Televes®

T.OX SERIES

EN Twin A/D PROCESSOR

Ref. 564901

User manual

Contents

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1. Technical specifications

1.1. TWIN A/D PROCESSOR ref. 564901

Down-Converter	Input frequency (selec.)		MHz	46 - 862	IN/OUT Connectors	type	female "F"
	Input level (-59 a -29 dBm)		dBµV	50 a 80	Input impedance	ohm	75
	Frequency steps (selec.)	Analog	KHz	250	Input line powering for preamps (< 50 mA)	Vdc	12 / 24 / OFF
		Digital		166,66 / 125	Input loop-through gain	dB	0 ± 3
Intermediate freq.	Bandwidth (selec.)		MHz	6 / 7 / 8			
UP-Converter	Output frequency (selec.)		MHz	46 - 862	Output loop-through losses (typ.)	dB	< 1,5
	Frequency steps (selec.)	Analog	KHz	250	Return losses (typ.)	dB	> 12
		Digital		166,66 / 125	IN/OUT Connectors	type	female "F"
	Phase noise (typ.)		dBc/Hz	80 @10KHz	Output impedance	ohm	75
	Output level		dBµV	80 ±5	Spurious level (min.)	dBc	55
	Output level regulation		dB	> 15			
General	Consumption (typ.)		mA	400 @ 24V⎓ (LNB power OFF) 450 @ 24V⎓ (LNB power ON)			
	Protection level			IP20			

* Automatic gain for high level input signals.
These technical specifications are defined for a maximum ambient temperature of 45 ° C (113 ° F). For higher temperatures forced ventilation is required.

1.2. Broaband Amplifier Technical Specifications

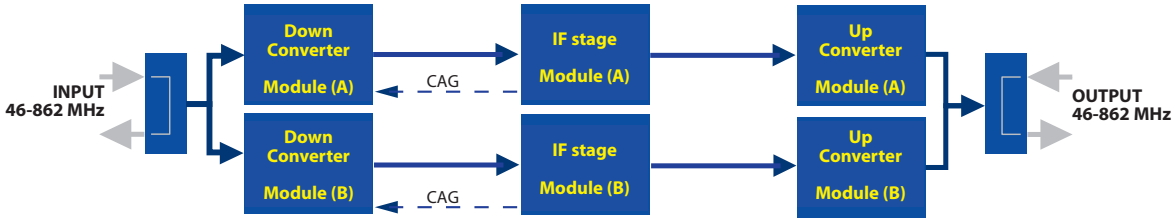
Amplifier ref. 5575	Frequency range	MHz	46 ··· 862	Connector	type	female "F"
	Gain	dB	44 ± 2,5	Powering voltage	V⎓	24
	Regulation margin	dB	20	Consumption at 24 V⎓	mA	450
	Output level (42 CH CENELEC)	dBµV	105	Test output attenuation	dB	-30
Amplifier ref. 451202	Frequency range (1)	MHz	47 ··· 862	Connector	type	female "F"
	Gain (1) (selec.)	dB	40 ··· 53	Mains voltage / frequency	V~ / Hz	196 ··· 264 / 50-60
	Output level (1) (DIN 45004B)	dBµV	129	Power consumption (max.)	W	16
	Rango de frecuencia (2)	MHz	5 ··· 30	Test output attenuation	dB	-20
	Gain (2) (typ.)	dB	20 / -3			
	Output level (2) (DIN 45004B)	dBµV	129 / --			

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

1.3. Power Supply Unit Technical Specifications

PSU ref. 5629	Mains voltage / frequency	V~ / Hz	196 - 264 / 50-60	Max. total current (output 1 + output 2)	A	5 (24V⎓)
	Output voltage	V⎓	24	Max. current per output	A	4 (24V⎓)

