CONDUCTOR		CAUTION REFER TO MANUAL
	FRAME TERMINAL		FUSE
	EQUIPOTENTIALITY		EQUIPMENT OR COMPONENT TO BE RECYCLED

### 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 ISDB-T TRANSMODULATOR

## **CompactMax-4**

## 1 INTRODUCTION

### 1.1 Description

The **CompactMax-4** is a compact transmodulation system that allows you to distribute Satellite TV channels (DVB-S or DVB-S2) in Digital Terrestrial Television (ISDB-T) format.

The **CompactMax-4** has 4 satellite inputs and 8 modulators for 8 output channels. From these 4 inputs, 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-4** extracts the sequence of digital data (Transport Stream) of DVB-S/S2 signal. TS tables are regenerated (PAT, PMTs, SDT and NIT). Then signal is modulated again in ISDB-T format, in order to distribute it in RF band between 47 and 858 MHz. After going through this process, the signal of the ISDB-T module 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-4** 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-4** 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 ISDB-T.
- Restoration of quality in a weak signal.
- To move ISDB-T channels from one frequency to other.
- 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.



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

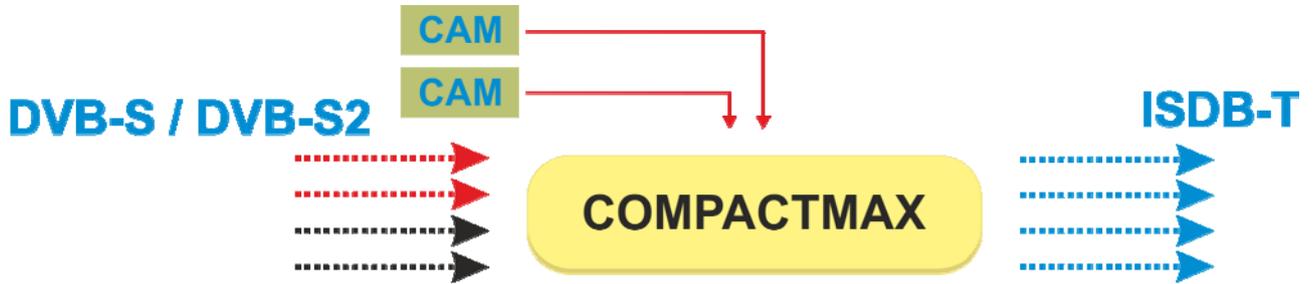


Figure 1.



