Televes®

T.OX SERIES

Refs. 563101, 563301

EN DVBS2 - COFDM / COFDM CI

User manual

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EN

1. Technical characteristics

1.1. DVBS2-COFDM ref. 563101, DVBS2-COFDM CI ref. 563301

Satellite Demodulator	Input frequency	950 - 2150 MHz	Through loss	< 1,5 dB typ.
	Symbol rate	10 - 30 Mbaud DVB-S2 (QPSK - 8PSK) 2 - 42,5 Mbaud DVB-S (QPSK)	Modulation	DVB-S2 (QPSK, 8PSK) DVB-S (QPSK)
	Frequency steps	1 MHz	Internal FEC	LDPC (9/10, 8/9, 5/6, 4/5, 3/4, 2/3, 3/5, 1/2)
	Input/Output connectors	"F" female	External FEC	BCH (Bose-Chaudhuri-Hocquenghem)
	Input impedance	75 ohm.	Roll-off factor	20%, 25%, 35%
	LNB power supply	13/17V/ OFF 22KHz (ON/OFF)	Input VSWR	10 dB min.
COFDM Modulator	Modulation format	QPSK, 16QAM, 64QAM	Scrambling	DVB ET300744
	Guard interva	1/4, 1/8, 1/16, 1/32	Interleaving	DVB ET300744
	FEC	1/2, 2/3, 3/4, 5/6, 7/8	Cell_id	Selectable
	Bandwidth	7 MHz, 8 MHz	Output spectrum	Normal / Inverted (Selec.)
RF output	Output frequency	177 - 266 / 474 - 858 MHz (CH mode) 45- 862 MHz (frequency mode)	Through loss	< 1,5 dB typ.
	Frequency steps	125 / 166 KHz	Return loss	> 12 dB typ.
	Maximum output level	80 ±5 dBµV (progr.)	Input/Output connectors	"F" female.
	Attenuation	>15 dB (prog)	Output impedance	75 ohm.
General	Consumption @ 24V⎓ (with signal)*	563101: 270 mA (LNB power OFF) 480 mA (LNB power ON)	563301: 280 mA typ. (no CAM inserted; LNB power OFF) 330 mA typ. (CAM inserted; LNB power OFF) 500 mA typ. (no CAM inserted; LNB power ON) 540 mA typ. (CAM inserted; LNB power ON)	
	Protection index	IP20		

* The unit's consumption with CAM will depend on the type of CAM being used (only ref. 563301).
For the LNB it is considered a standard consumption of 300 mA.
The technical characteristics described are defined for a maximum ambient temperature of 45°C (113ºF). Forced ventilation is used for higher temperatures.

1.2. Technical specs. Broaband Amplifiers

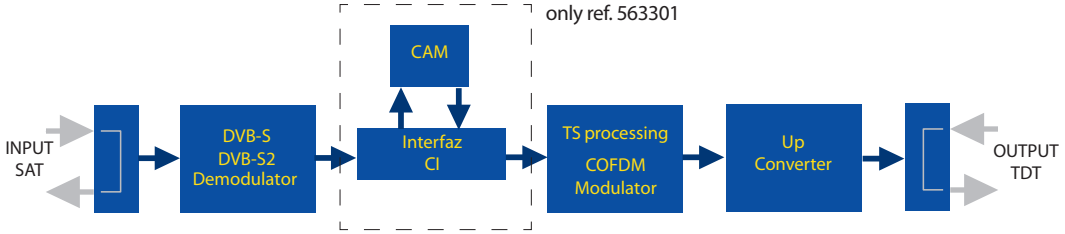
Amplifier 5575	Frequency range	46 ... 862 MHz	Connector	"F"
	Gain	44 ± 2,5 dB	Power supply	24 V⎓
	Regulation margin	20 dB	Consumption at 24 V⎓	450 mA
	Output level (60 dB)	105 dBµV (42 CH CENELEC)	Test socket	-30 dB
Amplifier 451202	Frequency range (1)	47 ... 862 MHz	Connector	"F"
	Gain (1)	40 - 53 dB (selec.)	Power supply	196 - 264 V~ 50/60 Hz
	Maximum output level (1)	129 dBµV (typ.) (DIN 45004B)	Max. Power	16 W
	Frequency range (2)	5 ... 30 MHz	Test socket	-20 dB
	Gain (2)	20/ -3 dB (typ.)		
	Maximum output level (2)	129/ --- dBµV (typ.) (DIN 45004B)		

(1) Main channel (2) Return channel (active/passive)

1.3. Technical specs. Power Supply Unit

Power supply unit 5629	Mains voltage	196 - 264 V~ 50/60 Hz	Total max. current (outpur 1 + output 2)	5A (24V⎓)
	Output voltage	24V⎓	Max. current per output	4A (24V⎓)

1.4. Blocks Diagram



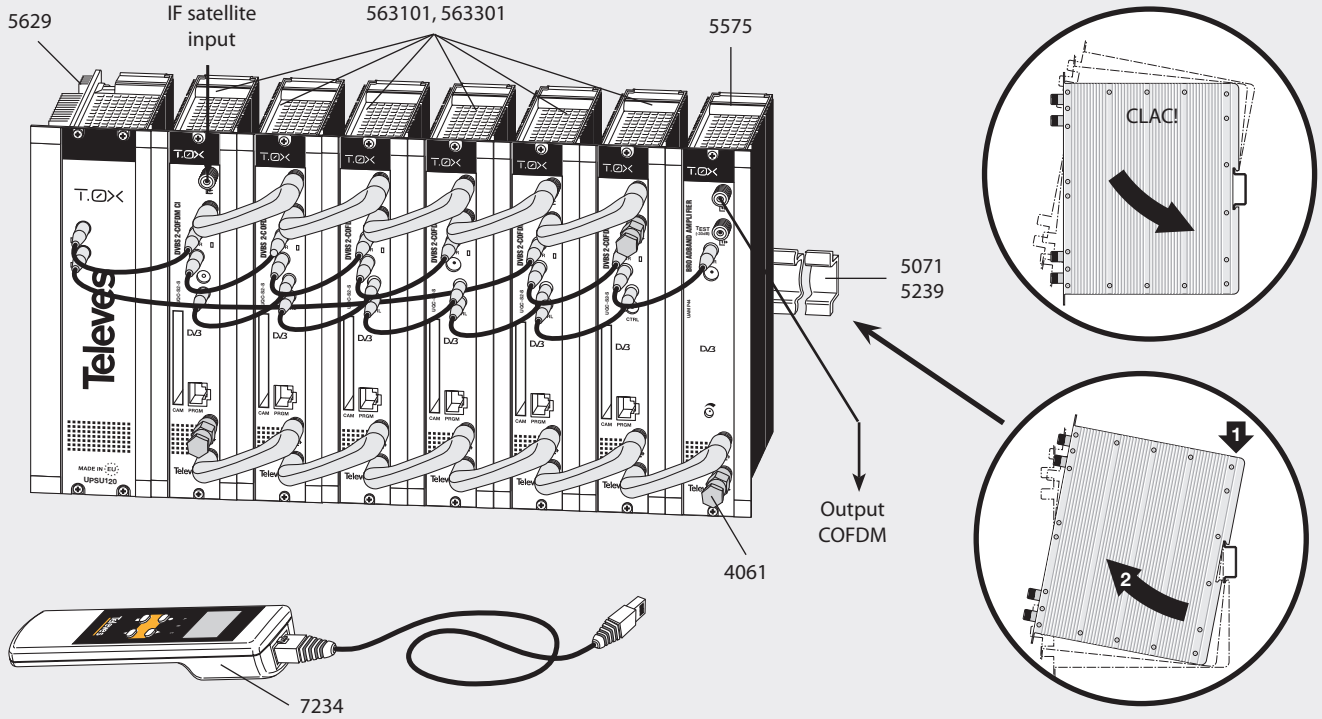
2. Description of references

Product Range	
563101	T-0X DVBS2-COFDM
563301	T-0X DVBS2-COFDM CI
5575	Broadband Amplifier 44dB 120dBµV T-0X
451202	Amplifier DTKom (47 - 862 MHz)
5559	Headend Manager CDC-IP T-0X
555901	Headend Manager CDC-IP GSM T-0X
5629	Power supply unit 24VDC/5A T-0X

Accessories	
7234	Universal Programmer
5071	T03-T05-T-0X Mounting rail (50 cm)
5239	T03-T05-T-0X Mounting rail.12 Modules+PSU (56 cm)
5301	19" Subrack frame
507202	T-0X Lockable cabinet with Ventilation Unit (7 Modules + PSU)
4061	75 Ohm DC-Block load
4058	75 Ohm Load
422601	T05 to T-0X Power connection lead (40 cm)
422602	T05 to T-0X Management connection lead (40 cm)
422603	T-0X Management connection lead (1m)
5673	Blank plate 50 mm

