

Televes®



T.OX SERIES

EN MUX DVBS2 - IP CI
MUX DVBT2 - IP CI

SAT Input, Refs:
Televes Pro:Idiom - 565840
Televes - 565801

TERR Input, Refs:
Televes Pro:Idiom - 565740
Televes - 565701

Instruction Manual

MUX DVBS2 - IP CI / MUX DVBT2 - IP CI

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1. Important Safety Instructions

General installation conditions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings.
Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Only use attachments/accessories specified by the manufacturer.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Warning

- Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as glasses, shall be placed on the apparatus.

Safe installation

- Do not place the equipment near heat sources or in a highly humid environment.
- Do not place the equipment in a place where it can suffer vibrations or shocks.
- Please allow air circulation around the equipment.
- Do not place naked flames, such as lighted candles on or near the product.

Symbols



Equipment designed for indoor use.



The equipment complies with the CE mark requirements.

1. Technical Features

1.1. MUX DVBS2 - IP ref. 565840, 565801, MUX DVBT2 - IP CI ref. 565740, 565701

Inputs Satellite (Ref. 565840, 565801)	Input frequency	MHz	950 - 2150	Through losses (av.)	dB	< 1.5		
	Symbol rate	Mbaud	2 - 45	Modulation	DVB-S2	QPSK, 8PSK (EN302307)		
	Frequency steps	MHz	1		DVB-S	QPSK (EN300421)		
	Input level	dBm	-60 to -20	FEC inner code	LDPC	9/10, 8/9, 5/6, 4/5, 3/4, 2/3, 3/5, 1/2		
	Input and output connectors	type	"F" female	FEC outer code		Bose-Chaudhuri-Hocquenghem		
	Input impedance	ohm	75	Roll-off factor	%	20, 25, 35		
	LNB powering	V= kHz	13-17- OFF / 22 kHz (ON-OFF)	Input SWR (min)	dB	10		
	Satellite selection (DiSEqC)	A, B, C, D						
	Consumption 24VDC (with signal)*	mA	Base	450				
+ CAM			+100					
+ LNB			+250 / LNB					
Max			1050					

Inputs Terrestrial (Ref. 565740, 565701)	Input frequency	MHz	150 - 862	Input level	dBm	-60 to -20	
	Frequency steps	kHz	125, 166 (Selec.)	Through losses (typ.)	dB	<1.5	
	Input and output connectors	type	"F" female	Bandwidth	MHz	DVB-T	6, 7, 8 (EN300744)
	Input impedance	ohm	75		MHz	DVB-T2	1.7, 5, 6, 7, 8 (EN302755)
	Pre-amplifiers powering	V= kHz	0, 12, 24 (Selec.)**	Input SWR (min)	dB	10	
	Consumption 24VDC (with signal)*	mA	Base	500			
+ CAM			+100				
+ Pre-amp			+100				
Max			700				

DRM	Pro:Idiom (Refs. 565840, 565740)	Max. 8 services
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IP Output	Number of UDP SPTS outputs (unicast/multicast)	Max. 32	Maximum bitrate	Mbps	150
	Network interface	2x RJ-45 GB Ethernet	Service signaling		SAP / M3U/ Pro:Centric

General	IP Code	IP20
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* Average consumption with input signal The CAM and LNB consumptions indicated above are maximum values. They depend on the CAM and LNB of each installation. The technical features described are defined for an ambient temperature of 45°C (113°F) At higher temperatures forced ventilation will be used.

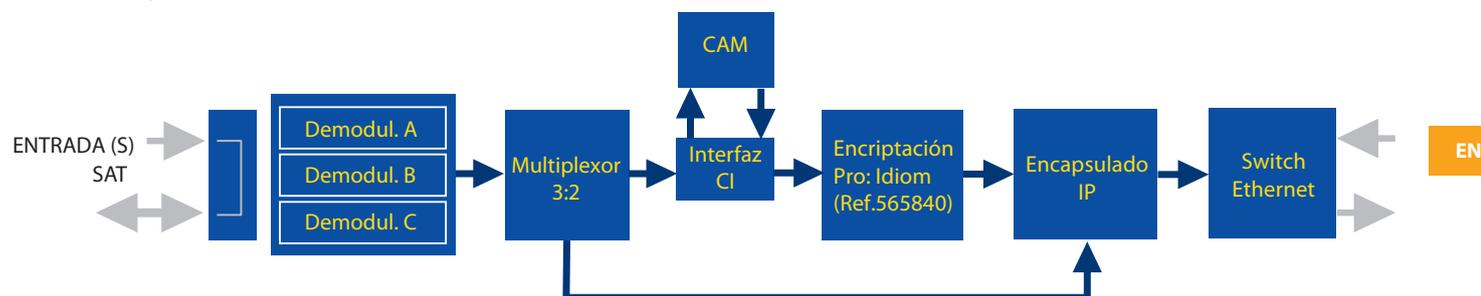
** A maximum Pre-amp consumption of 100mA is considered.

1.3. Power Supply Technical Features

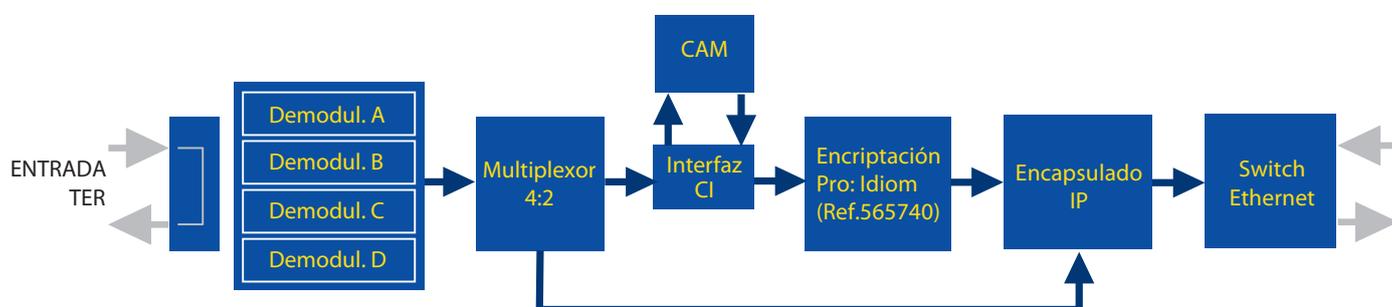
Power supply 5629	Input voltage/frequency	~V/Hz	220 - 230 / 50-60	Max. total current (output1 + output2)	A	5 (24V= =)
	Output voltage	V= =	24	Max. output current	A	4 (24V= =)