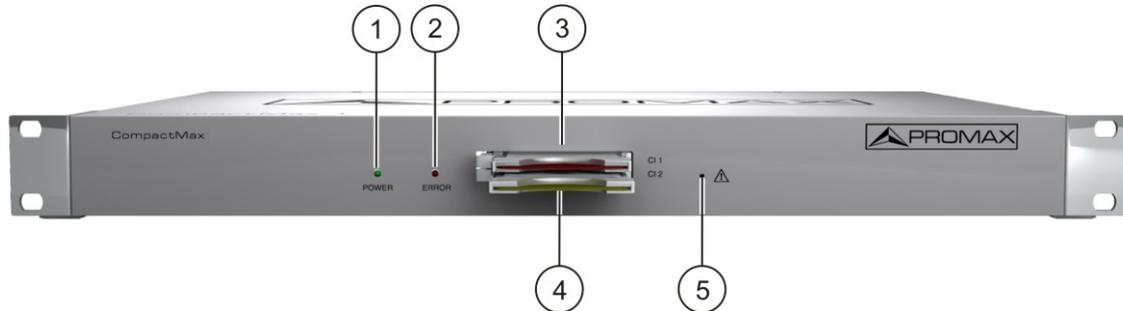
## 2 PACKAGE CONTENT

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



### 3 DESCRIPTION AND LOCATION ELEMENTS

#### ■ Front view

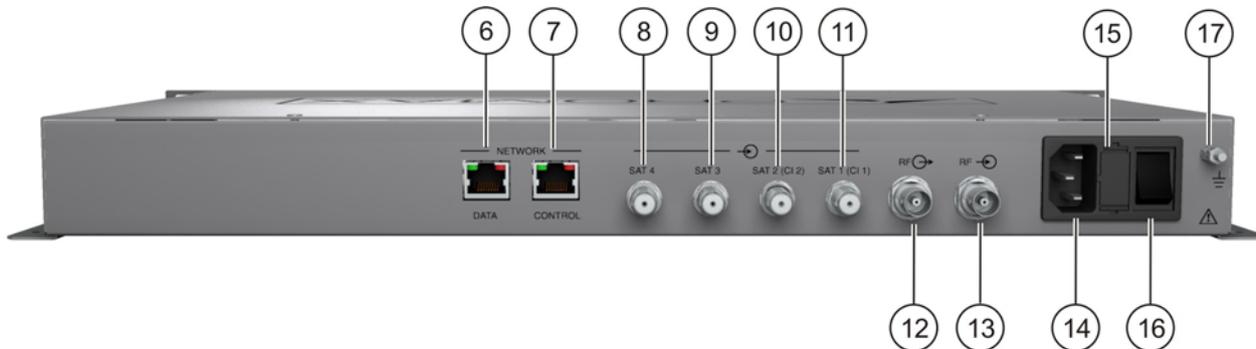


**Figure 2.**

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.



■ **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 (ISDB-T).
- 13.** RF loopthrough input.
- 14.** Power connector (110 - 230 V AC).
- 15.** Fuse holder.
- 16.** On / Off switch.
- 17.** Earth connection.



## 4 ASSEMBLY INSTRUCTIONS

### 4.1 Rack mounting

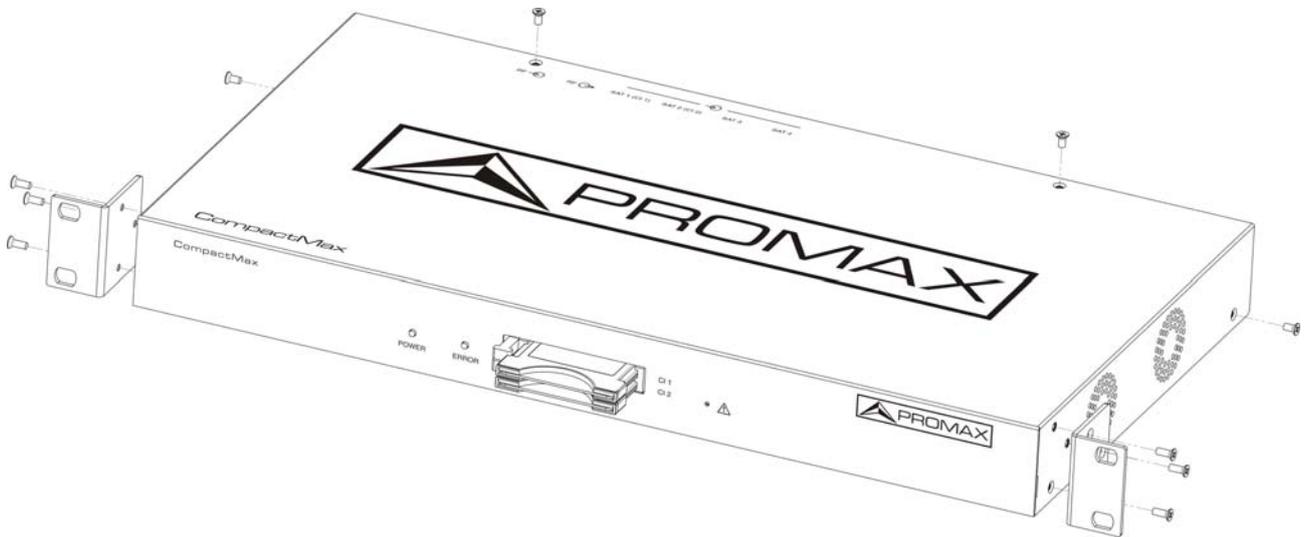


Figure 4.