1.4. Block diagram



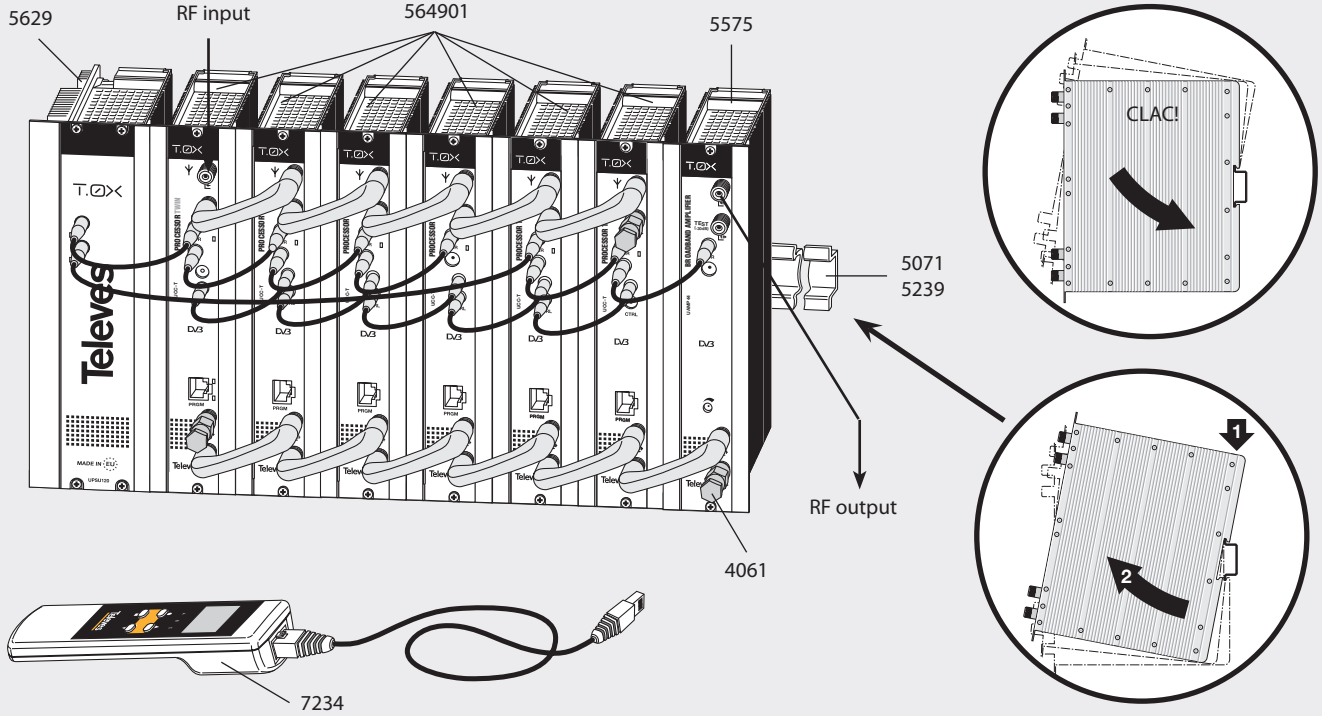
2. Reference description

Range	
564901	TWIN A/D PROCESSOR T.0X
5575	Broadband amplifier 44dB 120dBµV
451202	DTKom Amplifier (47 - 862 MHz)
5559	Headend Remote Management CDC-IP T.0X
555901	Headend Remote Management CDC-IP GSM T.0X
5629	Power Supply Unit 24V/5A T.0X

Accessories	
7234	Universal Programmer
5071	Wall support T03-T05-T.0X; Length=50 cm
5239	Wall support T03-T05-T.0X 12 Modules + PSU; Length= 56 cm
5301	19" rack frame
507202	T.0X Enclosure with forced ventilation (7 Modules + PSU)
4061	DC-blocked terminal load, male "F"
4058	Terminal load, male "F"
422601	T05 to T.0X Power interconnection lead L=40 cm
422602	T05 to T.0X Management interconnection lead L=40 cm
422603	T.0X Management interconnection lead L=1m
5673	Blank plate (50 mm width)

3. Installation

3.1. Wall mount



REMARK: It is recommended to use both outputs of the PSU to balance consumption between them. For example, 4+3 r 3+4 modules.

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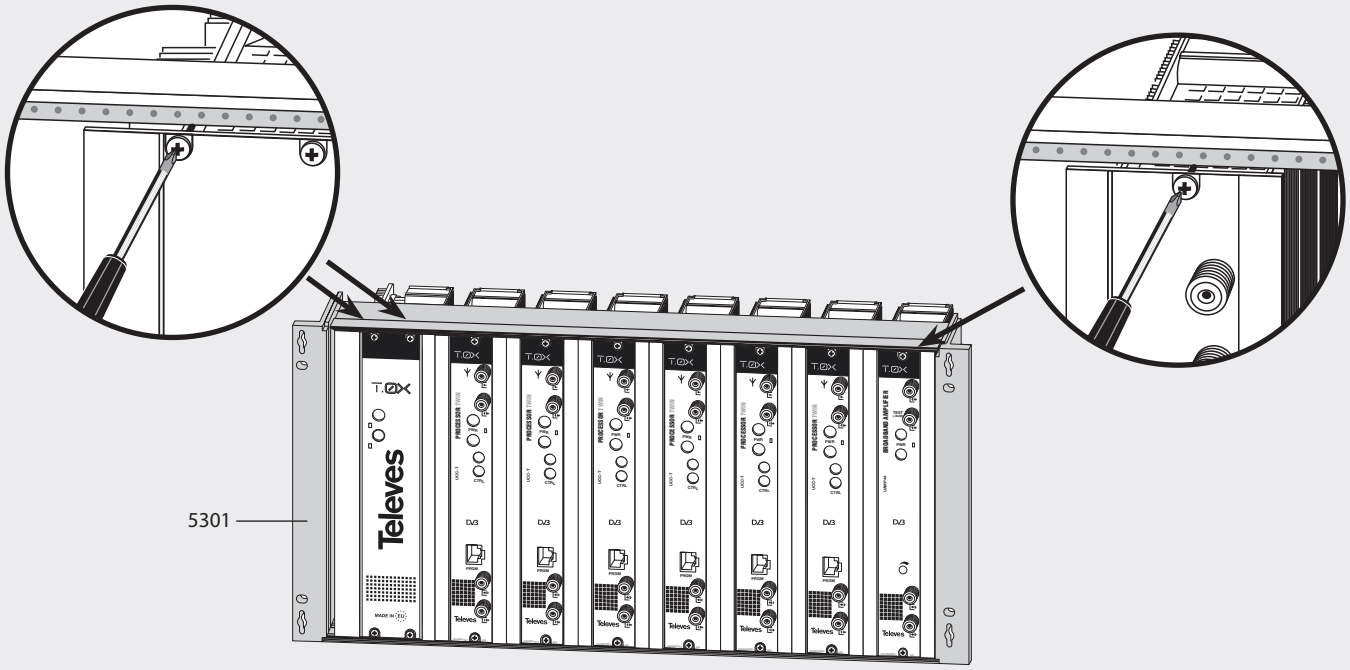
3.2. 19” rack mount



4. Product description

4.1. Introduction

The TWIN A/D PROCESSOR contains two processors, herein known as **module A and module B**. Each one of them can be used independently either as a channel **converter** (output channel different of input channel) or as an **amplifier** (output channel equal to input channel).