1.4. Block diagram

Ref. 565840, 565801



Ref. 565740, 565701



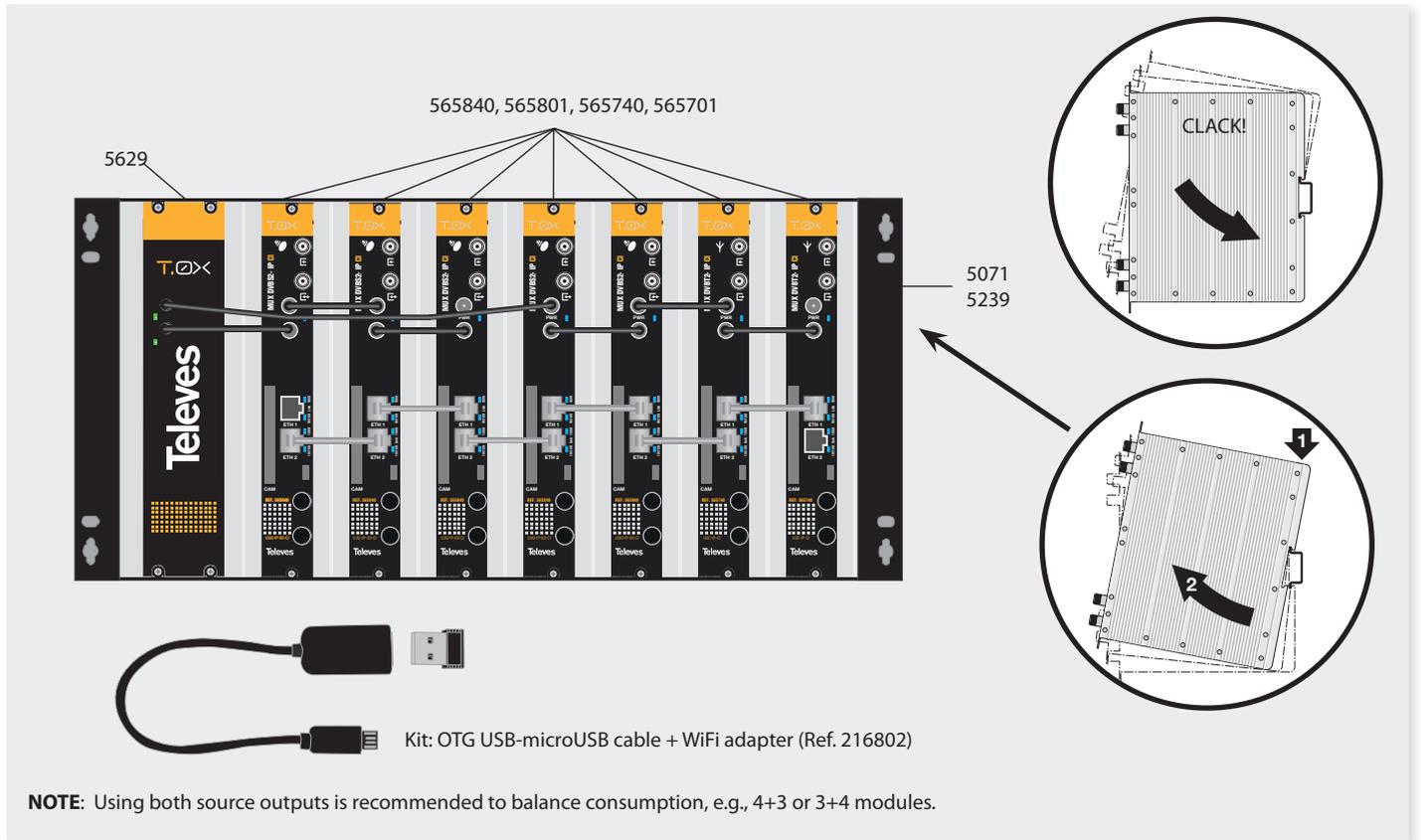
2. Reference Description

Range	
565840	T.0X DVBS2-IP CI MUX 3TP(2SAT) Pro:Idiom
565801	T.0X DVBS2-IP CI MUX 3TP(2SAT)
565740	T.0X DVBT/T2-IP CI MUX 4TP Pro:Idiom
565701	T.0X DVBT/T2-IP CI MUX 4TP
5629	Power supply 24V/5A T.0X

Accessories	
216802	Wi-Fi adapter kit + USB OTG
5071	T03-T05-T.0X Strip L=50 cm
5239	T03-T05-T.0X Support strip 12 Modules+Powering L= 56 cm
5301	19" rack framework
507203	Enclosure with T.0X lock and forced ventilation (7 Modules + Powering)
4061	F connector load adapter with capacitor
4058	F connector load adapter
422601	T05 @ T.0X power adapter hose L=40 cm
5673	Extra 50 mm plate

3. Mounting

3.1. Wall Mount



5629

565840, 565801, 565740, 565701

5071
5239

CLACK!

1

2

Kit: OTG USB-microUSB cable + WiFi adapter (Ref. 216802)

NOTE: Using both source outputs is recommended to balance consumption, e.g., 4+3 or 3+4 modules.

3.2. 19" Rack Mount



5301

4. Component Description

4.1. MUX DVBS2-IP CI/ MUX DVBT2-IP CI

1. Refs. 565840/565801:
Satellite IF input (input 0)
Refs. 565740/565701:
DVB-T / DVB-T2 input

2. Refs. 565840/565801:
Satellite IF input (input 1)/output
Refs. 565740/565701:
DVB-T / DVB-T2 output

3. Power module input
4. LED status indicator
5. Top Ethernet connector
6. Bottom Ethernet connector

7. Micro USB connector
8. CAM input

565840/
565801

565740/
565701

Insert the card all the way into the CAM with the contacts to the left and to the front before connecting the power supply to the module.

The satellite input mux (refs. 565840, 565801) can demodulate up to three DVBS or DVBS2 signals from one or two IF inputs. Terrestrial input multiplexer (refs: 565740, 565701) can demodulate up to four DVBT or DVBT2 signals.

All references allow for the creation of up to 32 SPTS IP outputs, selecting the service to be broadcast over IP for each of them. They also have a Common Interface slot for inserting a conditional access module (CAM) that allows services to be descrambled.

References 565840/565740 have the option to re-encrypt services previously descrambled with the CAM module through the DRM Pro:Idiom system. If this option is selected, the number of services to be descrambled is limited to eight. Multiplexers are set up on a web interface.

4.2. Power Supply

Connectors to power modules (1)

Mass +24V

LED status indicator

24V: OK
0V: Overload or short circuit

NETWORK input ~230V

(1)

NOTE: - The power supply may power up to seven modules with CAM, with only 2 active LNB powering operations, split in any of the modules.
- Upon inserting the CAM, consumption may increase by an average of 70mA, as it may vary from 20mA to 100mA based on the CAM. Each active LNB/Pre-amp increases consumption by about 250mA, depending on the LNB.
- Both of the supply's outputs must be used when consumption of one of them is over 4A (maximum current in each output).

5. - Instruction for Use

Connecting to the unit's web control interface

The unit's IP must be known to access its control interface. The default IP address of the unit is printed in the rear label.

Connect a PC directly to the module's ETH1 port with an Ethernet cable. Configure the PC's IP address on the same subnetwork as the module.

Open a browser (Mozilla Firefox or Google Chrome recommended) and go to the URL <https://<module IP>>

The unit can also be connected via Wi-Fi using adapter kit ref 216802. This adapter must be connected to the micro USB port on the front of the unit. After an automatic initialization process, connection to a Wi-Fi network will be possible. Its SSID has the following format: Televes_mng_XXYYZZ, where XXYYZZ corresponds to the final digits in the unit's MAC address. To go to the configuration website, open a browser and go to the URL "config.t0x".

The default login credentials for website access are: username: "web" and password "admin".

Assembly recommendations

To simplify initial headend configuration, follow the steps indicated below:

- Disconnect the power supply from the socket.
- Order the modules in ascending IP order.
- Connect the input signals (satellite or terrestrial) to the front input F connectors.
- Connect the units' ETH2 outputs to the external video distribution switch with Ethernet CAT6 cables. Another option is to create a loop between one unit's ETH2 connectors and the ETH1 of the next one, and only connect the ETH2 connector of the last module as shown in point 3.1.
- Connect the PC to the first module (lowest IP) as explained in the previous point. This unit must be configured as the Master and will be the point of access to the entire headend. All information on the other units connected to the Master data network (ETH2) will be visible on the interface of the unit configured as the Master. Units that are not the Master will only have their own configuration available.

IMPORTANT: A single Master must be configured in the headend, which will be marked with an "M" on all setup screens.

- Connect the powering hoses splitting consumption between the two power supply outputs (see point 3.1)
- Connect the power supply once all the above connections have been made.