### 4.2 Wall Mounting

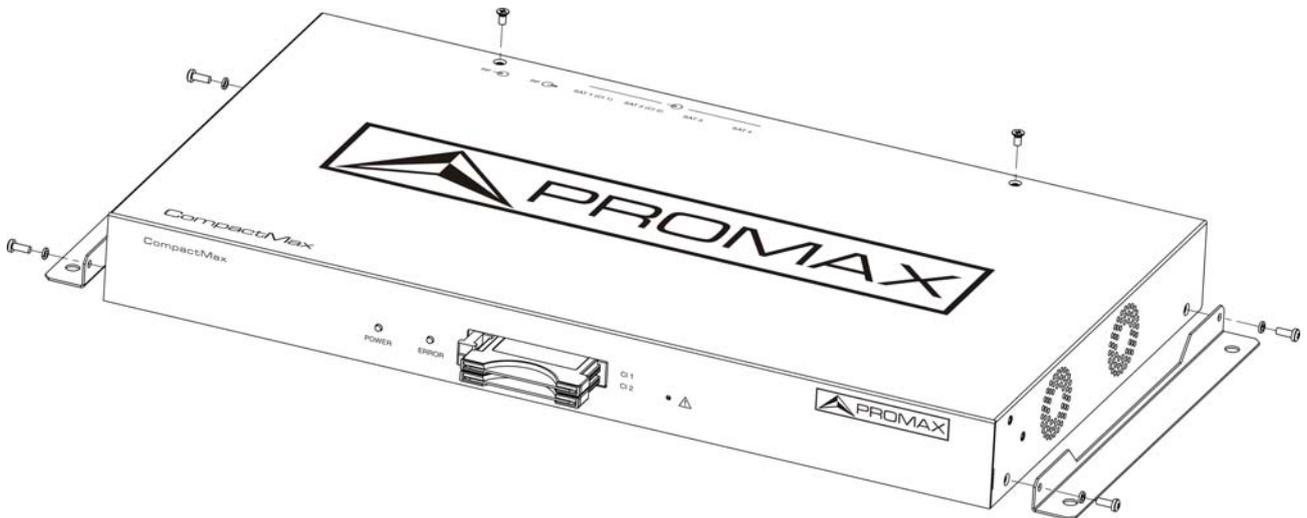


Figure 5.



## 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. The user can also dynamically change the programming grid without retuning each TV in the system.

### 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 figure 3 – (7)). 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. 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 default IP

If you do not remember or do not know the IP address, just follow these steps:

- 1 Press the IP reset button (see figure 2 – (5)).
- 2 The Error LED will blink. Keep pressed until the LED stops blinking.
- 3 At this moment the IP address has changed.
- 4 This change is temporary. If you switch off settings are lost. To save settings press on “Store fields” inside the tab “Store/Versions” at the webserver application.



### 5.3 Screen description

After logging, the following screen displays.