When used as a converter, it allows to select any channel in the VHF or UHF band (46-862MHz) and translate it in frequency to any position within these bands.

Both modules A and B feature its own Up-converter, thus enabling to allocate independently the two output channels to any position within the TV band.

The parameters are selected by the programmer ref. 7234, which is connected to the front of the unit.

By using the universal programmer, both modules can be programmed with the operating parameters required by the premises: input and output frequencies, output levels and bandwidth, mainly.

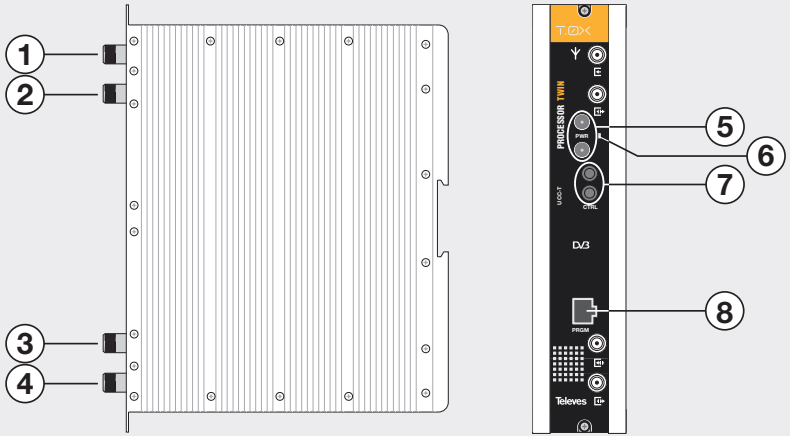
Both modules A and B share the same input port (loop-through).

The input loop-through allows the input signal be available to a number of units interconnected. At the same time it allows to power a preamplifier through the signal input cable (12 / 24 Vdc).

If a shortcircuit occurs at the input port, a LED on the front panel of the unit will start to flash and the input power will be switched-off. The programmed voltage at the input will be reset once repaired the shortcircuit.

It features also an input RF connector and an output RF connector in loop-through in order to mix the channels for subsequent amplification.

4.2. PROCESSOR A/D Twin



1. RF Input (12V/24V/Off)
2. RF Output (input loop-through)
3. RF Input (output loop-through)
4. RF Output
5. Power BUS connectors
6. Status LED
7. Control BUS connectors
8. Programmer / PC socket

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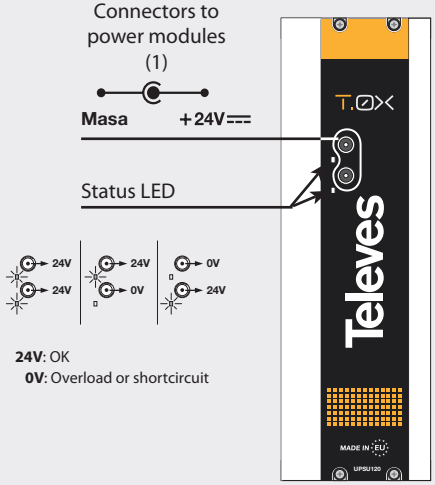
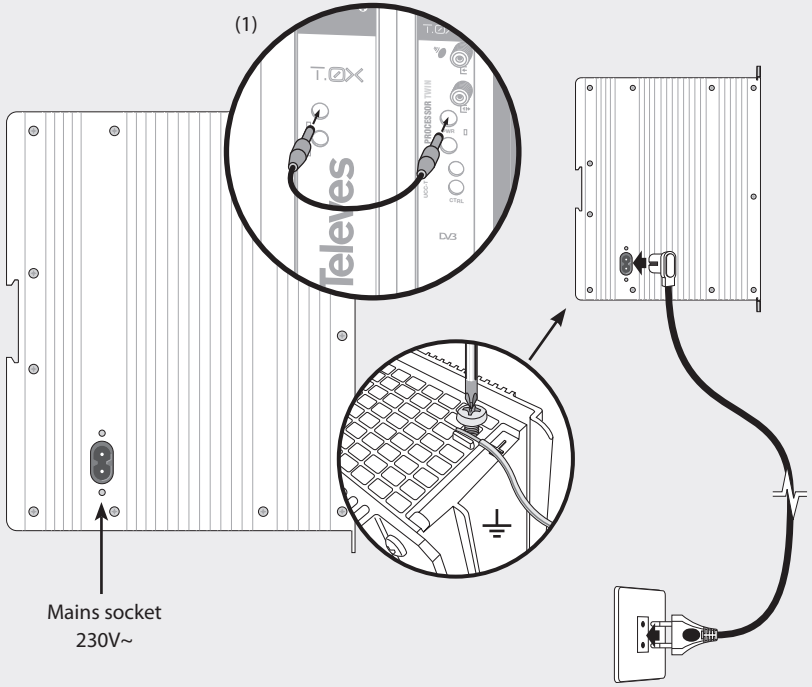
4.3. Power Supply Unit