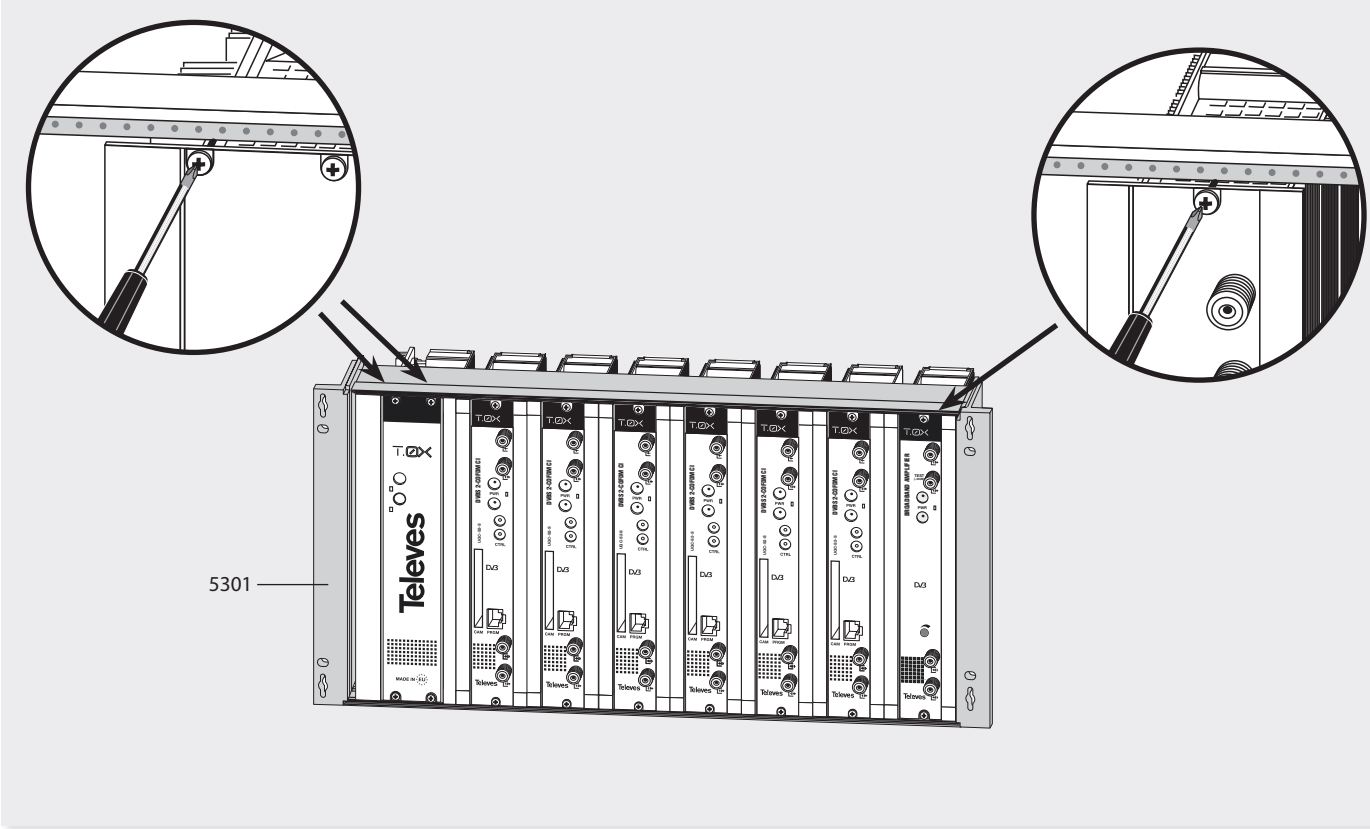
3. Mounting

3.1. Wall mounting



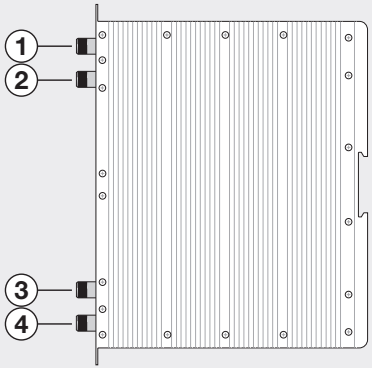
NOTE: The use of both source outputs is recommended, balancing the consumption. For example, 4+3 or 3+4 modules

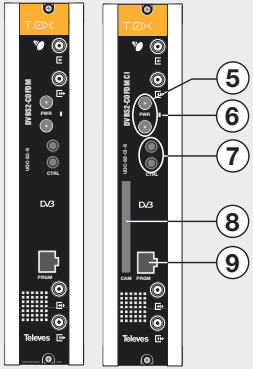
3.2. 19” rack mounting



4. Identification of the system elements

4.1. Introduction





Ref. 563101 Ref. 563301

1. IF satellite input
2. IF satellite output
3. RF input
4. RF output
5. Module power supply input
6. Status LED
7. Control BUS connector
8. Input to insert CAM (only ref. 563301)
9. Programmer / PC connector

Ref. 563301

Insert the smart card completely into the CAM slot before powering modules. Card contacts looking left and forwards when it is being inserted.

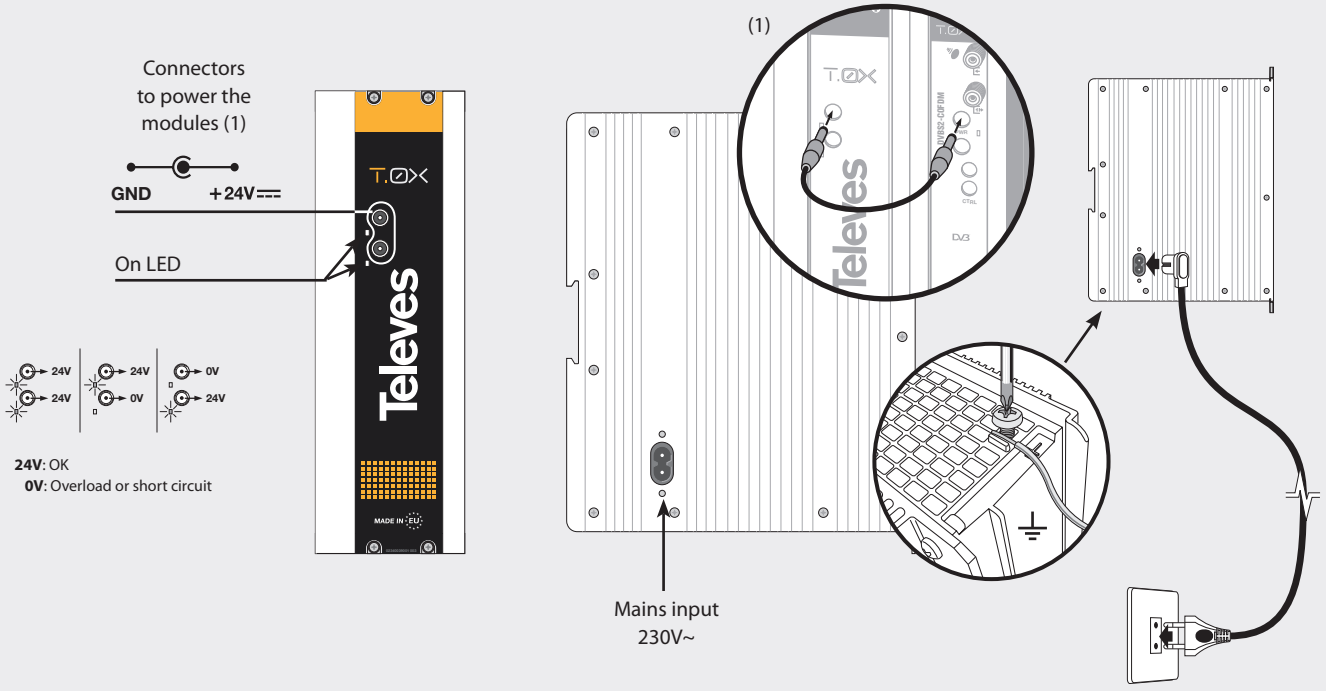
The DVBS2 transmodulator with COFDM CI receives a satellite transponder in some DVBS (QPSK) or DVBS2 (QPSK or 8PSK) modulation formats and demodulates it by obtaining an MPEG-2 transport package.

The MPEG2 transport package is then modulated in COFDM format and converted to the output channel (UHF or VHF and with a maximum bandwidth of 8 MHz) using an agile up-converter.

Additionally, ref. 563301 incorporates a Common Interface slot for inserting a conditional access module (CAM) to permit the unscrambling of services.

The programming of the transmodulator operating parameters (input frequency, output channel, modulation format and adaptation of services mainly) is performed through the universal programmer (ref. 7234).