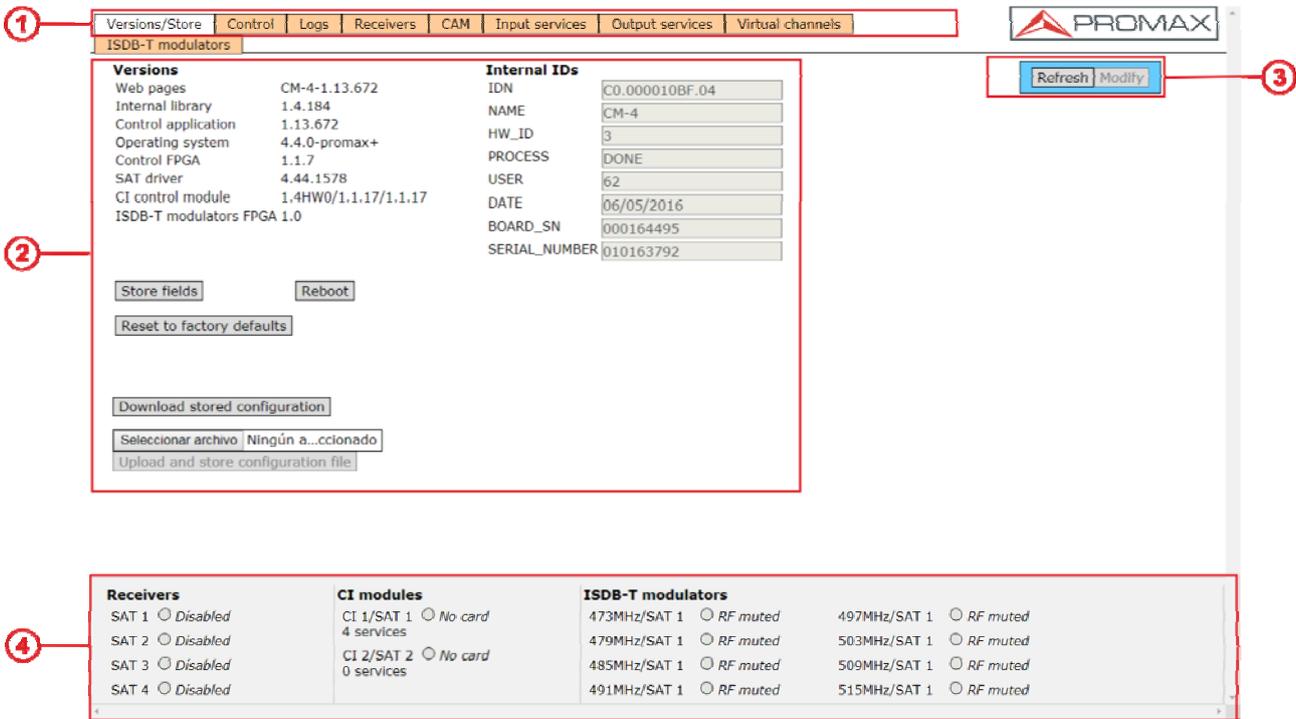


Figure 6.

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.

Each one of these areas it is explained in detail in the following sections.

### 5.4 Status Area

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

Receivers	CI modules	ISDB-T modulators	
SAT 1 <input type="radio"/> Disabled	CI 1/SAT 1 <input type="radio"/> No card 4 services	473MHz/SAT 1 <input type="radio"/> RF muted	497MHz/SAT 1 <input type="radio"/> RF muted
SAT 2 <input type="radio"/> Disabled	CI 2/SAT 2 <input type="radio"/> No card 0 services	479MHz/SAT 1 <input type="radio"/> RF muted	503MHz/SAT 1 <input type="radio"/> RF muted
SAT 3 <input type="radio"/> Disabled		485MHz/SAT 1 <input type="radio"/> RF muted	509MHz/SAT 1 <input type="radio"/> RF muted
SAT 4 <input type="radio"/> Disabled		491MHz/SAT 1 <input type="radio"/> RF muted	515MHz/SAT 1 <input type="radio"/> RF muted

**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)).
- **ISDB-T modulators:** It shows the status of each modulator, output frequency, signal source and status (RF muted/ not synchronized, etc.) . The radio button shows which one is working and its status (green (ok) / red (error)).

## 5.5 Edit options

Edit options are:

- **Refresh:** It reloads data from the transmodulator to the webserver application.
- **Modify:** Changes made on the webserver are applied on the transmodulator.
- **Expand:** It expands the data tree.
- **Collapse:** It collapses the data tree.
- **Reset Logs:** It clears the log register.



## 5.6 Setting parameters

Setting parameters are grouped in these tabs:

- **Versions/store:** Information about firmware and hardware versions and options to store/reset/reboot.
- **Control:** Network, password and language settings.
- **Logs:** Information about events during 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 at the RF output.
- **Virtual Channels:** Selection of channels at the remote control for each RF output.
- **ISDB-T modulators:** RF output settings to distribute in ISDB-T standard.

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



### 5.6.1 Versions / Store

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

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	Virtual channels
ISDB-T modulators							
<b>Versions</b>				<b>Internal IDs</b>			
Web pages	CM-4-1.13.672			IDN	<input type="text" value="C0.000010BF.04"/>		
Internal library	1.4.184			NAME	<input type="text" value="CM-4"/>		
Control application	1.13.672			HW_ID	<input type="text" value="3"/>		
Operating system	4.4.0-promax+			PROCESS	<input type="text" value="DONE"/>		
Control FPGA	1.1.7			USER	<input type="text" value="62"/>		
SAT driver	4.44.1578			DATE	<input type="text" value="06/05/2016"/>		
CI control module	1.4HW0/1.1.17/1.1.17			BOARD_SN	<input type="text" value="000164495"/>		
ISDB-T modulators FPGA 1.0				SERIAL_NUMBER	<input type="text" value="010163792"/>		
<input type="button" value="Store fields"/>				<input type="button" value="Reboot"/>			
<input type="button" value="Reset to factory defaults"/>							
<input type="button" value="Download stored configuration"/>							
<input type="button" value="Seleccionar archivo"/>				<input type="button" value="Ningún a...ccionado"/>			
<input type="button" value="Upload and store configuration file"/>							

**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, serial number and others.
- **Store fields:** It applies and saves all changes made on the webserver 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.