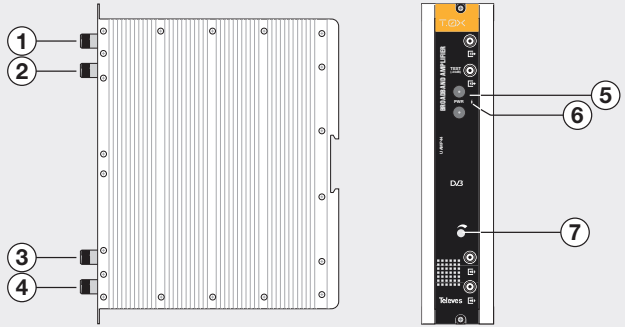




Remark: - The PSU can power **up to 12** TWIN A/D PROCESSOR units.
- It must be used both outputs whenever the current demanded by all units installed is greater than 4 A (maximum current per output)

4.4. Broadband amplifiers

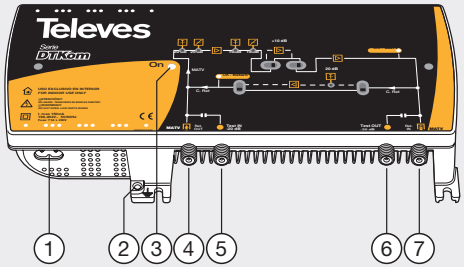
OPTION "A" - 5575



1. RF Output
2. Test Output
3. RF Input
4. RF Input
5. Powering connectors
6. Attenuator
7. Status LED

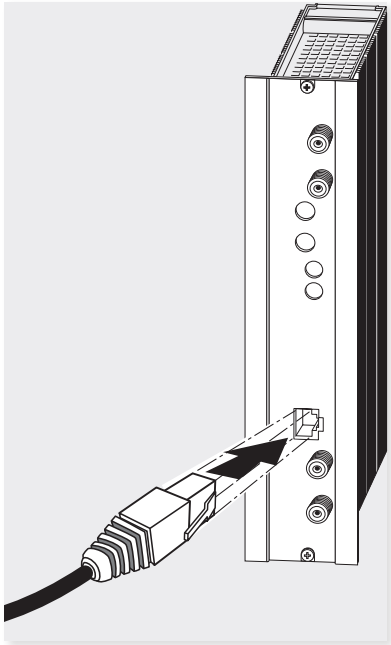
It features two signal input connectors, to allow mixing of the channels provided by two systems. Whenever is only used one input, please remember to terminate the non used port with the corresponding 75 ohm load, ref. 4061.
On its upper part the unit features one signal output connector and a test output connector (-30 dB)
The unit is powered via a power BUS made by independent power leads, which interconnect all the units each other.

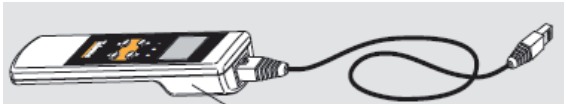
OPTION "B" - 451202



1. Mains socket (196-264 V~ 50/60 Hz)
2. Ground terminal
3. ON/OFF LED
4. MATV input / Return channel output
5. MATV input test connector
6. MATV output test connector
7. MATV output / Return channel input

4.5. Universal Programmer PCT 5.0





The programmer features 1 display, 3 LEDs and 4 buttons:

Programmer button function		
Button	Press mode	Function description
●	short	Enables parameter selection by shifting the cursor
●	long	Allows to swap between main and extended menus
▲ ▼	short	Change the parameter value selected by the flashing cursor
■	short	Changes menu
■	long	Save parameters to memory
■+●+▲	long	Increase screen contrast
■+●+▼	long	Decrease screen contrast
●+▲	long	Selects cloning menu

5. - Instructions for use

Insert the programmer into the corresponding connector ("PRGM socket") of the unit. Then the unit sends the parameters with what it was previously configured (frequency, output channels, input channels, output levels, ...) and a new configuration process can be carried out.

The first item displayed is the version of the Programmer firmware:

```
PCT firmware
version
------------
X.XX
```

Next it shows the firmware version of the TWIN A/D PROCESSOR unit:

```
Unit
firmware
version:
U:X.XX
```

Finally, it will be displayed the first device configuration menu, that is the one corresponding with its output menu.

5.1. Main Menu

To switch between A and B modules of the TWIN unit, keep pressed the button ● until the A/B indication stars to fl ash in the upper left corner of the display. Then use buttons ▲ and ▼ to select de desired module.

In both modules A and B, parameters changed are updated instantly; but in order to keep these operating parameters it will be necessary to save them before elapse 30 sec from the last change.

By short presses on the button ■, you can move through the available menus.

If it has been chosen **converter mode**, it will be displayed the sequence Output menu => Input menu, and so on.

In the case of being chosen **amplifier mode**, there is only one menu since both input and output channels are the same.

Remark 1: *Depending on how the processor is programmed (this is done accessing the extended menu, press button ■ twice and then, using buttons ▲ or ▼ , select mode of operation) may function as amplifier (input frequency equal to output frequency) or converter (input frequency is not equal to output frequency).*

*If the processor is programmed to operate as an **Amplifier** there is only one setup menu; and if it is programmed to operate as a **Converter**, there will be two setup menus: output and input.*

Remark 2: *To change the menu language before starting the device configuration, you must access the "Language" menu.*

To do so, press button ● (long press) to access the Extended menu, press button ■ six times in a row, and then, using buttons ▲ or ▼, select the language.