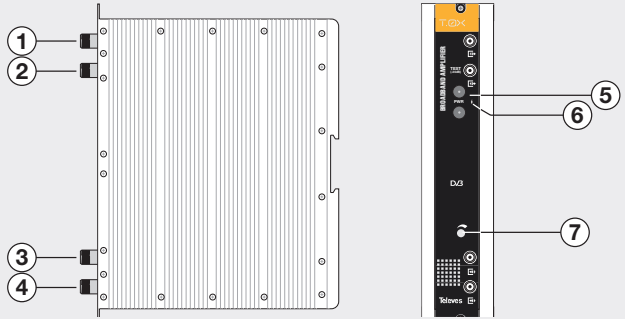
4.2. Power supply unit



NOTES: - The power source can supply a maximum of **seven** DVBS2-COFDM (CI) T0X modules.
- Whenever the demand of power exceeds 4A (max. current for each output), it is necessary to distribute it between the two powering outputs of the PSU.

4.3. Broadband amplifier

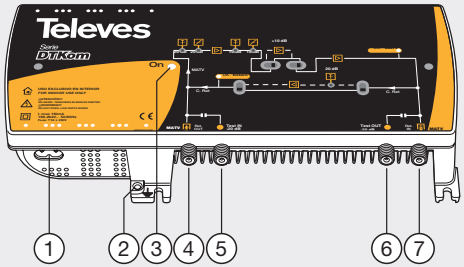
OPTION "A" - 5575



1. RF output
2. Test socket (-30 dB)
3. RF input
4. RF input
5. Powering BUS connectors
6. Status LED
7. Gain attenuator

It features two input connectors, to allow mixing of channels coming out from two different systems. If only one of the inputs is used, it is recommended to load the unused input with a 75 ohm terminator, ref 4061.
As the rest of T-0X units, this amplifier is powered via the 24 Vdc power BUS.

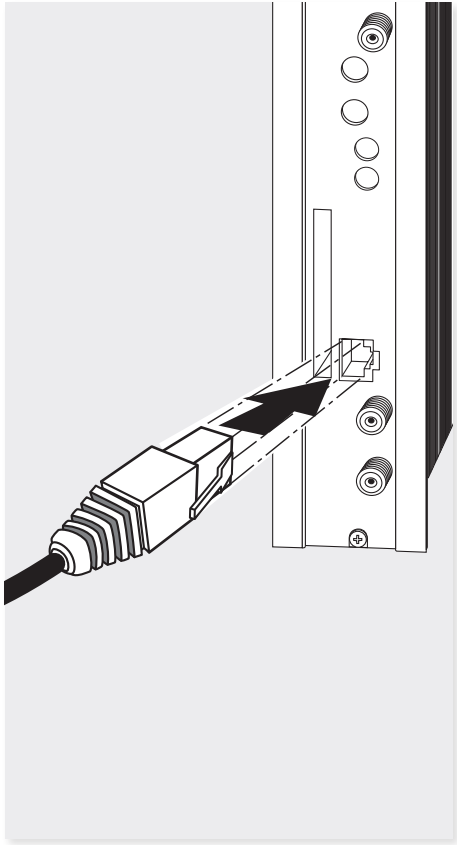
OPTION "B" - 451202



1. Mains power supply input (196-264 V~ 50/60 Hz)
2. Ground connection
3. Power LED
4. MATV input
   Return channel output
5. MATV input test
6. MATV output test
7. MATV output
   Return channel input

The broadband amplifier amplifies the channels generated in the transmodulators, covering the frequency margins from 47 to 862 MHz

4.4. Universal Programmer PCT 5.0



The programmer consists of 4 buttons:

- ● (short press) - Selection of parameter (positioning of the cursor).
- ▲-▼ Modification of the parameter chosen by the cursor (flashing)
- ■ (short press) - Change menu
- ● (long press) - Change between Principal and Extended menus
- ■ (long press) - Save changes to memory
- ● + ▲ Cloning menu.
- ■ + ● + ▲ Increases the contrast of the screen.
- ■ + ● + ▼ Decreases the contrast of the screen.

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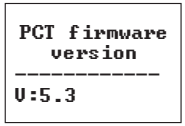
5. - Instructions for use

Insert the programmer in the front connector of the module programming ("PRGM"). First, the programmer's firmware version will appear:



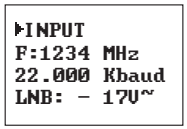
The firmware version of the DVBS2 – COFDM CI module is shown below:

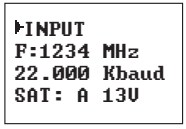
By pressing ● + ▲, you access the "cloning" functions, through which you can copy the configuration of the transmodulator into the Remote Control Unit and, in the same way, download this configuration from the Remote Control Unit to the transmodulator.
In the remote control unit manual you will find a decription of the cloning functions.

5.1. Normal menu

a. Input menu

The first main menu lets you select the **input frequency**, the **symbol rate** of the input signal and the **power supply** of the LNB converter and it allows the **selection of satellite** using DISEqC.





To make a change press the key ● until the desired parameter flashes. This field can be then be changed by means of the keys ▲ and ▼.

The range of values allowed for the input frequency is **950-2150 MHz**, whereas for the symbol rate the range is **2 to 42.5 Mbaud** for DVB-S and **10 to 30 Mbaud** for DVB-S2.

DiSEqC settings: It allows to select a satellite from four possible (A, B, C and D) through DiSEqC commands, for example when the input of the unit is the output of a multiswitch.

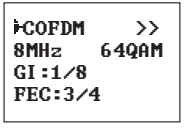
LNB power: The possible values for the power of the converter are: 0V, 13V, 13V 22KHz tone, 17V, 17V 22KHz tone. The tone is represented with the symbol "~".

In case of selecting 0V, the selection of satellite is disabled while selecting a satellite from 0V it will change automatically to 13V (is not possible select DiSEqC with 0V power supply).

In case of a 'short-circuit' in the input connector (power supply enabled for the LNB) the LED on the front of the module flashes until this condition disappears.

b. COFDM1 modulation menu

The next main menu allows various COFDM output modulation parameters to be selected:



The parameters that can be selected in this menu and their possible values are as follows:

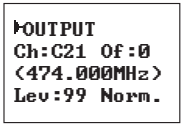
- **Bandwidth** of the COFDM signal: 7MHz or 8MHz.
- **Modulation**: QPSK, 16QAM or 64QAM.
- **Guard interval**: 1/4, 1/8, 1/16 or 1/32.
- **FEC**: 1/2, 2/3, 3/4, 5/6 or 7/8.

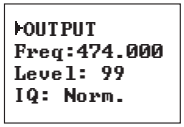
c. COFDM2 modulation menu

In the next main menu you can select the parameter cell_id (cell identifier) of the COFDM modulation:

d. Output menu

The next main menu shows the **frequency or output channel**, the output offset (only in channel mode), the **level control** and the selection of output **spectrum inversion**.





To change the frequency press the key ● until the desired parameter flashes. This field can be then be changed by means of the keys ▲ and ▼.

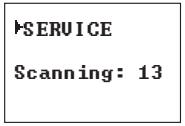
In **frequency mode** you can select any output frequency value between 45 - 862 MHz. The decimal part depends on the difference of frequency chosen (*see extended menu b*). If you select a difference of 125 KHz the permitted values for the decimal part are 0, 125, 250, 375, 500, 625, 750 and 875 KHz. With a difference of 166 KHz the possible values are 0, 166, 333, 500, 666 and 833 KHz.
The output level control permits values between 00 and 99.
The possible values for the output spectrum inversion are "Norm." (not inverted) and 'Inv.' (spectrum inversion).

In **channel mode** it lets you select an output channel from the table selected as well as the *offset* regarding the channel's receiving point frequency. The permitted offset values depend on the frequency difference selected (see configuration menu):

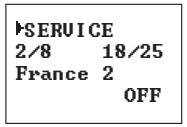
- Steps of 125KHz: ±4 (-500, -375, -250, -125, 0 , 125, 250, 375, 500 KHz)
- Steps of 166KHz: ±3 (-500, -333, -166, 0 , 166, 333, 500 KHz).

e. Service menu

This menu shows the list of transport stream services selected. Each time the user selects a new input transport, the unit performs a search for the services.
During that process the unit will display the following message, indicating the number of services found:



Once the search is complete, it shows the list of services with the following information:



The service order number as well as the total number of services in the multiplex (in service figure 2 of 8 available) are indicated, the statistics (in the figure 18/25), the name of the service and if the user has selected it for removal in the output (OFF) unscrambling (DCY) or to move it to output without changing (ON).