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	Virtual channels
ISDB-T modulators							
MAC	44:A6:89:00:22:0A						
IP	192.168.29.30						
Mask	255.255.255.0						
Gateway	192.168.29.1						
<input type="button" value="Change password"/>							
<b>Change languages</b>							
Web interface	English ▼						
SI tables charset	Latin (ISO6937 eur) ▼						
<input type="button" value="Accept"/> <input type="button" value="Show character set"/>							

**Figure 9.**

- **MAC:** Physical address of the transmodulator.
- **IP:** IP address of the transmodulator in the network (IP by default 192.168.29.30).
- **Mask:** Network parameter (by default 255.255.255.0).
- **Gateway:** Network parameter (by default 192.168.29.1).
- **Change password:** It allows the user to change the password to access the webserver application (user and password by default is: **Admin**).
- **Change language:** It allows the user to select the language for the webserver interface. Available languages are English and Spanish.
- **SI tables charset:** Select the character set for data received from the transport stream. To view all characters for the selected charset 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.

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	LCNs	DVB-T modulators
15.370	INFO	SAT 4 disabled						
15.352	INFO	SAT 3 disabled						
15.334	INFO	SAT 2 disabled						
15.156	INFO	SAT 1 disabled						
2.664	INFO	APPLICATION START						
15.174	INFO	SAT 3 disabled						
15.157	INFO	SAT 2 disabled						
15.138	INFO	SAT 1 disabled						
2.675	INFO	APPLICATION START						

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.

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	Virtual channels
ISDB-T modulators							
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <span style="font-size: 1.2em; margin-right: 5px;">-</span> <span style="font-weight: bold; margin-right: 10px;">SAT 1</span> <span style="margin-left: 10px;">○</span> </div> <div style="margin-left: 15px;"> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Disable</span> <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>LNB frequency (MHz)</span> <input type="text" value="9750"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Downlink frequency (MHz)</span> <input type="text" value="11471"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Polarization</span> <input type="text" value="13(VL)"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>LNB status</span> <input type="text" value="Vertical-low"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Signal status</span> <input type="text" value="Unlocked"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Modulation</span> <input type="text" value="DVBS"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Constellation</span> <input type="text" value="8PSK"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Code rate</span> <input type="text" value="2/3"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Symbol rate (kbauds)</span> <input type="text" value="25000"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Power (dBm)</span> <input type="text" value="0.0"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>MER (dB)</span> <input type="text" value="0.0"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> <span>Link margin (dB)</span> <input type="text" value="0.0"/> </div> </div> </div>							
<div style="display: flex; margin-bottom: 5px;"> <span style="font-size: 1.2em; margin-right: 5px;">+</span> <span style="font-weight: bold; margin-right: 10px;">SAT 2</span> <span style="margin-left: 10px;">○</span> </div>							
<div style="display: flex; margin-bottom: 5px;"> <span style="font-size: 1.2em; margin-right: 5px;">+</span> <span style="font-weight: bold; margin-right: 10px;">SAT 3</span> <span style="margin-left: 10px;">○</span> </div>							
<div style="display: flex; margin-bottom: 5px;"> <span style="font-size: 1.2em; margin-right: 5px;">+</span> <span style="font-weight: bold; margin-right: 10px;">SAT 4</span> <span style="margin-left: 10px;">○</span> </div>							

Figure 11.

