

Televés

COFDM-PAL

1 CH

User manual



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1.- TECHNICAL SPECIFICATIONS

1.1.- COFDM-PAL Ref. 557701

COFDM demodulator	Input through losses:	< 1.2 dB	VSWR input (75 ohm):	> 12 dB (46 - 862 MHz)
	Input frequency:	174-230 / 474-858 MHz or channel table	Signal/noise ratio:	> 20 dB
	Frequency steps:	1 MHz	FFT:	2K, 8K
	Locking margin:	± 500 KHz	Constellation:	QPSK, 16 QAM, 64 QAM
	Input level:	49 to 89 dBμV (-60 to -20 dBm) (8K, 64 QAM, FEC 2/3)	Guard interval:	1/4, 1/8, 1/16, 1/32
	SAW filter:	Select. 7 - 8 MHz	Viterbi rate:	1/2, 2/3, 3/4, 5/6, 7/8
	Max. rate symbol:		Transmission standard:	ETS300744
Decoding MPEG-2 -Video	Input format 1:	MPEG-1	Chrominance format:	4:2:0
	Decoding:	ISO/IEC 11172-2	Video resolution:	Max. 720 x 576
	Input format 2:	MPEG-2	WSS Signaling:	Active
	Decoding:	ISO/IEC 13818-2 (MP@ML)	Inserción de subtítulos PAL:	Active
	TS input rate:	Max. 90 Mbits/seg	Base band video output:	RJ45 connector
	Video rate:	1.5 to 15 Mbits/seg		
Decoding MPEG-2-Audio	Input format:	MPEG-1, MPEG-2	Audio output:	Mono
	Decoding:	LAYER 1, LAYER 2		
RF output	Output frequency:	46 - 862 MHz or channel table	Regulation margin:	15 dB
	Frequency steps:	250 KHz	VSWR output (75 ohm):	10 dB min. 14 dB tip.
	Maximum output level:	80 dBμV ±5 dB (selec. SW)	Through losses:	< 1.5 dB (46-862 MHz)
			Band spurious level:	55 dBc min. 60 tip.
General	Preamp. powering:	Select. 0 / 12 / (24 NOT AVAILABLE) V _{DC} / (< 50 mA)		
	Consumption:	5V _{DC} : 670 mA tip 15V _{DC} : 420 mA tip.		

The technical specifications are defined with a maximum room temperature of 40° C.

1 . 2.- Technical specifications Amplifier Ref. 5075

Amplifier	Frequency range:	47 ... 862 MHz	Connector:	"F"
	Gain:	45 ± 2 dB	Powering:	15 V $\overline{=}$
	Regulation margin:	20 dB	Consumption at 15 V:	800 mA
	Output level (60 dB):	105 dB μ V (42 CH CENELEC)	Test socket:	-30 dB

1 . 3.- Technical specifications Power Supply Ref. 5029

Power supply	Mains voltage:	230 ± 15 % V~	Maximum current provided:	24V $\overline{=}$ (0,55 A)
	Output voltages:	5, 15, 18, 24V $\overline{=}$		18V $\overline{=}$ (0,8 A)
				15V $\overline{=}$ (4,2 A) ⁽¹⁾
				5V $\overline{=}$ (6,6 A)

⁽¹⁾ If you use 24V and/or 18V, you need to take the power consumed by these from the 15V power.

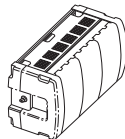
2.- REFERENCE DESCRIPTION

Ref. 557701 COFDM-PAL (174 - 230 / 474 - 858 MHz)
Ref. 5075 Amplifier (47 - 862 MHz)
Ref. 5029 Power Supply Unit (230 V~ ± 15 % - 50/60 Hz)
 (24 V $\overline{=}$ - 0,55 A)
 (18 V $\overline{=}$ - 0,8 A)
 (15 V $\overline{=}$ - 4,2 A)⁽¹⁾
 (5 V $\overline{=}$ - 6,6 A)