The meaning of the statistics is as follows: the first number indicates the percentage of the output

that occupies the service indicated. The second number indicates the percentage of the output that is free. In the example, France 2 will occupy 18% of the output (it is OFF so it is removed) and there is 25% of free space. It is easy to see that, in principle, this service could be activated (ON or DCY) because there is still sufficient capacity to output. The free percentage to output is only updated once the configuration of the services has been recorded.
Additionally, the status (scrambled or clear) of the service, both at the input and output are indicated in the upper right hand corner:

- Scrambled service at input and output.
- Scrambled Service at input and clear at output.
- Scrambled service at input.

f. Measurements menu 1

The following menu provides an indication of the input **signal quality** using an estimate of C/N (dB) and the link margin (dB).

```
▸MONITOR >>
C/N:14.1dB

L.M.: 7.7dB
```

g. Measurements menu 2

This menu indicates the **occupancy rate** of the module's output as well as the maximum achieved. If too many services are selected it will result in an output overflow and this condition is indicated.

```
▸MONITOR
Occupancy:
76%
Max:80%
```

```
▸MONITOR
Occupancy:
100%
Overflow!
```

Occupancy values higher than 82% are not recommended. This is a read only menu, which disables the keys ▲ and ▼.
You can reset the maximum occupation by pressing the key ●.

5.2. Extended menu

When the ● key is held down for more than 3 seconds the unit shows a series of less frequently used menus called *extended menus*.

a. Configuration menu 1

This menu enables the **address** of the unit to be selected (to be controlled through a CDC Headend Control).
It also allows selection of the **output frequency difference** (125 or 166KHz), the **table of channels** to use or **frequency mode** operation.

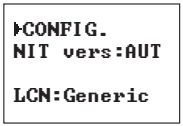
```
▸CONFIG.  >>
CDC Adr: 001
Step: 166KHz
CCIR N.Z.Ind
```

The channel tables that can be selected are:

- CCIR,
- China
- Chile
- Italy
- France
- OIR channels
- Ireland
- South Africa
- Poland
- Australia

b. Configuration menu 2

Next menu allows you to select the **version of the output NIT** and the **type of LCN** (Logical Channel Number).
NIT's version can be selected between 0 and 31 or "AUT", in which case the output NIT will have the same version as the input.

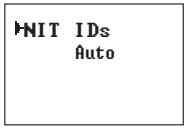


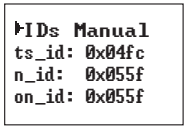
Regarding the **Logical Channel Number** (LCN), no all receivers understood in the same way this information. Some countries use some variation on the standard to be applied to this configuration to work properly. Possible values are **Generic**, **UK**, **Nordig 1**, **Nordig 2**.

c. Identifier menu

Some DVB-T receivers can present problems receiving transmodulator channels which share the same identifier (*transport_stream_id*). To avoid these cases the user can change the following DVBT output multiplex identifiers: *transport_stream_id* (ts_id), *network_id* (n_id) and *original_network_id* (on_id).

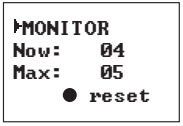
You can choose **Auto** mode (the identifiers do not change) or **Manual** mode.
When switching from Auto mode to Manual the identifiers received by satellite are displayed and the user can change them.





d. Temperature measurement menu

The following menu provides an indication of the unit's **current temperature** as well as the maximum recorded. The maximum can be reset by pressing the key ●.



The recommended operating margins are as follows:

- Optimum operation : **0-6**
- High temperature: **7-8**
- Excessive temperature: **9-10**

If the maximum recorded is outside the optimal range the installation should be adjusted to try to lower the temperature.

If the DVBS2-COFDM (CI) modules have been installed in a housing ref. 5069 and the temperature of one of the modules is outside of the optimal operating range, the ventilation unit will have to be installed ref. 5334. To check whether this change is effective the maximum can be reset and its value checked after a given time.

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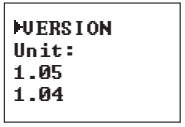
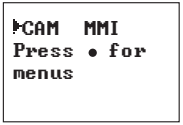
e. Versions menu

In this menu the user is shown the firmware versions for the unit and the COFDM (FPGA) modulator.



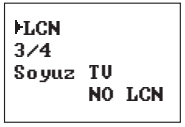
f. CAM (MMI) user interface menu (only ref. 563301)

This menu allows access to the conditional access module (CAM) user interface, for example, to check versions or card rights:



g. LCN menu

Assign a LCN (Logical Channel Number) (between 1 and 1023) to the existing services at the output (marked as ON or DCY).

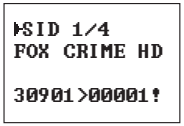


To change the LCN press keys ● and ▲ or ▼. If select "0000" as LCN will show "NO LCN".

When it is detected that the LCN displayed value is assigned to more than one service remind admiration (!) to the left of the value, will be displayed to indicate to the user that must assign other LCN.

h. Remapping menu of service_ids

This menu allows to set the value of the **service id** output for each of the configured services to ON / DCY. Using this option you can change a service by another previously to OFF and keep on the same service id, allowing that a large number of receivers to detect the change automatically without the need to re- scan.

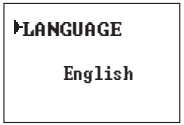


At the top of the screen shows the index (order) of the current service and the total number services present in the output. Then is the name of the service and finally, on the bottom line of the screen, the corresponding number with the service id original and the value of service id in the output.

It is user's responsibility to avoid setting the same SID for different services. When detects that tje shown SID value is assigned to more than one service or the value is 0, will be displayed a symbol of admiration (!) to the right of the value, to indicate to the user that should change it.

i. Language menu

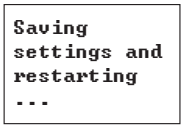
The last extended menu enables the menu language to be selected (Spanish / English / German / French / Italian):



Pressing keys ▲ and ▼ changes the selected language.

5.3. Parameters saving

Once a parameter is modified to the desired value in any menu (normal or extended), to save the settings press ■ for three seconds. The display will show the following indication:



If the configuration paremeters are modified but not saved, the previous configuration is retrieved after 30 sec. in other words, the changes are discarded.

6. - Selecting the DVB-T output mode in DVBS2-COFDM (CI) transmodulators

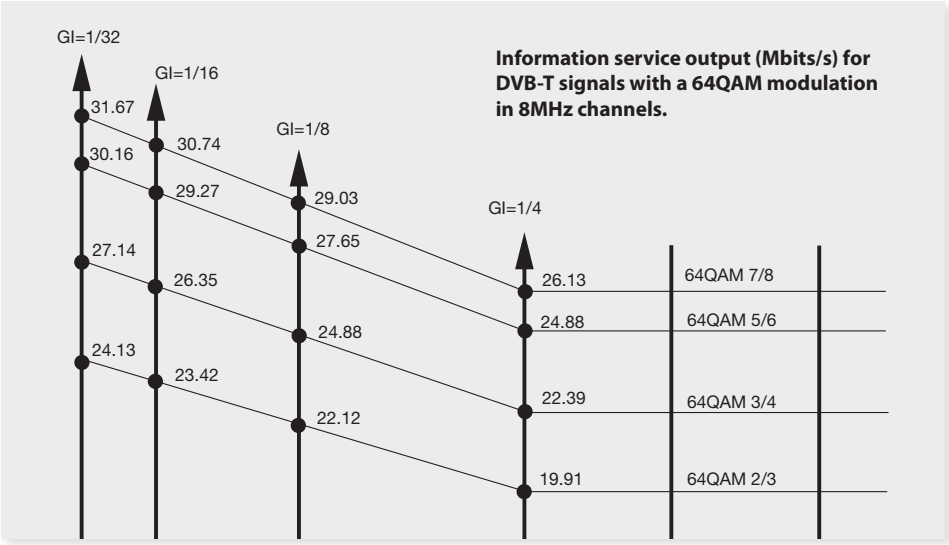
The standard DVB-T defines various possible operation modes which enable the DVB-T signal generated to adjust to the conditions of the transmission channel. The signal for instance can travel through a very noisy channel (low C/N) but will bring with it reception errors. The signal may also reach the receiver through a number of paths, one main path and another or various secondary ones (ECHOES).

Put simply, we could say that the DVB-T operation modes can be characterised by the following:

1 - Type of modulation
2 - Level of protection against Errors
3 - Level of protection against Echoes

In the following chart, one can see a subgroup of the possible DVB-T modes that indicates the information service output (Mbits/s) that each one can transmit.
The greater the information service output of the DVB-T mode selected, the greater the number of TV and Radio services which can be transmitted through the signal.

NOTE: *We suggest choosing one of the DVBT modes from the chart. Those modes which have not been included have a lower information service output.*



One the right hand side of the chart are the different unit step functions (64 QAM 2/3, 64QAM 3/4, 64QAM5/6, 64QAM 7/8), each one corresponds to a degree of protection against errors which the DVB-T signal can carry.

The higher the step selected, the greater the information service output (Mbits/s) of the relevant DVB-T mode, although it´s level of protection against errors will be inferior and it will require a higher C/N to receive the signal.

We will now look at the level of protection against echoes.
To do so, one must select one of the four possible vertical axes that appear on the left side of the previous chart (GI=1/4, GI=1/8, GI=1/16, GI=1/32).

The further left the selected axis is, the greater the DVB-T mode´s information service output (Mbits/s) will be, but its level of protection against echoes will be lower, in other words, the maximum supported echo delay will be inferior.