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

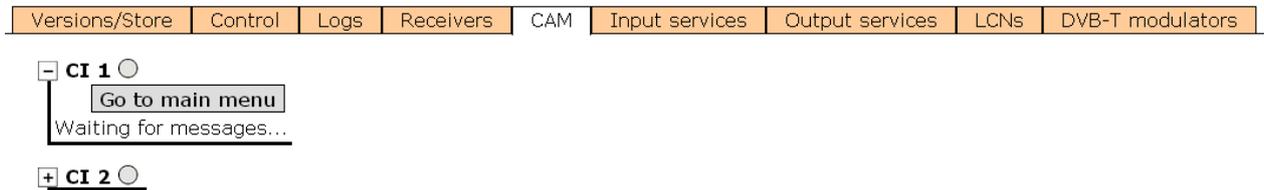
- **Disable:** Check or uncheck to enable / disable the SAT input.
- **LNB frequency (MHz):** Oscillator frequency of the antenna (in MHz). If you have a Universal LNB, generally are 9750 MHz for LOW band and 10600 MHz for HIGH band.
- **Downlink frequency (MHz):** Tuning frequency of the satellite.
- **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 accesses the next menu or option. Each CAM module has its own menu settings.



### 5.6.6 Input Services

This window gives information about services captured from satellite receivers.

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	Virtual channels
ISDB-T modulators							

**- SAT 1**

Transport stream identifier

Original network identifier

**Received services**

Capturing tables; press refresh to update...

**+ SAT 2**

**+ SAT 3**

**+ SAT 4**

**Figure 13.**

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

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

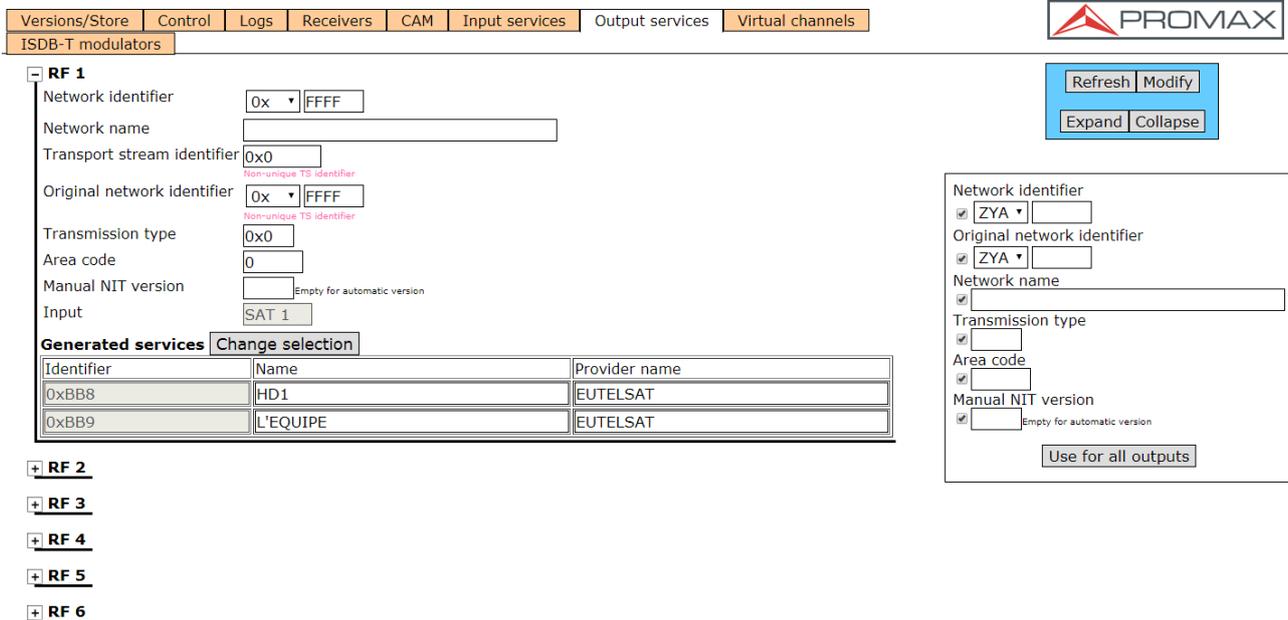
Available information is:

- **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.