Unit control interface

The control interface is divided into the following areas:

- The menu bar is shown to the left.
- The upper right-hand section shows the language selection.
- The middle section shows the different control forms based on the selected menu.

Each setup screen includes the apply configuration button to send data to the unit. If the screen is changed and the changes were not applied, a warning message will appear.

NOTE: The screenshots shown here have several units (lines) on each menu. This only occurs if the unit is configured as the Master. Otherwise, only the data on the unit being physically connected will be shown.

The available options are:

Status Menu

This screen shows information about:

- Inputs used by the headend, including frequency, engagement, and quality measures.
- CAMs inserted in the modules: name and status.
- IP outputs: list of configured services, including the bitrate and the encryption status.

Icon	Description
	Open service in the input.
	Encrypted service in the input, configured at DCY and properly decrypted by the CAM module.
	Encrypted service in the input, configured at DCY and not properly decrypted by the CAM module.
	Encrypted service in the input and configured at ON. Decryption not configured in the CAM module.
	Re-encryption service via Pro:Idiom. Only applicable to services configured at DCY.
	The input service does not contain any video elementary stream.

EN

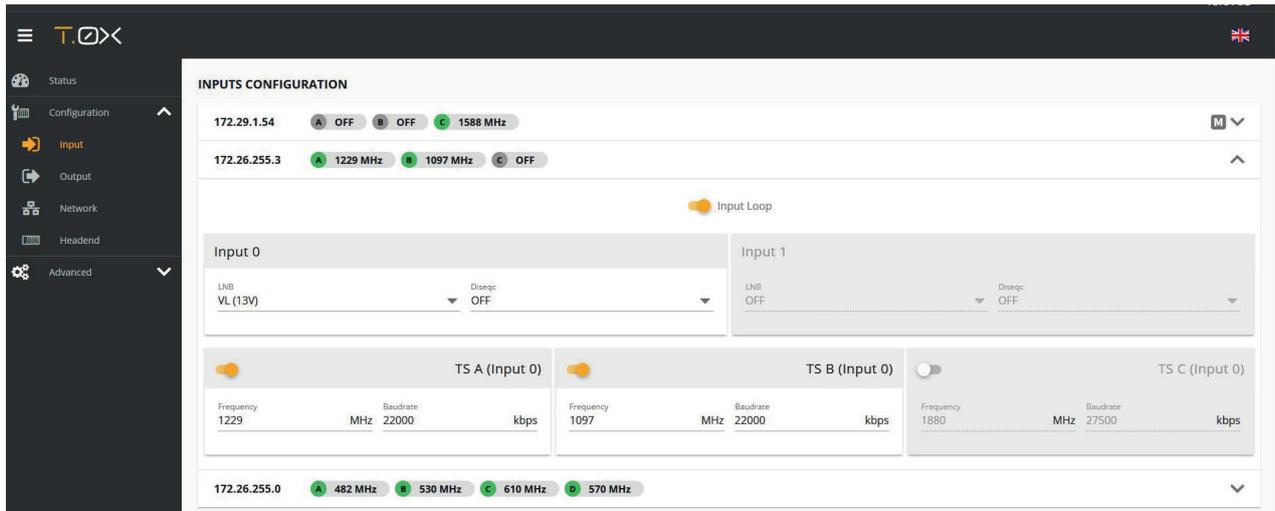
The screenshot shows the TOX interface with a sidebar on the left containing 'Status', 'Configuration', and 'Advanced' options. The main area is titled 'STATUS' and displays two input channels. The top channel (172.29.1.54) shows settings for A (OFF), B (OFF), C (1588 MHz), and D (12 / 68.4 - 49.4 Mbps) with a firmware version of FW v1.0.20. Below this, it lists three transponders: TS A, TS B, and TS C, each with parameters like Link Margin, C/N, Errors, Frequency, Baudrate, and Status. The bottom channel (172.26.255.3) shows settings for A (1229 MHz), B (1097 MHz), C (OFF), and D (13 / 41.2 - 36.1 Mbps) with FW v1.0.20. Below the status section is an 'IP Outputs' table with columns for ID, IP, Port, Service, Bitrate, and Status. The table lists five outputs with various services like FDF, CLAN TVE spa, RADIOS, and unnamed services, each with a specific bitrate and status (e.g., Pro-Idiom, Free-Stream). The bottom of the screenshot shows another channel header with settings for A (482 MHz), B (530 MHz), C (610 MHz), D (570 MHz), and E (21 / 85.4 - 84.8 Mbps) with FW v1.0.20.

Input Settings Menu

Ref 565840, 565801: The unit has three demodulators (TS A, TS B, and TS C) that receive satellite signal from two F connectors (Input 0 in upper connector and Input 1 in lower connector). Depending on how the loop mode is configured, one or two bands and polarities should be available for all demodulators (loop enabled). In the latter case, the first connector will deliver the signal to TS A and the second to TS B and TS C.

The parameters to be configured are:

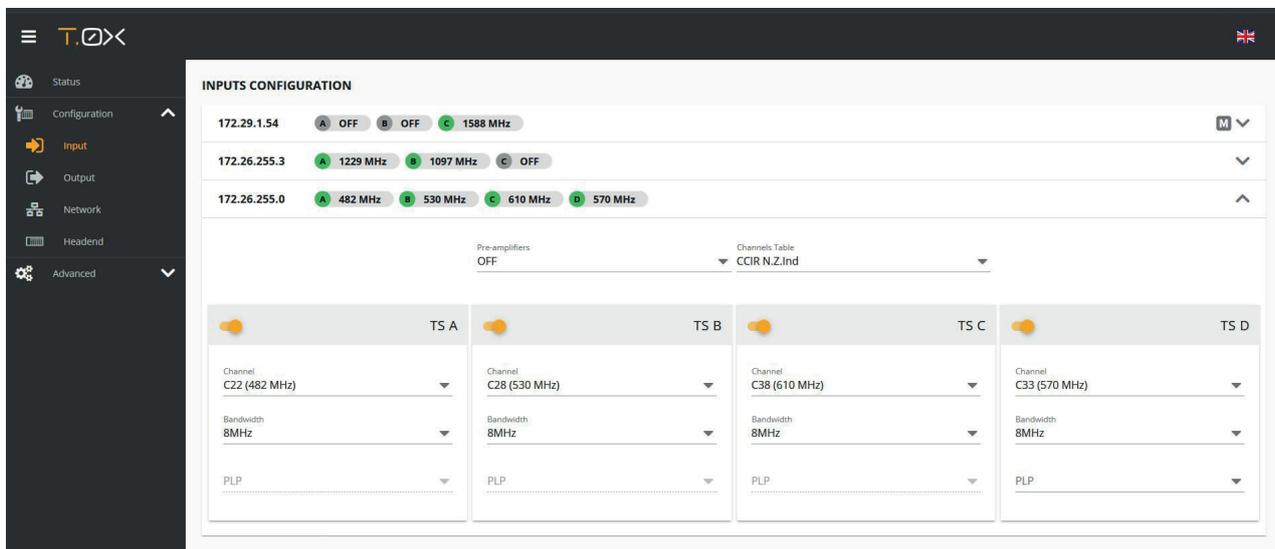
- Loop or no loop mode
- Powering of the LNB(s) (0, 13V, 13V tone, 17V, 17V tone)
- Satellite selection (A,B,C,D) with DiSeqC commands.
- Frequency (950-2150 MHz) and baud rate (2 to 45 Mbaud) of each satellite transponder.



Ref 565740, 565701: The unit has four demodulators connected to a single signal input, with the unit always operating in loop mode.

The parameters to be configured are:

- Input preamplifier powering (0, 12, 24V)
- Channel table or frequency mode selection
- Input frequency or channel
- Input bandwidth (1.7, 5, 6, 7, 8 MHz)
- PLP selection in the event multiple PLPs are detected in the input (only DVB-T2)



Output Settings Menu

On this screen, the services that will be distributed over IP (SPTS) in the output are selected. To add one or several services, press the + button.