In short, the higher and further to the left the DVB-T mode selected is, the more powerful this mode will be in terms of information service output (Mbits/sg).
On the other hand, the lower and further to the right the DVB- T mode selected is, the more robust this mode will be in terms of interferences which could affect the signal.

The terrestrial transmission channel (transmission aerial - terrestrial atmosphere – receiving aerial) is very complex, with numerous interferences that can potentially affect the DVB-T signal.

Due to this, in Spain, the DVB- T signal is generally disseminated with the following features:

(1) Type of modulation: 64QAM
(2) Level of protection against Errors: 2/3
(3) Level of protection against echoes: 1/4

If one looks at the previous chart, one can see that the information service output of the DVB-T mode is 19.91 Mbits/s.

In our case, the DVB-T signal generated by the DVBS2-COFDM (CI) transmodulator, is not going to be transmitted through the terrestrial transmission channel, but through a channel that is generally much more benign: the distribution network of the building.

NOTE: *The better the quality of the building´s distribution network, the better the transmission channel will be when transmitting signals.*

Given that our transmission channel is better, we can use the DVBS2-COFDM (CI) transmodulator, by selecting a higher DVB-T output mode than that used by terrestrial channels to disseminate. This will have a greater information service output (Mbits/s) and will therefore enable us to include a greater number of TV and Radio
services.

Therefore, when setting up the DVBS2- COFDM (CI) transmodulators, one should follow a procedure such as the one below:

1 - Select one of the stronger DVB-T output modes.
E.g. 64QAM-5/6 with GI=1/32, information service output of 30.16 Mbits/s.

2 - Check the quality of the signal received at various points within the building.

If the signal quality is good, the technician can consider using an even stronger DVB-T mode, in other words, one with a greater information service output. On the other hand, in cases where the signal quality is insufficient, they must consider using a more robust DVB-T mode.

In most cases, the distribution network within the building should support those DVB-T modes that have a lower protection level against echoes. Therefore, if a more robust mode is necessary, one should first try using, one at a time, greater protection levels against errors.

7. - Controlling the Device

This version of the DVBS2-COFDM (CI) T0X allows configuration and monitoring via a PC, both locally and remotely.

a. Local control

You need to have the TSuite software package (version v2.1.4.x32 or higher), as well as a special cable (provided with the programme) that connects a PC serial port to the DVBS2-COFDM (CI) T0X "PRGM" connector.
The programme can be used to set up and read all the operating parameters, as well as to monitor the correct operation of the device.

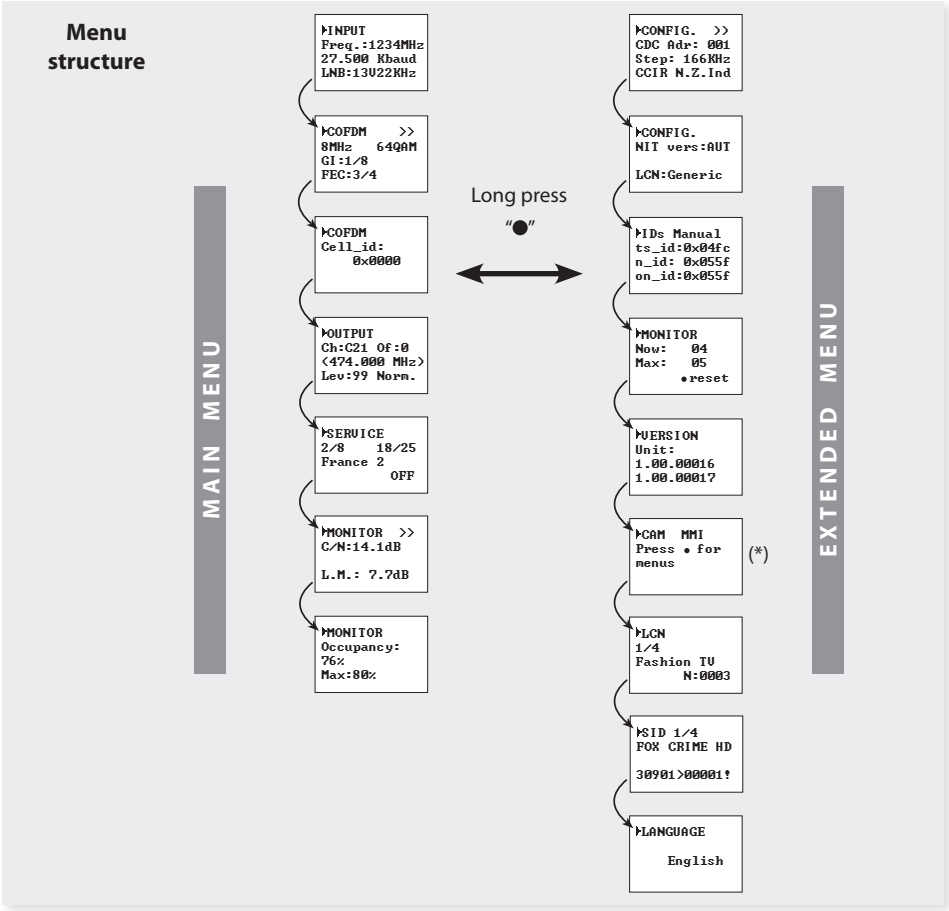
b. Remote control

It is necessary to have a Headend Control module (ref. 555901) that includes the programme mentioned above, and the corresponding modem connected to a phone line.

Once the communication with the headend control has been established, all the controllable devices that have been installed in the headend can be accessed. In this case it is essential that each element be programmed with a different device address between 1 and 254.

EN

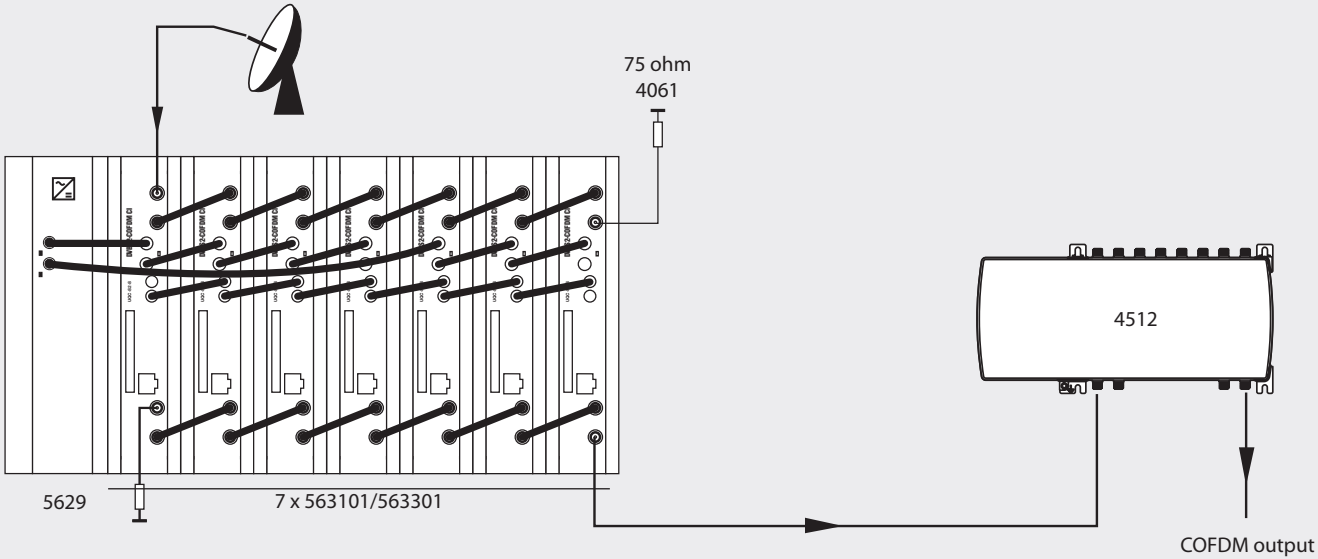
Menu structure



(*) Only ref. 563301

8. Application example

Distribution of 7 channels of DVBS2-COFDM CI T0X



The diagram shows the assembly for the distribution of 7 channels of DVBS2-COFDM (CI) T0X

9. Norms for rack mounting (max. 35 DVBS2-COFDM (CI) T0X - 7 subracks with 5 units in height - 8,7")

9.1. Installation of the rack with ventilation facilities

To facilitate the renewal and circulation of the air inside the rack, and the temperature of the units and thus improve their characteristics, it is advisable to place 2 ventilation units of 25W, particularly when the rack with the DVBS2-COFDM (CI) T0X is located in warm place, with a temperature higher than 45°C.