ISDB-T modulators

RF 1

Network identifier: 0x FFFF

Network name: [ ]

Transport stream identifier: 0x0

Original network identifier: 0x FFFF

Transmission type: 0x0

Area code: 0

Manual NIT version: [ ] Empty for automatic version

Input: SAT 1

Generated services: Change selection

Identifier	Name	Provider name
0xBB8	HD1	EUTELSAT
0xBB9	L'EQUIPE	EUTELSAT

RF 2

RF 3

RF 4

RF 5

RF 6

Refresh Modify

Expand Collapse

Network identifier:  ZYA [ ]

Original network identifier:  ZYA [ ]

Network name: [ ]

Transmission type:  [ ]

Area code:  [ ]

Manual NIT version:  [ ] Empty for automatic version

Use for all outputs

Figure 14.

Select the RF output (RF 1 to RF 8) to work on and expand the data tree to set the parameters in order to release services at the output:

- **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.
- **Transmission type:** Type of transmission for the signal.
- **Area Code:** Code for the area where the signal is distributed.
- **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 to use the same settings for all RF outputs, use the external box and click on "Use for all outputs".



### 5.6.8 Virtual Channels

This window allows user to select the control remote keys to each output service.

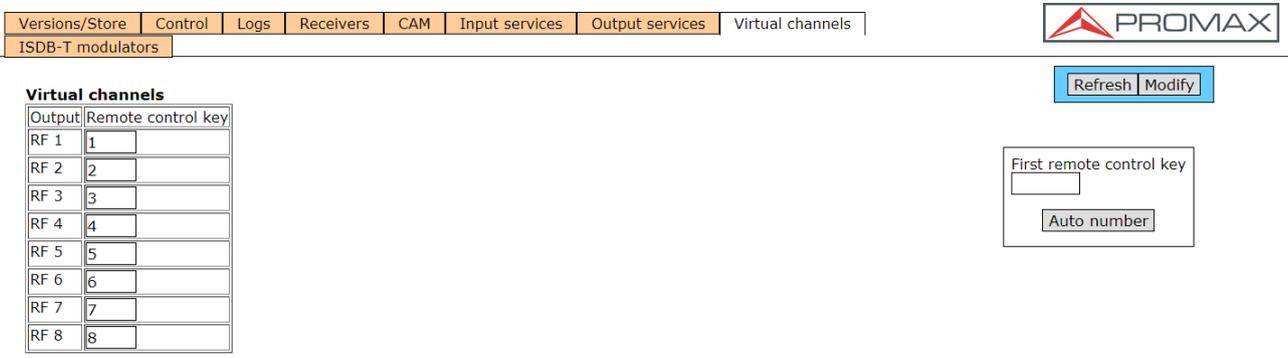


Figure 15.

There is also an option to auto number all services by filling the "First remote control key" box and clicking on "Auto number".



### 5.6.9 ISDB-T modulators

This window shows RF output settings in order to distribute services in ISDB-T format.

Versions/Store	Control	Logs	Receivers	CAM	Input services	Output services	Virtual channels
ISDB-T modulators							
Attenuation (dB)		<input type="text" value="0.0"/>					
Channel bandwidth (MHz)		<input type="text" value="6"/>					
<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; align-items: center;"> <span>[-] RF 1</span> <span><input type="radio"/></span> </div> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <p>Frequency (kHz) <input type="text" value="473142"/></p> <p>Spectral inversion <input type="checkbox"/></p> <p>Mute RF <input checked="" type="checkbox"/></p> <p>Guard interval <input type="text" value="1/4"/></p> <p>Constellation <input type="text" value="64QAM"/></p> <p>Code rate <input type="text" value="7/8"/></p> <p>Mode <input type="text" value="Mode 3"/></p> <p>Time interleaving length <input type="text" value="0"/></p> </div> <div style="width: 50%;"> <p>Hardware fault <input type="checkbox"/></p> <p>Input status <input type="text" value="No sync"/></p> <p>Input bit rate (kbps) <input type="text" value="0"/></p> <p>Output bit rate (kbps) <input type="text" value="19168"/></p> <p>RF muted <input checked="" type="checkbox"/></p> </div> </div> </div>							
<div style="display: flex; flex-direction: column; gap: 5px;"> <div><span>[+] RF 2</span> <input type="radio"/></div> <div><span>[+] RF 3</span> <input type="radio"/></div> <div><span>[+] RF 4</span> <input type="radio"/></div> <div><span>[+] RF 5</span> <input type="radio"/></div> <div><span>[+] RF 6</span> <input type="radio"/></div> <div><span>[+] RF 7</span> <input type="radio"/></div> <div><span>[+] RF 8</span> <input type="radio"/></div> </div>							

Figure 16.