The general status of the output is shown next to the unit's IP, where the number of outputs (N), maximum IP rate recorded since the last configuration (MAX), and the instant rate (INST) are indicated as follows:

$$N / \text{MAX} - \text{INST Mbps}$$

To activate the re-encryption of the services configured at DCY, select an encryption system (currently only Pro:Idiom).

OUTPUTS CONFIGURATION

172.29.1.54 12 / 68.4 - 44.9 Mbps

172.26.255.3 9 / 34.3 - 33.1 Mbps

DRM Encryption: Pro:Idiom

IP Outputs

<input type="checkbox"/>	Order	IP	Port	Status	Service	Actions
<input type="checkbox"/>	2	225.0.0.14	2001	DCY	CLAN TVE (TS A)	
<input type="checkbox"/>	3	225.0.0.15	2001	DCY	LA SEXTA (TS A)	
<input type="checkbox"/>	5	225.0.0.17	2001	DCY	HOLLYWOOD (TS A)	
<input type="checkbox"/>	6	225.0.0.19	2001	DCY	CLAN TVE spa (TS A)	
<input type="checkbox"/>	7	225.0.0.41	2001	ON	RADIOES (TS B)	
<input type="checkbox"/>	8	225.0.0.42	2001	ON	RADIOES ESP (TS B)	
<input type="checkbox"/>	9	225.0.0.46	2001	ON	BAJO DEMANDA (TS B)	

172.26.255.0 21 / 0.0 - 0.0 Mbps

APPLY CONFIGURATION

Multiple services can be added at once by selecting one base IP address and one base port, such as address or port auto-increment. At the time the service is selected, its bitrate and the encryption status at the input is indicated.

New IP Output

New IPs: 3 Base IP: 225.0.0.14 Base Port: 2001 Autoincrement Mode: IP

Search

<input type="checkbox"/>	TS	SID	Service Name	Bitrate
<input type="checkbox"/>	A	30652	FDF	3.5 Mbps
<input checked="" type="checkbox"/>	A	30654	CLAN TVE	3.7 Mbps
<input type="checkbox"/>	A	30655	LA SEXTA	4.4 Mbps
<input checked="" type="checkbox"/>	A	30656	LA 1	3.4 Mbps
<input type="checkbox"/>	A	30657	HOLLYWOOD	3.3 Mbps
<input type="checkbox"/>	A	30658	LA 2	4.4 Mbps
<input type="checkbox"/>	A	30659	TELECINCO	3.4 Mbps
<input checked="" type="checkbox"/>	A	30662	M.CineDoc&Roll	3.5 Mbps
<input type="checkbox"/>	A	30663	CUATRO	4.0 Mbps
<input type="checkbox"/>	A	30665	TNT	3.3 Mbps
<input type="checkbox"/>	A	30666	unnamed	0.0 Mbps
<input type="checkbox"/>	A	30667	unnamed	0.1 Mbps

CANCEL SAVE

Using , all parameters for each of the SPTS outputs can be edited: IP, port, and selected service.

The service parameters are configured in detail in the Advanced tab: name: decryption (ON/DCY), service_id, and PID filter configuration.

In the case of services at DCY, review the default configuration of the PIDs. Only the required PIDs, generally video and audio, should be set to DCY status. This recommendation is based on the fact that the CAMs have a limit to the number of PIDs they can decrypt.

NOTE 1: In the event the Pro:Idiom DRM is activated and within the limits imposed by this system, PIDs can be deleted automatically from the output. If this situation arises, the video and audio PIDs are always prioritized and the advanced version of the service will show a message indicating this circumstance.

NOTE 2: When the Pro:Idiom DRM is activated, there is an encryption limit of 8 services. Only 8 services can have DCY status, otherwise the website will not allow the configuration to be saved.

Editar Salida IP

ID 3 IP 225.0.0.15 Puerto 2001 LA SEXTA (TS A)

SERVICIO	AVANZADO	
ID del Servicio 30655	Nombre del Servicio <input type="checkbox"/> LA SEXTA	
Estado DCY		
<input checked="" type="checkbox"/> Editar PIDs		
PID	Type	Status
162	Video	DCY
88	Audio (spa)	DCY
38	Data	OFF
208	Data	OFF
222	Data	OFF
309	Data	OFF
213	Data	OFF

CANCELAR GUARDAR

Network Settings Menu

Each unit has two Ethernet RJ45 connectors, which can be used on a single network, the default setting, or on two separate networks, one as a control and the other for video distribution.

On this screen, users can enable the separation of these networks and configure the IP address, subnet mask, and default port link, as well as the DHCP mode, for each of them. The unit's MAC is also shown on this menu.

In the event the networks are separated, users must configure different networks on both interfaces.

A unit configured as the Master with separated networks will only be able to detect and configure the subordinate units connected to its ETH2 interface.

NETWORK CONFIGURATION

192.168.112.3 M MAC: 00:0E:7C:2D:01:36

Split Net Ports

Interface	DHCP	IP	Netmask	Gateway
ETH1	OFF	192.168.112.3	255.255.255.0	192.168.112.1
ETH2	OFF	172.168.112.3	255.255.255.0	172.168.112.1

192.168.112.10 ^ MAC: 00:0E:7C:2A:FF:03

Split Net Ports

Interface	DHCP	IP	Netmask	Gateway
ETH1	ON	192.168.112.10	255.255.255.0	192.168.112.1

192.168.112.9 v

192.168.112.18 v

192.168.112.60 v

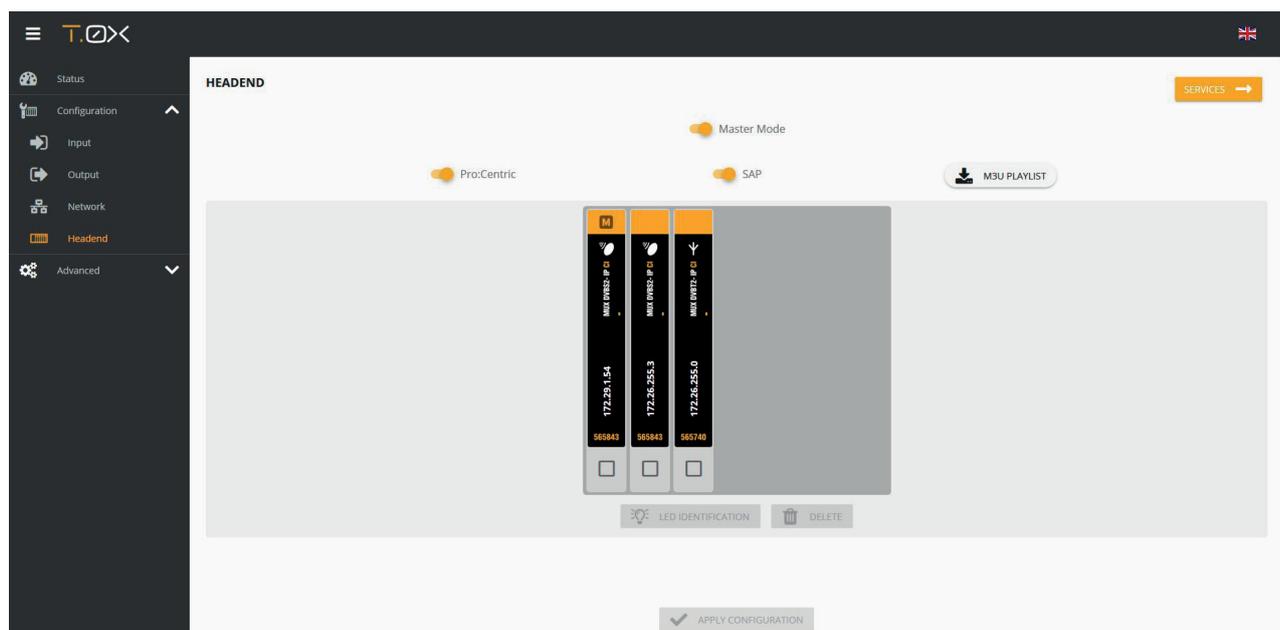
Headend Menu

The Master mode can be configured under this screen and the unit can be identified physically with the flashing LED button on the front. If the Master mode is activated, the unit searches for other units connected to the network (ETH2) and presents a list of the modules it has found.