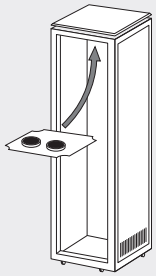


fig. 1

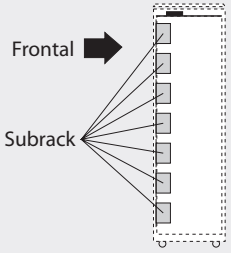
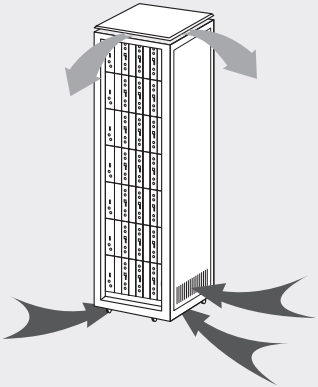


fig. 2

These ventilators will be placed on a tray, that is screwed onto the top part of the Rack, fig. 1 and 2. This way, the ventilators will force the fresh air entering from the base of the cabinet, to circulate between the modules and be expelled through a gap on top of the cabinet (3-5 cm approx.). See fig. 3.



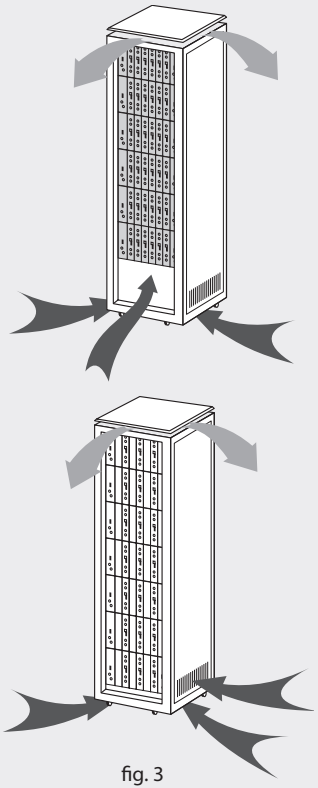


fig. 3

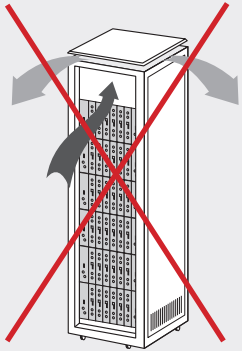
EN

It is very important that this process operates correctly, therefore the following must be observed:

- Do not open the side doors, as this would cause the ventilators to extract the air from the outside rather than the air in the inside of the rack.

- Do not place objects close to the rack that may block the entry and exit points of the air.

- If the rack is not complete, the subracks must be placed from the top downwards without leaving any gaps in between, fig. 4.



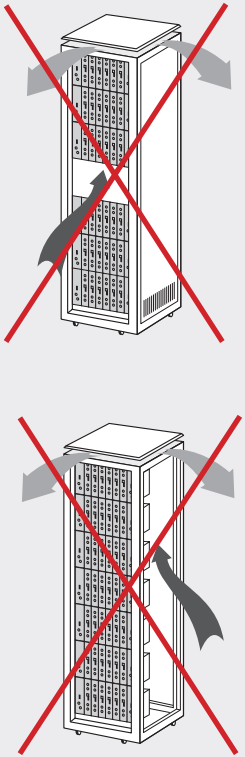


fig. 4

9.2. Installation of the rack without ventilation facilities

To install the units in racks without installation facilities, and when the rack is located in a place with a temperature of around 45°C, it is advisable to place the rack completely open, in other words, do not use the side doors. This is to facilitate the ventilation of the units , fig. 5.

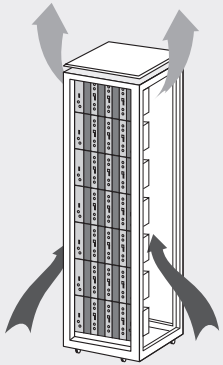


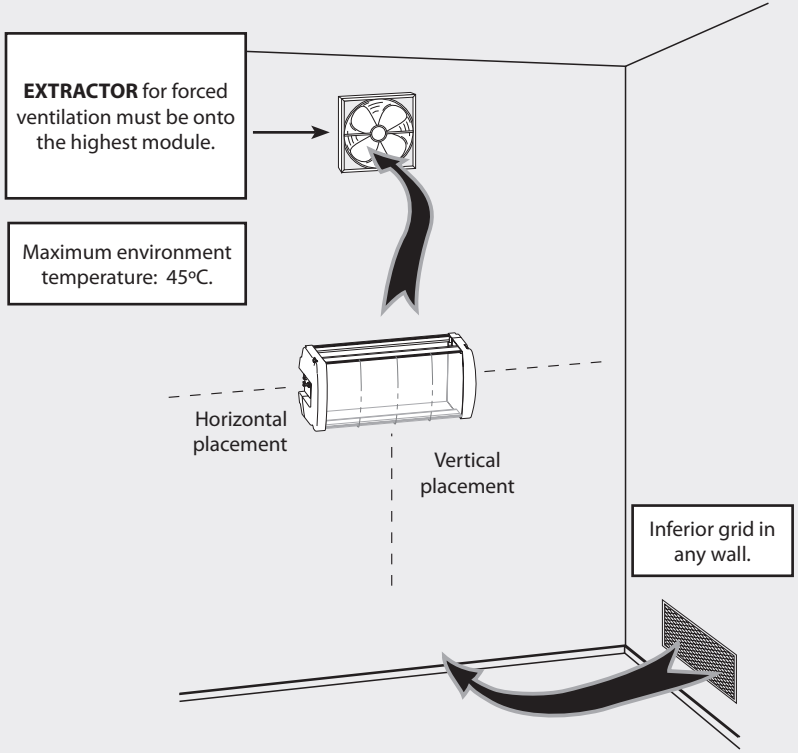
fig. 5

10. Norms for cabinet mounting

IMPORTANT

The scheme of recommended ventilation is the one in the figure in any case of cabinet placement (horizontal or vertical).

The maximum temperature permitted surrounding the highest cabinet is 45ºC in both ways of placement, horizontal or vertical way.



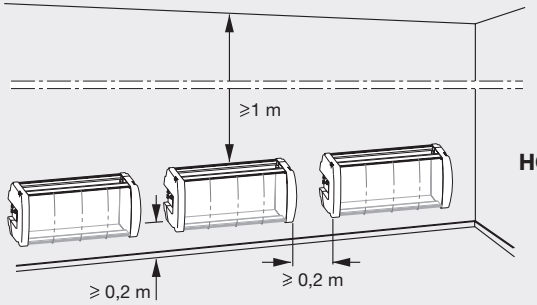
EN

IMPORTANT

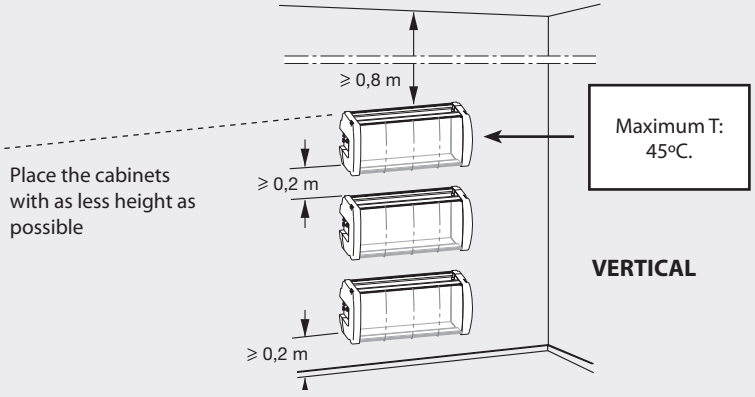
Horizontal placement of the cabinets is strongly recommended, hanging them with as less height as possible.

If the horizontal placement is impossible, then vertical placement is allowed.

Respect the recommended minimum distances in the attached schemes.