Finally press button ■ (long press) to save changes. For more information, see paragraph "Extended Menu" => "Language Selection Menu".

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a. Output menu

This menu allows to select:

- **Output channel**, in both channel and frequency modes.
- **Output frequency offset** (in case of digital channel mode).
- **Output level**.

The contents of the output menu depends on how the unit has been programmed the last time (frequency or channel mode, analog or digital mode; options available in the extended menu).

```
A►OUTPUT
Ch: C21 Of:0
(474.00 Mhz)
Level:    99
```

Channel mode operation for digital signals

If the digital signal option has been selected, it is displayed the number of the **output channe**l as well as its **central frequency**.

The **offset option** shifts the central frequency of the output channel an amount which can be configured by selecting one of the following values: +4, +3, +2, +1, 0, -1, -2, -3, -4.

Frequency steps for this option can also be configured in the corresponding extended menu. There are two choices: 125 KHz and 166.66 KHz.

Finally, it will be displayed the **output level**, which can be changed using a scale of selectable values from 00 to 99:

- By selecting 99, the output level is the maximum that the unit can deliver (85 dBµV approx.).
- As soon as it is selected a lower value than 99, the output level will decrease all the way down till select 00, which is an output level 15 dB less than its maximum output level.

```
A▶OUTPUT
Ch: C21
(471.250Mhz)
Level:    99
```

Channel mode operation for analog signals

The display will show the number of the **output channe**l as well as its **Video Carrier** frequency.

This operating mode has not available the offset option.

Concerning the output level, it follows the same rules as above, and the display shows:

```
A▶OUTPUT
Frequency:
474.00 Mhz
Level:    99
```

Frequency mode operation

The display will show, either the Video Carrier frequency (for analog signals) or the central frequency of the channel (for digital signals).

Output frequency values range from 47 to 862 MHz.

The output level follows the same rules as above.

To modify parameters, scroll through the menu by pressing button ● (short press) until the required parameter flashes; then change it with buttons ▲ or ▼.

b. Input Menu

Allows selection of the **input channel**, in either channel mode or frequency mode, and the **input frequency offset** for digital channels.

The contents of the input menu depends on how the unit has been programmed the last time (frequency mode/channel mode; digital mode/analog mode) as can be done in the extended menu.

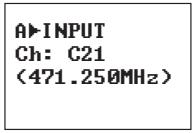
```
A▶INPUT
Ch: C21 Of:0
(474.00 MHz)
```

Channel mode operation for digital signals

The display will show the **input channel** as well as its **central frequency**.

Additionally, the **offset option** shifts the central frequency of the input channel an amount which can be configured by selecting one of the following values: +4, +3, +2, +1, 0, -1, -2, -3, -4.

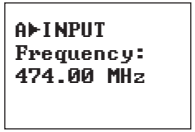
Frequency steps for this option can also be configured in the corresponding extended menu. There are two choices: 125 KHz and 166.66 KHz.



Channel mode operation for analog signals

The display will show the number of the **output channe**l as well as its **Video Carrier** frequency.

This operating mode has not available the offset option.



Frequency mode operation

The display will show, either the Video Carrier frequency (for analog signals) or the central frequency of the channel (for digital signals).

Output frequency values range from 47 to 862 MHz.

To modify parameters, scroll through the menu by pressing button ● (short press) until the required parameter flashes; then change it with buttons ▲ or ▼.

5.2. Extended Menu

By keeping pressed the button ● for more than 3 sec, the programmer displays a number of menus less frequently used, which are called *extended menus.*

a. Menú de Configuración 1

This menu allows the selection of the **processor' address**, for the remote management of the headend by means of a CDC unit, as well as the **powering voltage for preamplifiers**.

> **Warning**:
>
> *All devices controllable by the CDC (headend management system) are linked by a common control BUS (connectors labeled "CTRL"), and each device must have a unique address selected among 1 and 254, inside the bus (0 and 255 are values reserved for other purposes).*

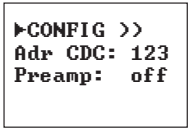
To change on address, you must press the ● key until the desired digit flashes. Then you can modify that digit by using buttons ▲ and ▼.

The next parameter in this menu is the **voltage** to be available on the input port of the unit, intended to power preamplifiers.

To select powering voltage for preamplifiers, use also buttons ▲ and ▼. Choices are:

Off	No voltage on the input port
12V	12 Vdc on the input port
24V	24 Vdc on the input port

Save parameters as usually by pressing button ■ (long press).

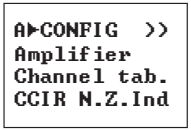


b. Configuration Menu 2

This menu allows to select one of the two possible processor operating modes: **Amplifier or Converter**.

In the **Amplifier** option, output frequency is equal to input frequency, as well as the offset, and therefore is shown only the output menu.

In the **Converter** option, output frequency is not equal to input frequency, and therefore are shown both output and input menus



In the case of converter mode operation, use buttons ▲ and ▼ to choose how to select the input and output frequencies for:

- frequency mode, or
- channel mode.