The units can be ordered visually in order to identify them more easily with the real position of the headend. The “assembly recommendations” section indicates that the units must be installed in ascending IP order, configuring the left-most unit as the Master. If this is done properly, the order suggested by the interface will already be correct, as they are listed in ascending IP order by default. Users will have to confirm the position suggested or modify it as they see fit, after which time they must Apply the configuration. This must be done at least once for the Master to allow the other modules to be configured. Likewise, when the Master detects the appearance of a new module in the headend, it will send the user to this screen, so that they can accept the position of the new module or modify it as they wish. The configuration must be applied in order to continue. Each of the modules can be identified by temporarily activating the flash on the front LED. They can be eliminated if they have been removed from the network.

This view shows potential errors detected in the headend modules. The different potential cases are shown with an exclamation point:

- COM_ERROR: the module is not responding in the headend.
- AUTH_ERROR: the module has a different password than the master, so it cannot be configured. The module’s password must be changed.
- EMR_ERROR: the module only allows firmware to be updated due to a stop error.



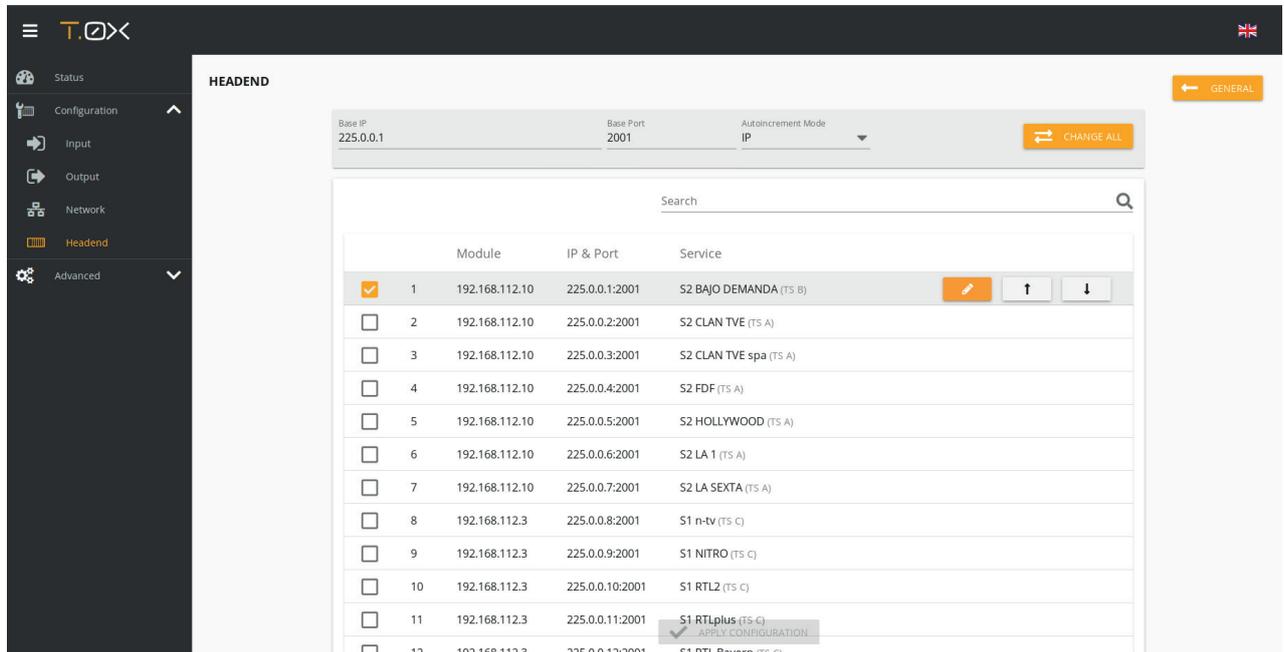
The list of all services can be downloaded in .m3u format from this headend window.

The services view allows the IPs/ports for all SPTS outputs to be modified and services to be ordered. The order established by the user on this screen will be used by the Pro:Centric service and in the .m3u file.

In the event Master mode is activated, there are two additional options:

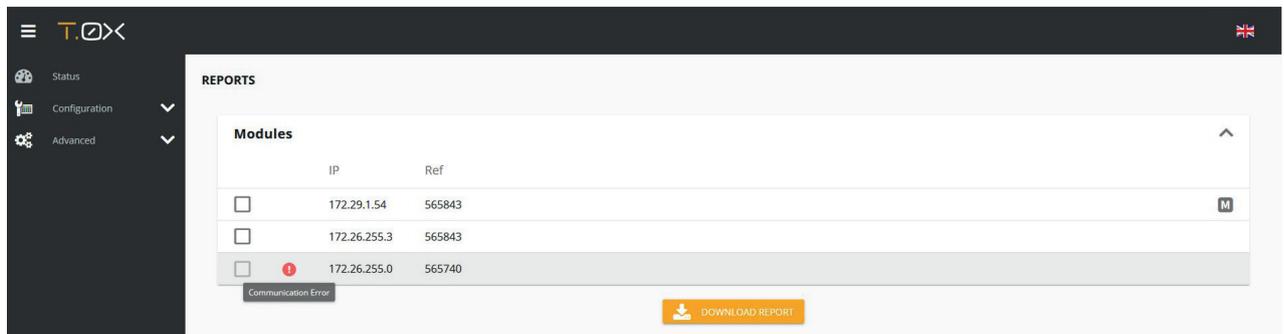
- Pro:Centric: the unit provides an announcement application for services distributed over IP. This is a very simple functionality to allow channels to be chosen in the event that an external Pro:Centric server is not available in the installation (middleware). To configure this service in the set top boxes supported by it, the ETH2 IP and port 80 must be indicated.
- SAP (Session Announcement Protocol): Using this standard protocol, the master module publishes the list of services distributed by the headend. If separate networks are configured, publication is done on the ETH2 network.

A unit configured as the Master offers the possibility of ordering all headend services. This order will also be the one used when creating the m3u file and in the service list provided by the Pro:Centric server.



Advanced Menu Reports

From this screen, users can download report files on the selected unit to facilitate debugging in the event of an incident. In the event an error is detected with any of the modules, an exclamation point appears indicating the type of error, as shown in the following image.

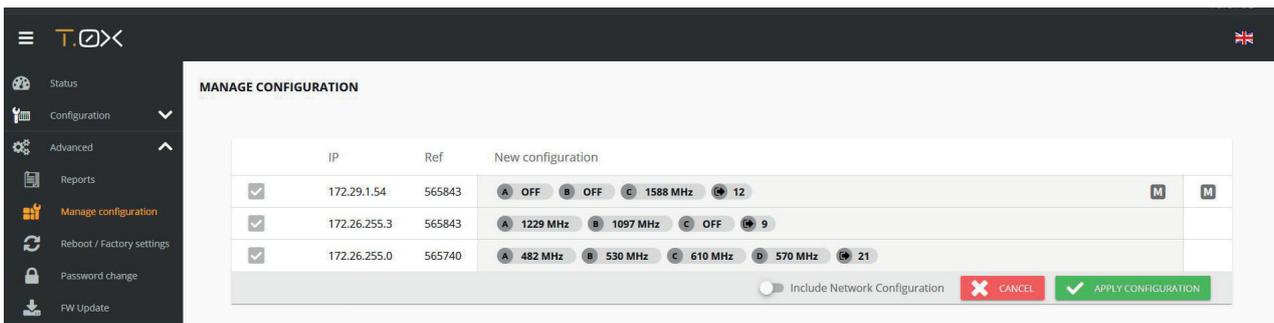


Advanced Menu Settings

On this screen, users can upload and download headend config files to allow for the simple duplication of the configuration of a unit or a full headend.