HORIZONTAL



VERTICAL

A. Channels table

Table1		Table2		Table3		Table4		Table5		Table6		Table7		Table8		Table9		Table10	
CCIR		China/Taiwan		Chile		Italy		France		OIR channels		Ireland		South-Afric		Poland (OIR)		Australia	
C05	177,50	7	179,00	6	177,00	D	177,50	L05	178,75	R06	178,00	5	178,00	4	178,00	K06	178,00	6	177,50
C06	184,50	8	187,00	7	183,00	E	186,00	L06	186,75	R07	186,00	6	186,00	5	186,00	K07	186,00	7	184,50
C07	191,50	9	195,00	8	189,00	F	194,50	L07	194,75	R08	194,00	7	194,00	6	194,00	K08	194,00	8	191,50
C08	198,50	10	203,00	9	195,00	G	203,50	L08	202,75	R09	202,00	8	202,00	7	202,00	K09	202,00	9	198,50
C09	205,50	11	211,00	10	201,00	H	212,50	L09	210,75	R10	210,00	9	210,00	8	210,00	K10	210,00	9A	205,50
C10	212,50	12	219,00	11	207,00	H1	219,50	L10	218,75	R11	218,00	10	218,00	9	218,00	K11	218,00	10-o	211,50
C11	219,50	C21	474,00	12	213,00	H2	226,50	C21	474,00	R12	226,00	11	226,00	10	226,00	K12	226,00	10	212,50
C12	226,50	C22	482,00	22	479,00	C21	474,00	C22	482,00	C21	474,00	C21	474,00	C21	474,00	C21	474,00	11-o	218,50
C21	474,00	C23	490,00	23	485,00	C22	482,00	C23	490,00	C22	482,00	C22	482,00	C22	482,00	C22	482,00	11	219,50
C22	482,00	C24	498,00	24	491,00	C23	490,00	C24	498,00	C23	490,00	C23	490,00	C23	490,00	C23	490,00	12	226,50
C23	490,00	C25	506,00	25	497,00	C24	498,00	C25	506,00	C24	498,00	C24	498,00	C24	498,00	C24	498,00	S45	473,50
C24	498,00	C26	514,00	26	503,00	C25	506,00	C26	514,00	C25	506,00	C25	506,00	C25	506,00	C25	506,00	H21	480,50
C25	506,00	C27	522,00	27	509,00	C26	514,00	C27	522,00	C26	514,00	C26	514,00	C26	514,00	C26	514,00	H22	487,50
C26	514,00	C28	530,00	28	515,00	C27	522,00	C28	530,00	C27	522,00	C27	522,00	C27	522,00	C27	522,00	H23	494,50
C27	522,00	C29	538,00	29	521,00	C28	530,00	C29	538,00	C28	530,00	C28	530,00	C28	530,00	C28	530,00	H24	501,50
C28	530,00	C30	546,00	30	527,00	C29	538,00	C30	546,00	C29	538,00	C29	538,00	C29	538,00	C29	538,00	H25	508,50
C29	538,00	C31	554,00	31	533,00	C30	546,00	C31	554,00	C30	546,00	C30	546,00	C30	546,00	C30	546,00	H26	515,50
C30	546,00	C32	562,00	32	539,00	C31	554,00	C32	562,00	C31	554,00	C31	554,00	C31	554,00	C31	554,00	H27	522,50
C31	554,00	C33	570,00	33	545,00	C32	562,00	C33	570,00	C32	562,00	C32	562,00	C32	562,00	C32	562,00	H28	529,50
C32	562,00	C34	578,00	34	551,00	C33	570,00	C34	578,00	C33	570,00	C33	570,00	C33	570,00	C33	570,00	H29	536,50
C33	570,00	C35	586,00	35	557,00	C34	578,00	C35	586,00	C34	578,00	C34	578,00	C34	578,00	C34	578,00	H30	543,50
C34	578,00	C36	594,00	36	563,00	C35	586,00	C36	594,00	C35	586,00	C35	586,00	C35	586,00	C35	586,00	H31	550,50
C35	586,00	C37	602,00	37	569,00	C36	594,00	C37	602,00	C36	594,00	C36	594,00	C36	594,00	C36	594,00	H32	557,50
C36	594,00	C38	610,00	38	575,00	C37	602,00	C38	610,00	C37	602,00	C37	602,00	C37	602,00	C37	602,00	H33	564,50
C37	602,00	C39	618,00	39	581,00	C38	610,00	C39	618,00	C38	610,00	C38	610,00	C38	610,00	C38	610,00	H34	571,50
C38	610,00	C40	626,00	40	587,00	C39	618,00	C40	626,00	C39	618,00	C39	618,00	C39	618,00	C39	618,00	H35	578,50
C39	618,00	C41	634,00	41	593,00	C40	626,00	C41	634,00	C40	626,00	C40	626,00	C40	626,00	C40	626,00	H36	585,50
C40	626,00	C42	642,00	42	599,00	C41	634,00	C42	642,00	C41	634,00	C41	634,00	C41	634,00	C41	634,00	H37	592,50
C41	634,00	C43	650,00	43	605,00	C42	642,00	C43	650,00	C42	642,00	C42	642,00	C42	642,00	C42	642,00	H38	599,50
C42	642,00	C44	658,00	44	611,00	C43	650,00	C44	658,00	C43	650,00	C43	650,00	C43	650,00	C43	650,00	H39	606,50
C43	650,00	C45	666,00	45	617,00	C44	658,00	C45	666,00	C44	658,00	C44	658,00	C44	658,00	C44	658,00	H40	613,50
C44	658,00	C46	674,00	46	623,00	C45	666,00	C46	674,00	C45	666,00	C45	666,00	C45	666,00	C45	666,00	H41	620,50
C45	666,00	C47	682,00	47	629,00	C46	674,00	C47	682,00	C46	674,00	C46	674,00	C46	674,00	C46	674,00	H42	627,50
C46	674,00	C48	690,00	48	635,00	C47	682,00	C48	690,00	C47	682,00	C47	682,00	C47	682,00	C47	682,00	H43	634,50
C47	682,00	C49	698,00	49	641,00	C48	690,00	C49	698,00	C48	690,00	C48	690,00	C48	690,00	C48	690,00	H44	641,50

C48	690,00	C50	706,00	50	647,00	C49	698,00	C50	706,00	C49	698,00	C49	698,00	C49	698,00	C49	698,00	H45	648,50
C49	698,00	C51	714,00	51	653,00	C50	706,00	C51	714,00	C50	706,00	C50	706,00	C50	706,00	C50	706,00	H46	655,50
C50	706,00	C52	722,00	52	659,00	C51	714,00	C52	722,00	C51	714,00	C51	714,00	C51	714,00	C51	714,00	H47	662,50
C51	714,00	C53	730,00	53	665,00	C52	722,00	C53	730,00	C52	722,00	C52	722,00	C52	722,00	C52	722,00	H48	669,50
C52	722,00	C54	738,00	54	671,00	C53	730,00	C54	738,00	C53	730,00	C53	730,00	C53	730,00	C53	730,00	H49	676,50
C53	730,00	C55	746,00	55	677,00	C54	738,00	C55	746,00	C54	738,00	C54	738,00	C54	738,00	C54	738,00	H50	683,50
C54	738,00	C56	754,00	56	683,00	C55	746,00	C56	754,00	C55	746,00	C55	746,00	C55	746,00	C55	746,00	H51	690,50
C55	746,00	C57	762,00	57	689,00	C56	754,00	C57	762,00	C56	754,00	C56	754,00	C56	754,00	C56	754,00	H52	697,50
C56	754,00	C58	770,00	58	695,00	C57	762,00	C58	770,00	C57	762,00	C57	762,00	C57	762,00	C57	762,00	H53	704,50
C57	762,00	C59	778,00	59	701,00	C58	770,00	C59	778,00	C58	770,00	C58	770,00	C58	770,00	C58	770,00	H54	711,50
C58	770,00	C60	786,00	60	707,00	C59	778,00	C60	786,00	C59	778,00	C59	778,00	C59	778,00	C59	778,00	H55	718,50
C59	778,00	C61	794,00	61	713,00	C60	786,00	C61	794,00	C60	786,00	C60	786,00	C60	786,00	C60	786,00	H56	725,50
C60	786,00	C62	802,00	62	719,00	C61	794,00	C62	802,00	C61	794,00	C61	794,00	C61	794,00	C61	794,00	H57	732,50
C61	794,00	C63	810,00	63	725,00	C62	802,00	C63	810,00	C62	802,00	C62	802,00	C62	802,00	C62	802,00	H58	739,50
C62	802,00	C64	818,00	64	731,00	C63	810,00	C64	818,00	C63	810,00	C63	810,00	C63	810,00	C63	810,00	H59	746,50
C63	810,00	C65	826,00	65	737,00	C64	818,00	C65	826,00	C64	818,00	C64	818,00	C64	818,00	C64	818,00	H60	753,50
C64	818,00	C66	834,00	66	743,00	C65	826,00	C66	834,00	C65	826,00	C65	826,00	C65	826,00	C65	826,00	H61	760,50
C65	826,00	C67	842,00	67	749,00	C66	834,00	C67	842,00	C66	834,00	C66	834,00	C66	834,00	C66	834,00	H62	767,50
C66	834,00	C68	850,00	68	755,00	C67	842,00	C68	850,00	C67	842,00	C67	842,00	C67	842,00	C67	842,00	H63	774,50
C67	842,00	C69	858,00	69	761,00	C68	850,00	C69	858,00	C68	850,00	C68	850,00	C68	850,00	C68	850,00	H64	781,50
C68	850,00			70	767,00	C69	858,00			C69	858,00	C69	858,00	C69	858,00	C69	858,00	H65	788,50
C69	858,00			71	773,00													H66	795,50
				72	779,00													H67	802,50
				73	785,00													H68	809,50
				74	791,00													H69	816,50
				75	797,00													H70	823,50
				76	803,00													H71	830,50
				77	809,00													H72	837,50
				78	815,00													H73	844,50
				79	821,00													H74	851,50
				80	827,00													H75	858,50
				81	833,00														
				82	839,00														
				83	845,00														
				84	851,00														
				85	857,00														