In channel mode (Tables of Channels) there are the following choices:

- CCIR N.Z. Ind
- China Taiwan
- Chile M/N
- Italy
- France
- Russia (OIR)
- Ireland
- South Africa
- Poland (OIR)
- Australia

c. Configuration Menu 3

```
A▶CONFIG  >>
In BW:  8MHz
Pendiente: 0
```

The first parameter to be selected is the **bandwidth (BW)** of the input signal. Choices are 6, 7 and 8 MHz.

The next parameter is the **slope**. Choices are 0, 1, 2, 3 and 4.

The slope balances the signal within the channel.

When the signal is analog, it changes the level difference between video carrier and audio carrier.

d. Configuration Menu 4

```
A▶CONFIG  >>
Mode:Digital
In: 125MHz
Out: 125MHz
```

This menu allows to choose between **analog or digital signals**, for both input and output ports.

- **Digital signals**

  There are two possible choices for frequency steps: 125 and 166.66 KHz.

- **Analog signals**

  The frequency step is 250 KHz only.

In any of the extended menus 1, 2 and 3, the first press on button ● (short press) allows accessing to the selection of module A or B within the processor, by highlighting one of the two letters. Then use buttons ▲ and ▼ to select one of both modules.

The next press on button ● (short press) makes flash the name of the parameter to be modified.

Then use buttons ▲ and ▼ to change its value.

e. Temperature Menu

The next extended menu displays the **current temperature** of the processor, as well as the **maximum** value recorded.

The maximum recorded temperature may also be reset by pressing and holding the button ● for a few seconds.

```
▶TEMPERATURE
Now:   04
Max:   05
      • reset
```

The working temperature ranges displayed are the following:

- Optimum temperature: 0-6
- Temperature is high: 7-8
- Temperature is excessive: 9-10

The temperature accuracy is ± 5ºC.

To give an idea, a displayed value equal to 3 is equivalent to a working temperature between 25 and 34 ºC.

In the event that the maximum temperature recorded is outside the optimal range, the headend installation should be modified to try to reduce its ambient temperature, e.g. by mounting the units inside a ventilated T.0X cabinet ref. 507202.

To check whether this change is effective, reset the maximum temperature recorded and check again its value after some working time has elapsed.

f. Version menu

This menu shows to the user the firmware versions loaded in the processor.

```
FW. Vers.
Vx.xx.xxxxx
Boot Vers
Vx.xx.xxxxx
```

g. Language menu

This menu allows to select the language used to program the processor (Spanish / English / German):

```
▶ LANGUAGE
   English
```

Select one of them by pressing buttons ▲ and ▼.

5.3. Saving parameters

After setting up the unit by means of the two menus available, main and extended, all data will be saved by pressing the button ■ for about 3 seconds.

The display shows:

```
Saving
settings and
restarting
...
```

Do not remove the programmer before the message disappears from the screen.

If configuration data are changed but not saved, previous settings will be restored after about 30 seconds. Therefore all changes made would be cancelled.

6. - Device control

This version of the TWIN A/D PROCESSOR allows configuration and monitoring via a PC, both locally and remotely.

a. Local control

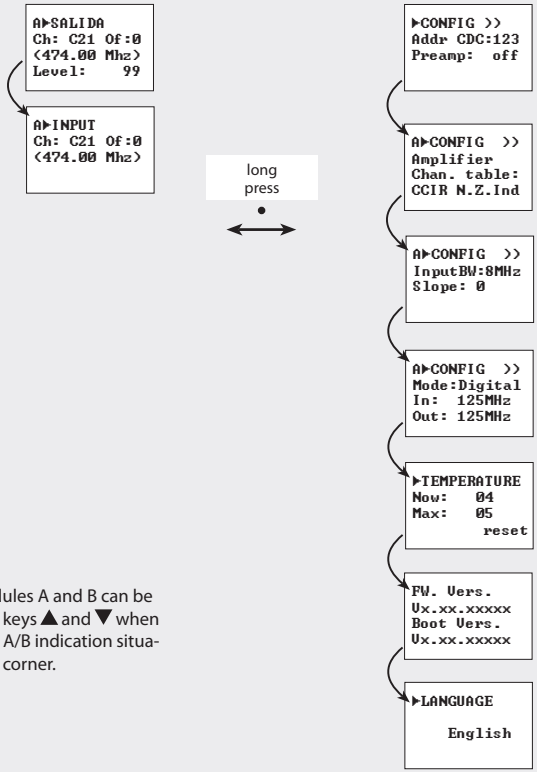
The "Headend Management" programme (v2.14 or higher) is required, as well as a special lead (provided with the programme) that connects a PC serial port to the "PRGM" socket of the TWIN A/D PROCESSOR.
The programme can be used to set up and read all the operating parameters, as well as to monitor the correct operation of the device.

b. Remote control

It is necessary to have a Headend Control module (ref. 5559 or 555901) that includes the programme mentioned above.

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 imperative that each module is programmed with a different device address selected between 1 and 254.

Flow diagram of menus



At any moment, modules A and B can be switched by pressing keys ▲ and ▼ when the cursor is over the A/B indication situated on the upper left corner.