When configurations are imported, the number of modules selected must coincide with the number of modules in the imported file. Users must activate the option “Include network configuration” if they would like to overwrite the current network options with the options of the imported file. This option must be handled carefully, otherwise users may end up unable to communicate with the unit as they will go offline.

EN



Advanced Menu Restart and Factory Reset

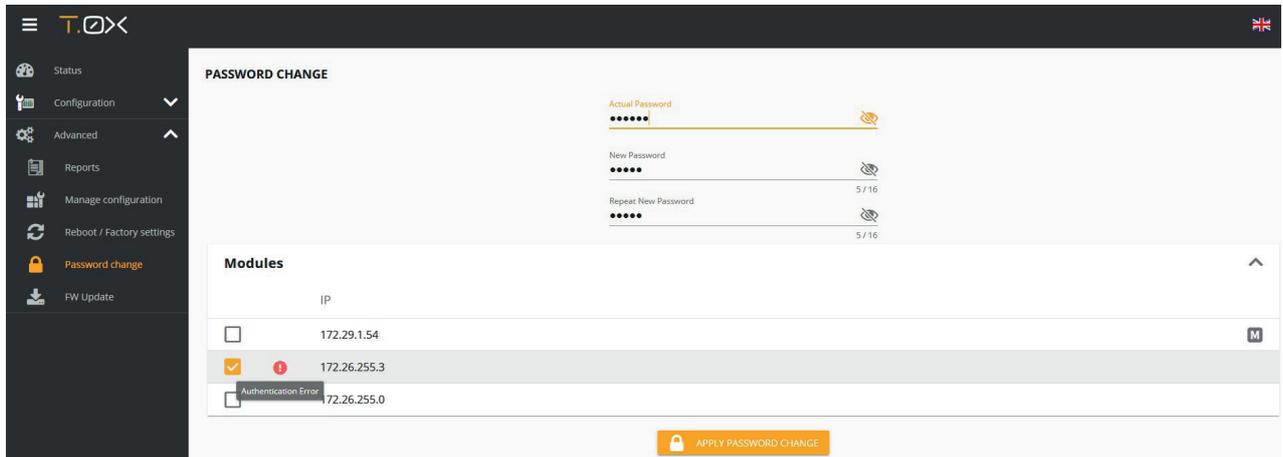
The unit in question can be restarted or returned to the default (factory reset).



Advanced Menu Password Change

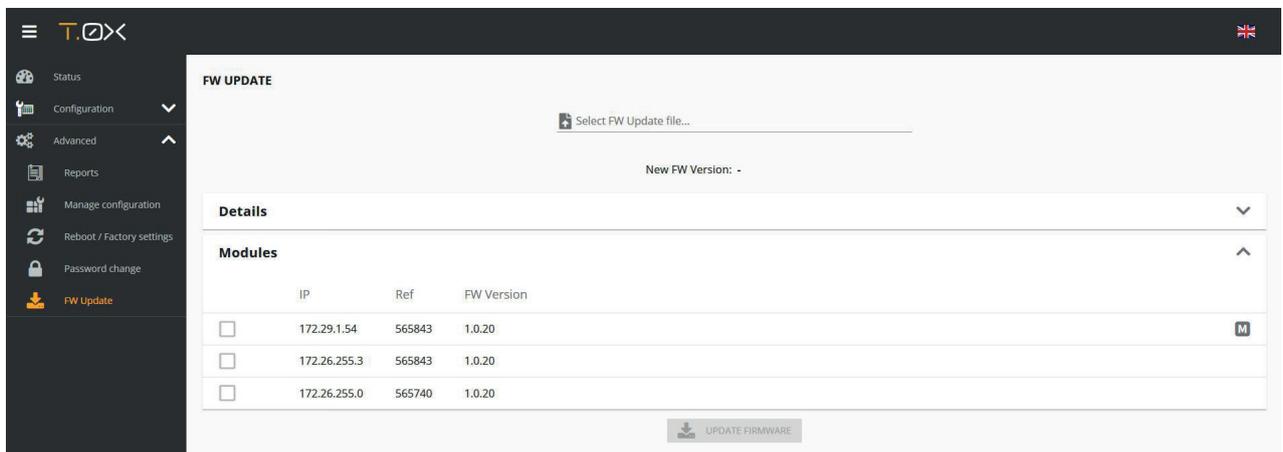
On this screen users can change their headend access password.

When the password is changed, the master unit applies the change to all the units it is controlling (units with the same password). The password for only one of the connected units cannot be changed unless it is a unit with an authentication error. In this case, the password for this unit does not coincide with the password for the Master and cannot be configured. Users can select the unit with the authentication error and change the password to the Master password provided they know the module's old password.



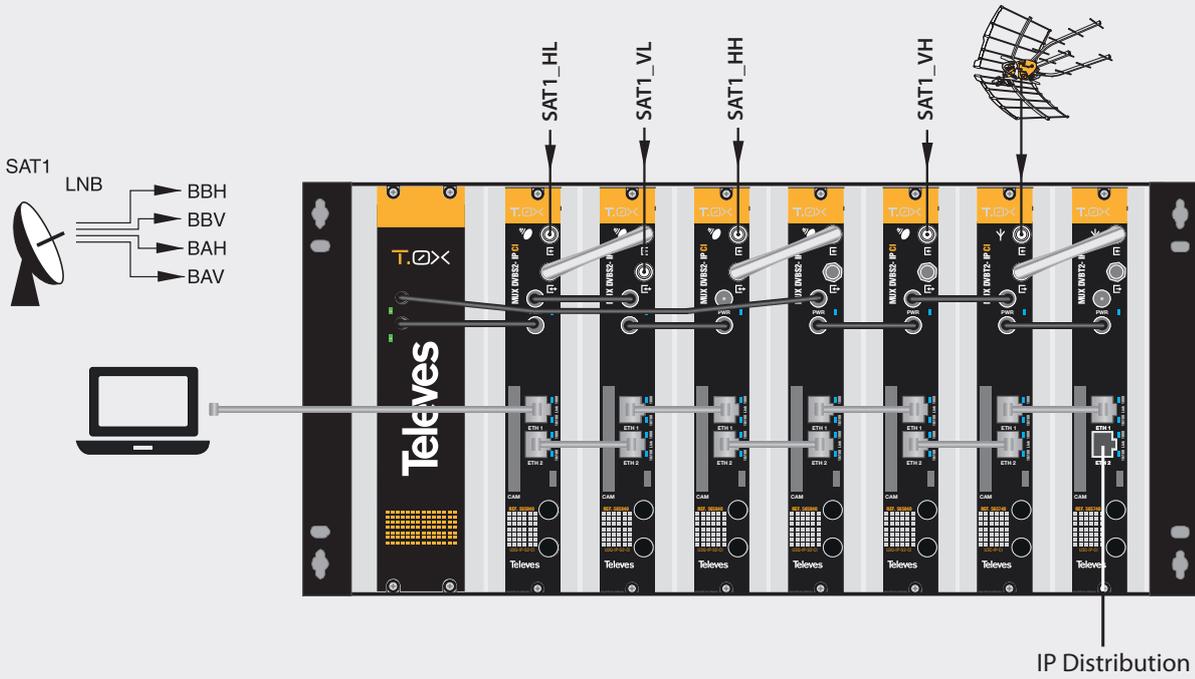
Advanced Menu Firmware Update

The headend modules can be updated with a UPG file. Simply select the update file and click the “Update FW” button.