EN

DECLARATION OF CONFORMITY Nº 110601135344

Televes

DECLARACIÓN DE CONFORMIDAD / DECLARAÇÃO DE CONFORMIDADE / DECLARATION DE CONFORMITE / DICHIARAZIONE DI CONFORMITÀ / DEKLARACJA ZGODNOŚCI / DECLARATIE DE CONFORMITATE / KONFORMITETSERKLÆRING / CONFORMITEITSVERKLARING / VASTAVUSE SERTIFIKAAT / KONFORMITÄTSERKLÄRUNG / ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΣΥΜΜΟΡΦΩΣΗΣ / FÖRSÄKRAN OM ÖVERENSSTÄMMELSE / VAATIMUSTENMUKAISUUSVAKUUTUS / ATITIKTIES DEKLARACIJA / ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ / MEGFELELŐSÉGI NYILATKOZAT / BEKREFTELSE / ДЕКЛАРАЦІЯ ВІДПОВІДНОСТІ

Manufacturer / *Fabricante / Fabricante / Fabricant / Fabbricante / Fabrikant / Κατασκευαστής / Tillverkare / Valmistaja / Producent / Gamintojas / Изготовитель / Producator / Gyártó / Fabrikant / Produsent / Fabrikant / Виробник / Valmistaja:*

Televes S.A.
Rua Benéfica de Conxo, 17 - 15706 - Santiago de Compostela - Spain

Declare under our own responsibility the conformity of the product / *Declara bajo su exclusiva responsabilidad la conformidad del producto / Declara sob sua exclusiva responsabilidade a conformidade do produto / Déclare sous notre propre responsabilité la conformité de ce produit / Dichiara sotto la sua esclusiva responsabilità la conformita del prodotto / Wir übernehmen die Verantwortung für die Konformität des Produktes / Πιστοποιούμε με δική μας ευθύνη την συμμόρφωση του προϊόντος / Försäkrar om överstämmelse enligt tillverkarens eget ansvar för produkten / Vakuutamme yksinomaan omalla vastuullamme tuotteen yhdenmukaisuus / Oświadczamy na własną odpowiedzialność zgodność wyrobu / Deklaruojame savo atsakomybe, kad produktas yra atitinkamas / Заявляем с полной своей ответственностью о соответствии продукта / Declarum pe propria raspundere ca produsul este in conformitate cu cerintele esentiale si celalalte prevederi aplicabile / Saját felelősségünkre kijelentjük, hogy a termék megfelel / Erklærer under vores eget ansvar overensstemmelse for produktet / Verklaren onder ons eigen verantwoordelijkheid dat het product / Заявляє з повною своєю відповідальністю що до відповідності продукта / Kinnitame toote vastavust:*

Reference / *Referencia / Referência / Référence / Articolo / Artikelnummer / Αήλωση / Referens / Referenssi / Numer Katalogowy / Produkto numeris / Αριθμός / Referința / Referência / Varenummer / Varenummer / Artikelnummer / Αριθμός / Viide:*

5631XX

Description / *Descripción / Descrição / Description / Descrizione / Beschreibung / Περιγραφή / Beskrivning / Kuvaus / Opis / Produkto aprašas / Описание / Descriere / Leírás / Beskrivelse / Beskrivelse / Beschrijving / Опис / Kirjeldus:*

DVBS2 COFDM T0X

Trademark / *Marca / Marca / Marque / Marchio / Handelsmarke / Μάρκα / Varumärke / Tavaramerkki / Marka / Prekės ženklas / Торговая марка / Marca / Márkanév / Varemærke / Varemerke / Handelsmerk / Торговельна марка / Kaubamärk:*

Televes

With the requirements of / *Con los requerimientos de / Com as especificações de / Avec les conditions de / Con i requisiti di / Die Voraussetzungen erfüllen / Με τις απαιτήσεις του / Enligt följande bestämmelser / Seuraavien määrityksien / Zgodność z wymogami / Atitinka reikalavimus / Требованиями / In conformitate cu / Az alábbi követelményeknek / Med bestemmelserne / Med bestemmelsene / In overeenstemming met / відповідно до вимог / tingimustel:*

- Low Voltage Directive 2006 / 95 / EC.
- EMC Directive 2004 / 108 / EC.

Following standards / *Con las normas / Com as normas / Selon les normes / Con le norme / Folgende Anforderung / Ακόλουθα πρότυπα / Följande standard / Seuraavien standardien / Zastosowanie następujących norm / Pagal standartus / Следующих стандартов / Respecta urmatoarele standarde / A Következő szabványoknak / Følgende standarder / Følgende standarder / Volgende richtlijnen en normen / Наступних стандартів / Järgmistele standarditele:*

EN 60728-11:2005, EN 50083-2:2006

Santiago de Compostela, 01/6/2011

José L. Fernández Carnero
Technical Director

DECLARATION OF CONFORMITY Nº 110601141515

Televes

DECLARACIÓN DE CONFORMIDAD / DECLARAÇÃO DE CONFORMIDADE / DECLARATION DE CONFORMITE / DICHIARAZIONE DI CONFORMITÀ / DEKLARACJA ZGODNOŚCI / DECLARATIE DE CONFORMITATE / KONFORMITETSERKLÆRING / CONFORMITEITSVERKLARING / VASTAVUSE SERTIFIKAAT / KONFORMITÄTSERKLÄRUNG / ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΣΥΜΜΟΡΦΩΣΗΣ / FÖRSÄKRAN OM ÖVERENSSTÄMMELSE / VAATIMUSTENMUKAISUUSVAKUUTUS / ATITIKTIES DEKLARACIJA / ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ / MEGFELELŐSÉGI NYILATKOZAT / BEKREFTELSE / ДЕКЛАРАЦІЯ ВІДПОВІДНОСТІ

Manufacturer / *Fabricante / Fabricante / Fabricant / Fabbricante / Fabrikant / Κατασκευαστής / Tillverkare / Valmistaja / Producent / Gamintojas / Изготовитель / Producator / Gyártó / Fabrikant / Produsent / Fabrikant / Виробник / Valmistaja:*

Televes S.A.
Rua Benéfica de Conxo, 17 - 15706 - Santiago de Compostela - Spain

Declare under our own responsibility the conformity of the product / *Declara bajo su exclusiva responsabilidad la conformidad del producto / Declara sob sua exclusiva responsabilidade a conformidade do produto / Déclare sous notre propre responsabilité la conformité de ce produit / Dichiara sotto la sua esclusiva responsabilità la conformita del prodotto / Wir übernehmen die Verantwortung für die Konformität des Produktes / Πιστοποιούμε με δική μας ευθύνη την συμμόρφωση του προϊόντος / Försäkrar om överstämmelse enligt tillverkarens eget ansvar för produkten / Vakuutamme yksinomaan omalla vastuullamme tuotteen yhdenmukaisuus / Oświadczamy na własną odpowiedzialność zgodność wyrobu / Deklaruojame savo atsakomybe, kad produktas yra atitinkamas / Заявляем с полной своей ответственностью о соответствии продукта / Declarum pe propria raspundere ca produsul este in conformitate cu cerintele esentiale si celalalte prevederi aplicabile / Saját felelősségünkre kijelentjük, hogy a termék megfelel / Erklærer under vores eget ansvar overensstemmelse for produktet / Verklaren onder ons eigen verantwoordelijkheid dat het product / Заявляє з повною своєю відповідальністю що до відповідності продукта / Kinnitame toote vastavust:*

Reference / *Referencia / Referência / Référence / Articolo / Artikelnummer / Αήλωση / Referens / Referenssi / Numer Katalogowy / Produkto numeris / Αριθμός / Referința / Referência / Varenummer / Varenummer / Artikelnummer / Αριθμός / Viide:*

5633XX

Description / *Descripción / Descrição / Description / Descrizione / Beschreibung / Περιγραφή / Beskrivning / Kuvaus / Opis / Produkto aprašas / Описание / Descriere / Leírás / Beskrivelse / Beskrivelse / Beschrijving / Опис / Kirjeldus:*

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Trademark / *Marca / Marca / Marque / Marchio / Handelsmarke / Μάρκα / Varumärke / Tavaramerkki / Marka / Prekės ženklas / Торговая марка / Marca / Márkanév / Varemærke / Varemerke / Handelsmerk / Торговельна марка / Kaubamärk:*

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EN 60728-11:2005, EN 50083-2:2006

Santiago de Compostela, 01/6/2011

José L. Fernández Carnero
Technical Director

Guarantee

Televés S.A. offers a two year guarantee, beginning from the date of purchase for countries in the EU. For countries that are not part of the EU, the legal guarantee that is in force at the time of purchase is applied. Keep the purchase invoice to determine this date.

During the guarantee period, Televés S.A. complies with the guarantee by repairing or substituting the faulty equipment.

The harm produced by improper usage, wear and tear, manipulation by a third party, catastrophes or any other cause beyond the control of Televés S.A. is not included in the guarantee.

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