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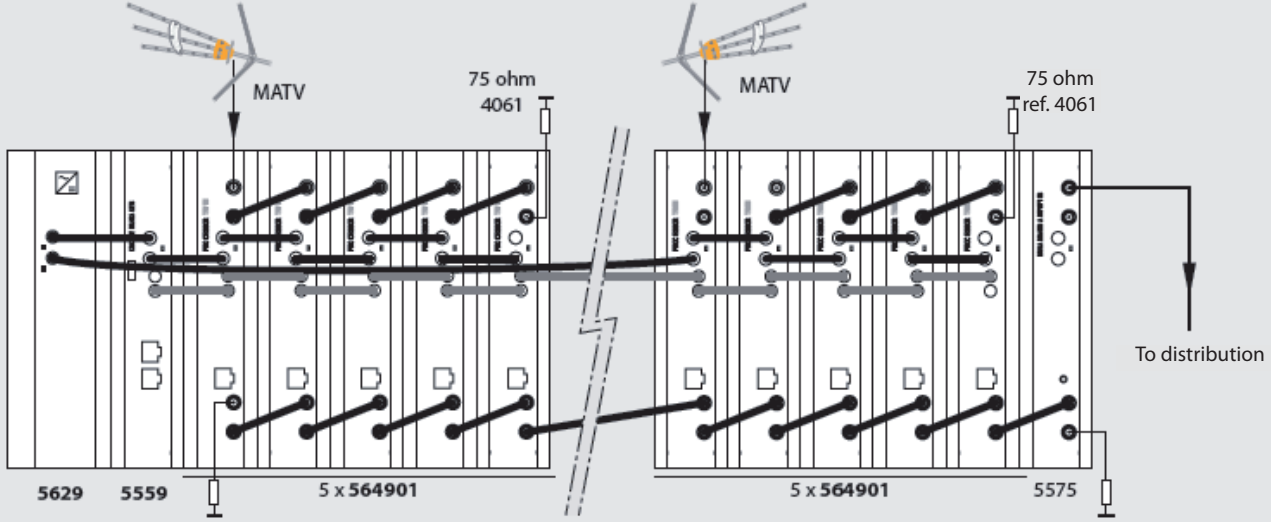
7. Example of application

Distribution of 20 channels



This figure depicts a headend configured for distributing 10x2 channels processed.
It is necessary to take into account the constraint of 4 A per each one of the outputs of the PSU.

8. 19” Rackmount standards (max. 56 units - 7 subracks with 5U height - 8’7”)

8.1. Installation of the rack with ventilation facilities

To aid in cooling for proper operation, especially in warm locations (>45 C ambient), installation of 2 25W or greater fans is recommended at the top of the rack. See fig 1 and 2.

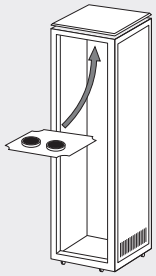


fig. 1

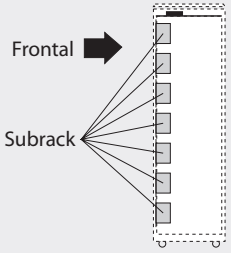
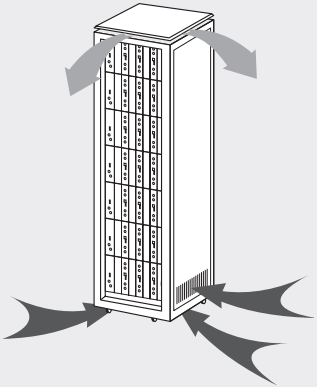


fig. 2

Estos ventiladores irán colocados en una bandeja atornillada en la parte superior del Rack, fig. 1 y 2. De esta manera, los ventiladores harán circular entre los módulo el aire fresco que entra por la parte inferior del armario (fig.3), y lo expulsarán a través de la rendija (de unos 3 a 5 cm) que hay en su parte superior.



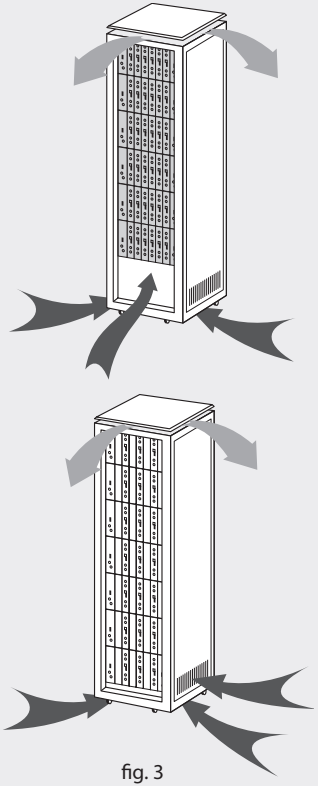
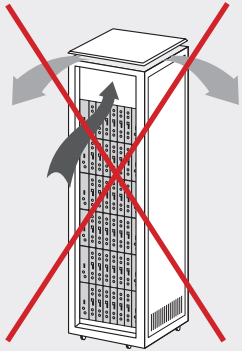


fig. 3

In order to provide adequate cooling, proper airflow must be established. As such, the following items must be observed:

- Do not open the side doors. This could cause fans to move air from outside rather than through the rack.
- Do not place objects near the rack that could clog the ventilation inlets and outlets.
- If the rack is not complete, the subracks must be placed from the top downwards without leaving large gaps in between, fig. 4.



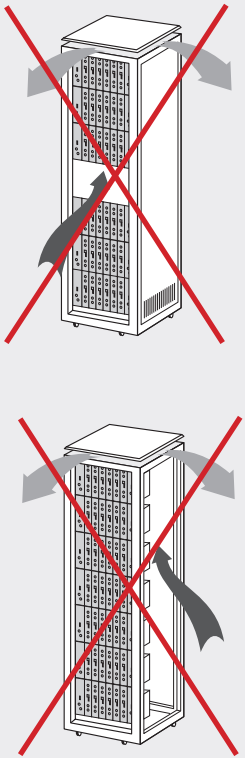


fig. 4

8.2. Installation of the rack without fans

If fans are not available and the rack is installed in ambient temperatures near 45C, it is advisable to leave the rack sides completely open. See fig 5.