Select the RF output (RF 1 to RF 8) to work on and expand the data tree to set the parameters in order to release services at the output. Select the same RF outputs than selected in the "Output services" tab.

- **Frequency:** Output frequency for service.
- **Spectral inversion:** Check to invert signal spectrum.
- **Mute RF:** It disables the output signal.
- **Guard Interval:** Guard Interval for the signal: 1/4, 1/8, 1/16, 1/32.
- **Constellation:** Constellation modulation: DQPSK, QPSK, 16-QAM, 64-QAM.
- **Code Rate:** To define code rate: 1/2, 2/3, 3/4, 5/6, 7/8.
- **Mode:** To define signal mode: 1 (2k), 2 (4k), 3 (8k).
- **Time interleaving length:** To define time interleaving length.
- **Hardware fault:** When the system detects an error on the hardware it check this box.

- **Input status:** It shows status for the input.
- **Input bit rate (kbps):** It shows the bitrate for the input in kbps.
- **Output bit rate (kbps):** It shows the bitrate for the output in kbps.
- **RF muted:** If the output signal of the modulator is switched off by the user or by itself then this box is checked.



## 6 SPECIFICATIONS

Specifications	CompactMax-4
<b>SATELLITE INPUTS</b>	4 satellite inputs
<b>LNB</b>	
<b>Typical LO frequencies</b>	9750 MHz, 10600 MHz
<b>Supply</b>	External/+13 (vert.pol.)/+18 V (hor.pol.), 5 W each satellite input (max.)
<b>22 kHz signalling</b>	Low/high frequency band
<b>Indicators</b>	Over/under load/current and malfunction
<b>IF frequency range</b>	950 MHz to 2150 MHz (LNB LO freq $\pm$ downlink freq)
<b>Input power range</b>	-70 to -20 dBm typ., -50 dBm nominal, -5 dBm max
<b>Input Impedance</b>	75 $\Omega$
<b>Input return loss</b>	> 10 dB
<b>Noise figure</b>	14 dB maximum
<b>DVB-S</b>	Up to 62 Msymb/s
<b>DVB-S2</b>	Up to 45 Msymb/s
<b>ISDB-T OUTPUTS</b>	8 ISDB-T modulator outputs
<b>Carrier frequency</b>	47 MHz to 858 MHz in 1 kHz steps
<b>Output level</b>	-20 dBm $\pm$ 1 dB, 50 ohms
<b>Output attenuation</b>	0 to 30 dB in 0.1 dB steps
<b>MER</b>	38 dB minimum, >40 dB typical
<b>Channel bandwidth</b>	6 MHz with selectable spectral inversion
<b>Guard Interval</b>	1/4, 1/8, 1/16, 1/32
<b>Mode</b>	1 (2k), 2 (4k), 3 (8k)
<b>Constellation</b>	DQPSK, QPSK, 16QAM, 64QAM
<b>Layer</b>	A
<b>Segments</b>	1..13
<b>CONDITIONAL ACCES</b>	Two Common Interface DVB-CI compliant slots
<b>TS PROCESSING</b>	<p>Selection of arbitrary number of services from the received TS (bit rate of the input services selected &lt; ISDB-T output bit rate).</p> <p>NULL packet deletion and PCR restamping.</p> <p>Regeneration of the PAT, PMT, SDT, NIT tables.</p> <p>User-defined NID, ONID, Network Name, LCNs with associated private data specifier, Service Name, Provider Name and TS ID.</p>
<b>REMOTE CONTROL</b>	<p>1000 Mbps Ethernet connector to access a webservice</p> <p>User-defined IP address</p>
<b>MECHANICAL FEATURES</b>	
<b>Dimensions</b>	430 x 43 x 260 mm W x H x D
<b>Weight</b>	2.85 kg
<b>Size</b>	4,807 cm <sup>3</sup>
<b>POWER SUPPLY</b>	110 – 230 V AC
<b>OPERATING TEMPERATURE</b>	From 0 to 45 °C
<b>NOTE:</b>	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.



## 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.



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