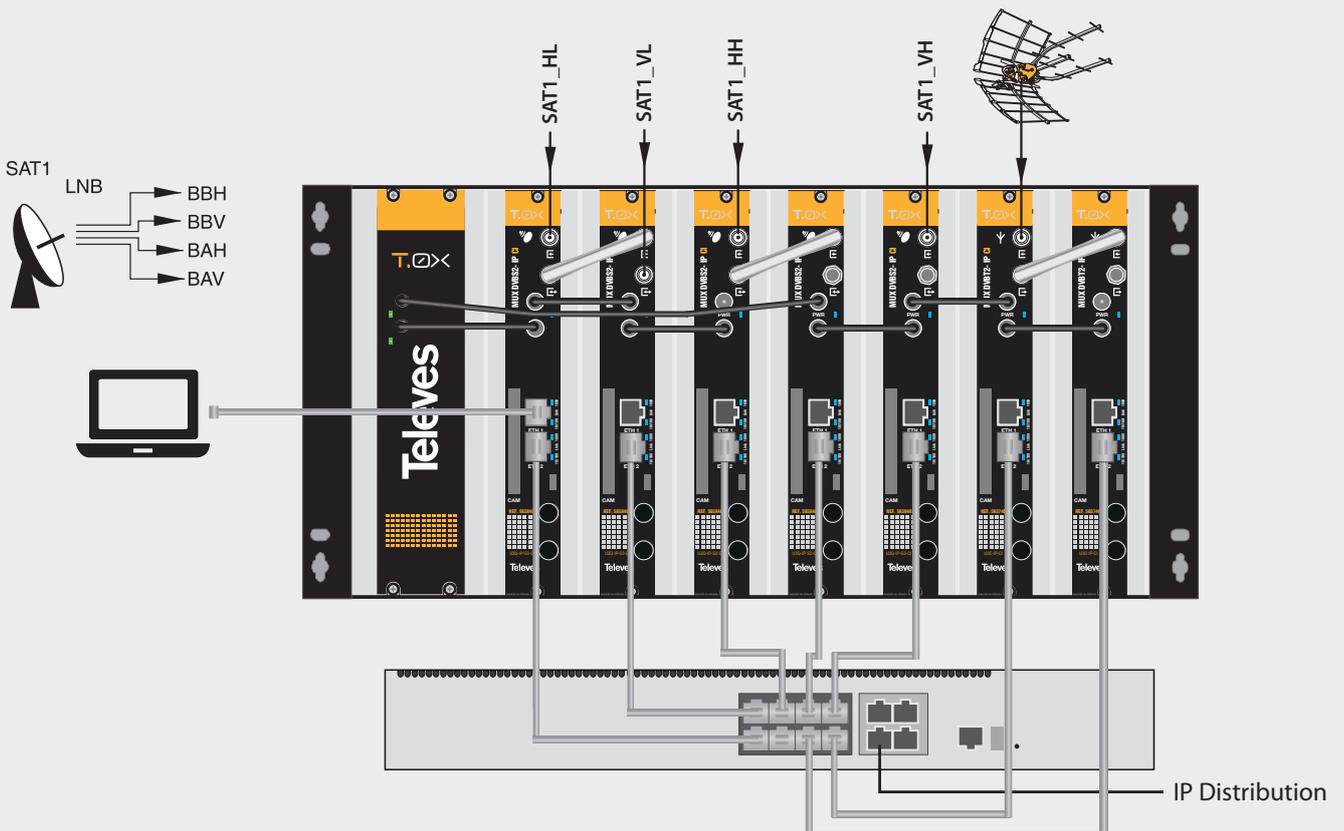
6. Application Examples

Example 1: Interconnection via internal switch of the units. Non-master units must be configured with a single Ethernet (“Split Net Ports” to OFF).



EN

Example 2: Interconnection via external switch.

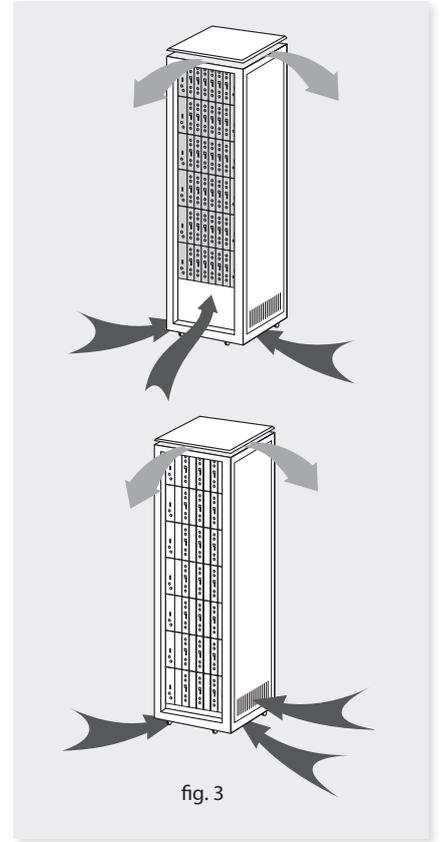
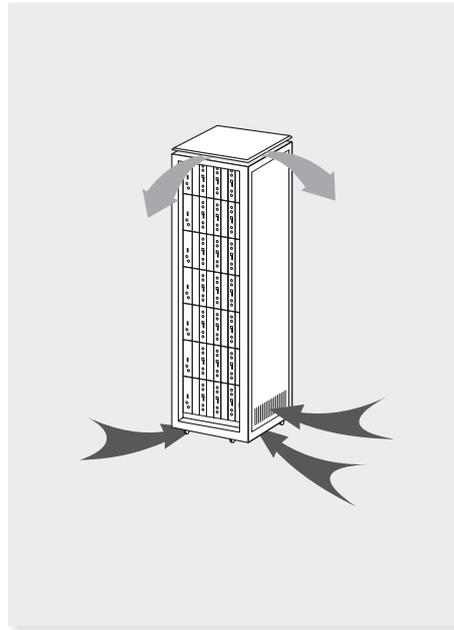
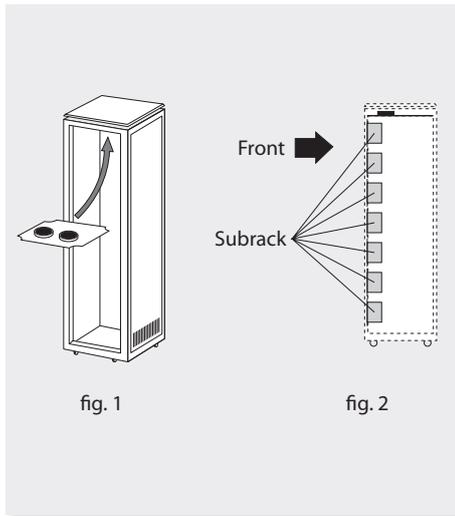