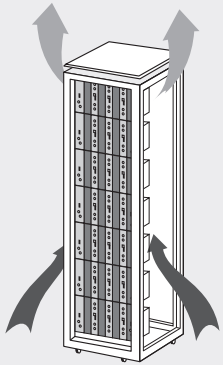


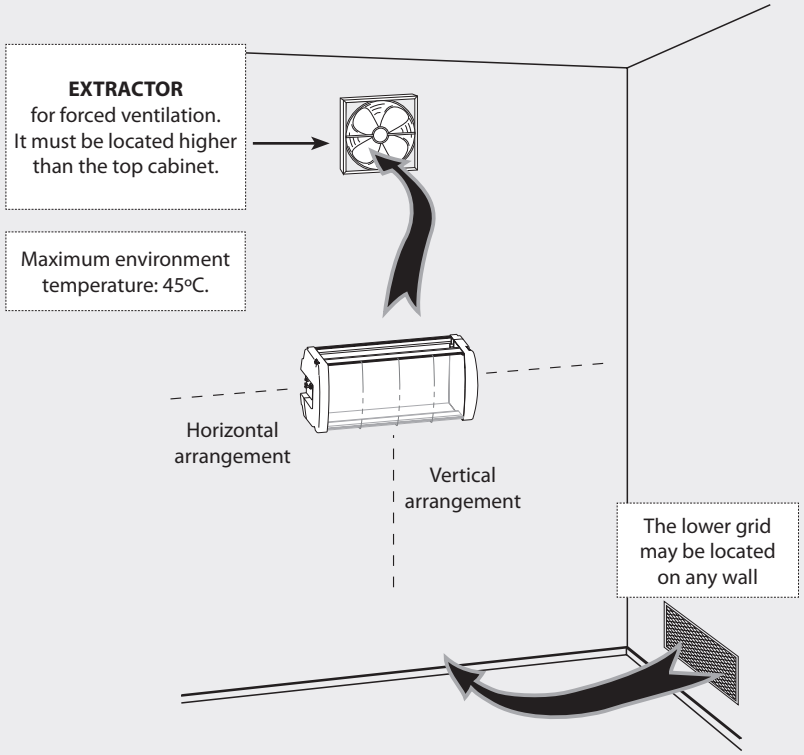
fig. 5

9. Standards for mounting wall cabinets

IMPORTANT

The figure on the right suggests how to arrange wall cabinets for an optimal ventilation, as well as additional actions to do it.

La temperatura máxima en las proximidades del cofre situado a mayor altura no debe ser superior a 45ºC, tanto si la disposición de los cofres es horizontal como vertical.



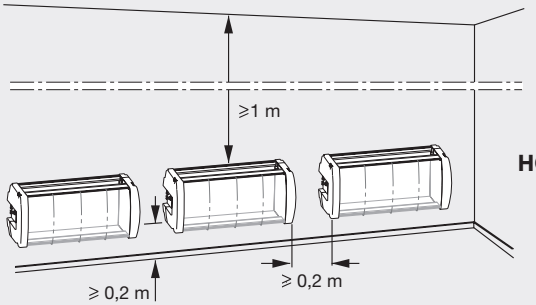
EN

IMPORTANT

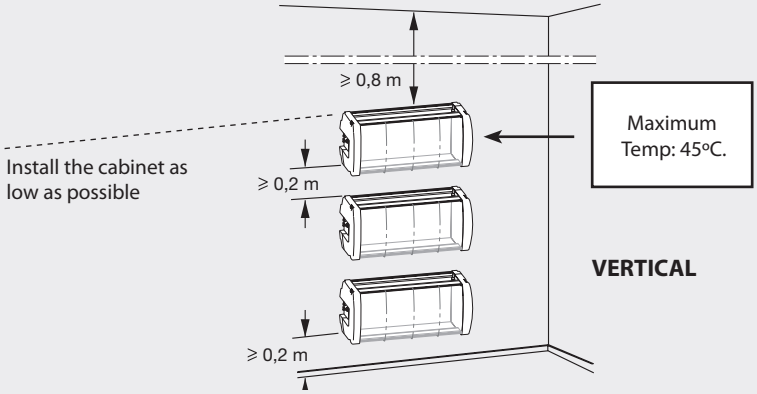
Horizontal placement of cabinets is strongly recommended by hanging them as near as possible to the floor .

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

Respect the recommended minimum distances in the attached schemes.



HORIZONTAL



VERTICAL

A. Table of channels

Tabl. 1		Tabl. 2		Tabl. 3		Tabl. 4		Tabl. 5		Tabl. 6		Tabl. 7		Tabl. 8		Tabl. 9		Tabl. 10	
CCIR		China/Taiwan		Chile		Italy		France		OIR Channels		Ireland		South Africa		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														

10. 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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- **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 richlijnen en normen / Наступних стандартів / Järgmistele standarditele:*

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

Santiago de Compostela, 18/6/2012

José L. Fernández Carnero
Technical Director

564901_000_EN