7. Rack Mount Standards (max. 49 MUX CI T-0X - 7 subracks 5u. tall - 8.7")

7.1. Installing Rack with Ventilation

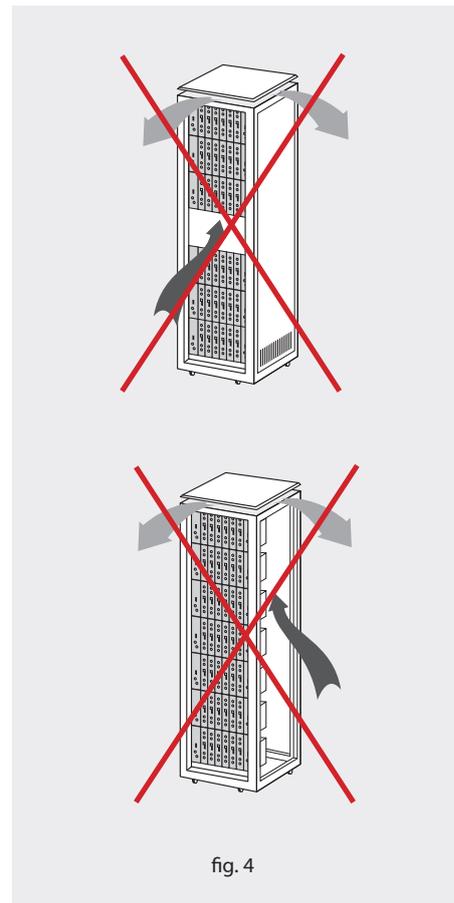
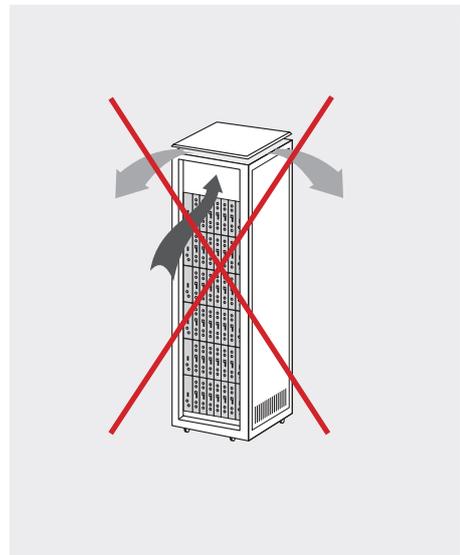
To encourage air renewal and circulation inside the rack, thereby reducing the temperature of the units and improving their features, installing 2 25W ventilation units is recommended, especially when the rack with the units is in a warm environment above 45°C.

These ventilators will be placed on a plate bolted to the top of the rack, fig. 1 and 2. Thus, the ventilators will circulate fresh air entering the back of the cabinet (fig. 3), and expel it through the aperture (3 to 5 cm) at the top.



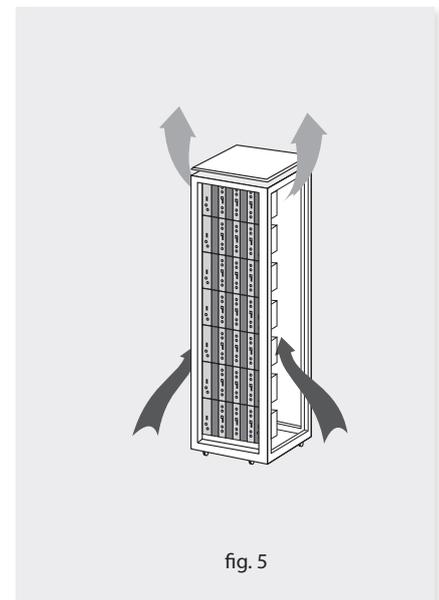
This cycle must flow correctly and the following should be avoided:

- Opening the side doors, as this will cause the ventilators to take in exterior air instead of interior air.
- Placing objects next to the rack that cover the air intake or output.
- In cases where the rack is not complete, subracks should be placed from top to bottom without leaving any space in between, fig 4.



7.2. Installing Rack without Ventilation

To install rack mount units without ventilation, when the rack is in locations with an ambient temperature around 45°C, the rack should be installed fully open, e.g., doing without the side doors to facilitate unit ventilation, fig. 5.

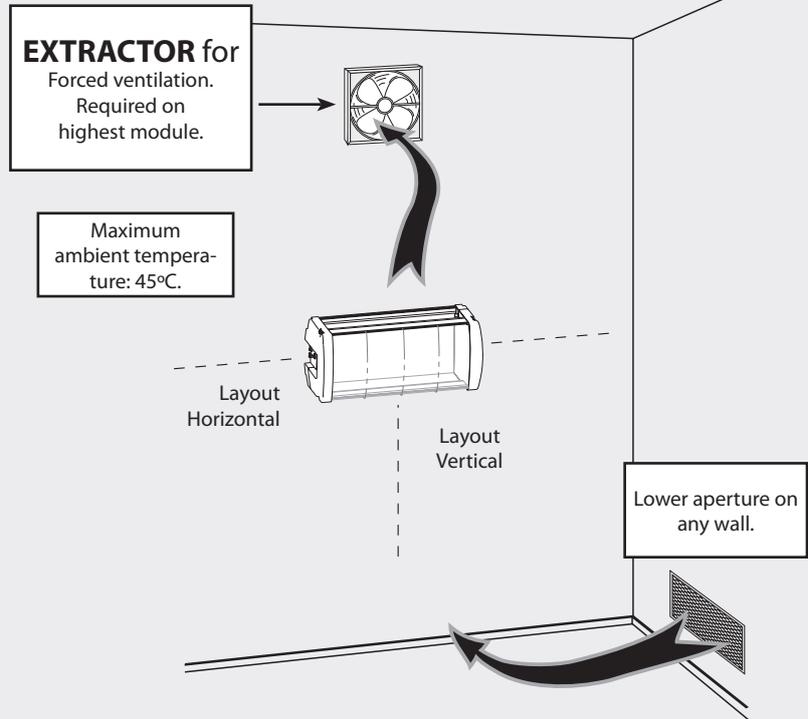


8. Enclosure Mounting Standards

IMPORTANT

The ventilation diagram recommended both for horizontal and vertical layouts is the one set out in the figure.

The maximum temperature near the top-most enclosure cannot exceed 45°C, both for horizontal and vertical layouts.



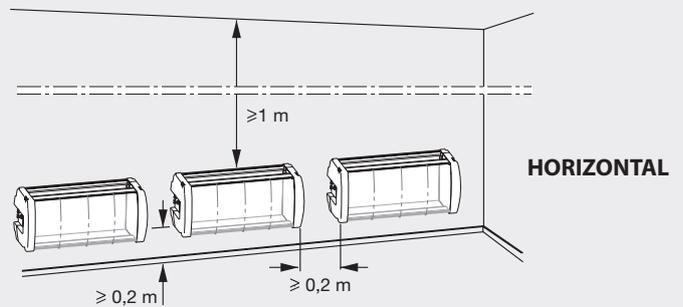
EN

IMPORTANT

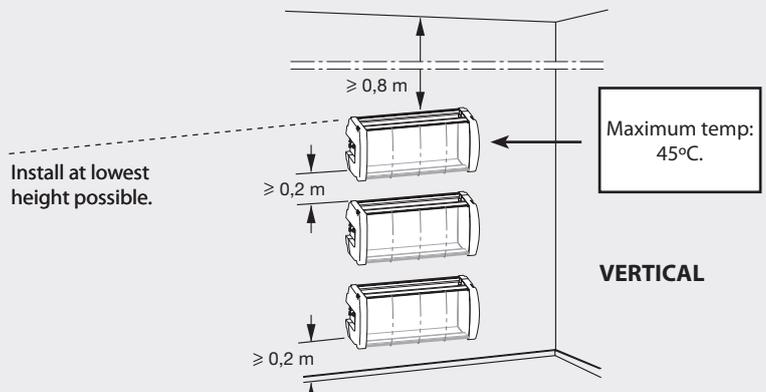
The recommended layout for enclosures is horizontal, placing them at the lowest height possible.

In the event using a horizontal layout is not possible, use a vertical layout.

The clearance requirements indicated in the enclosed diagrams must be followed.



HORIZONTAL



VERTICAL

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