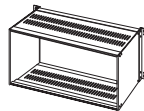
Ref. 7234 Universal programmer
Ref. 5071 Wall support 10 mod + PSU.
Ref. 5239 Wall support T40/T50 12 mod + PSU.
Ref. 8250 Subrack 19"
Ref. 5301 19" subrack
Ref. 5072 Universal cabinet
Ref. 5069 Cabinet of 14 modules + power supply unit
Ref. 4061 75 ohm adapter load "F" DC block
Ref. 4058 75 ohm adapter load "F"
Ref. 5073 Blank plate
Ref. 5334 Ventilation unit



Ref. 5301



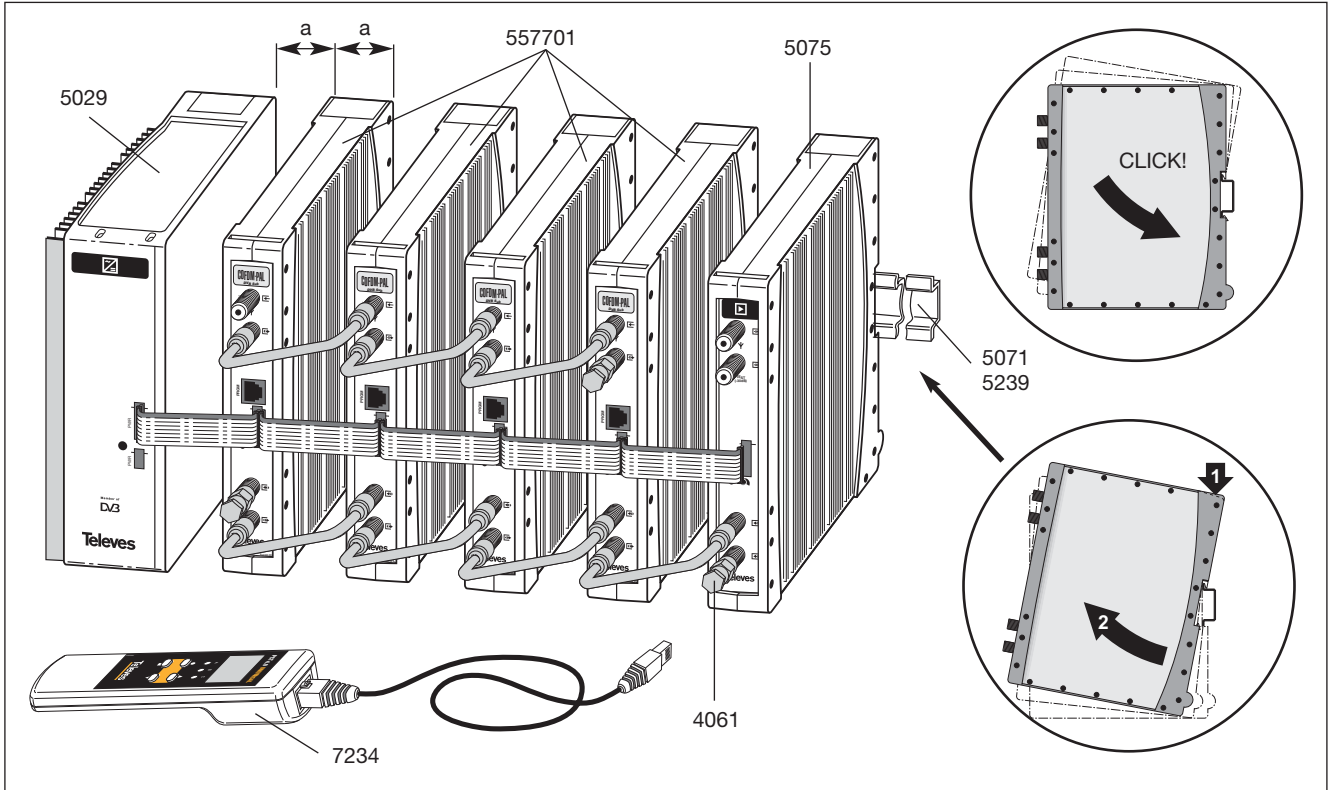
Ref. 5072



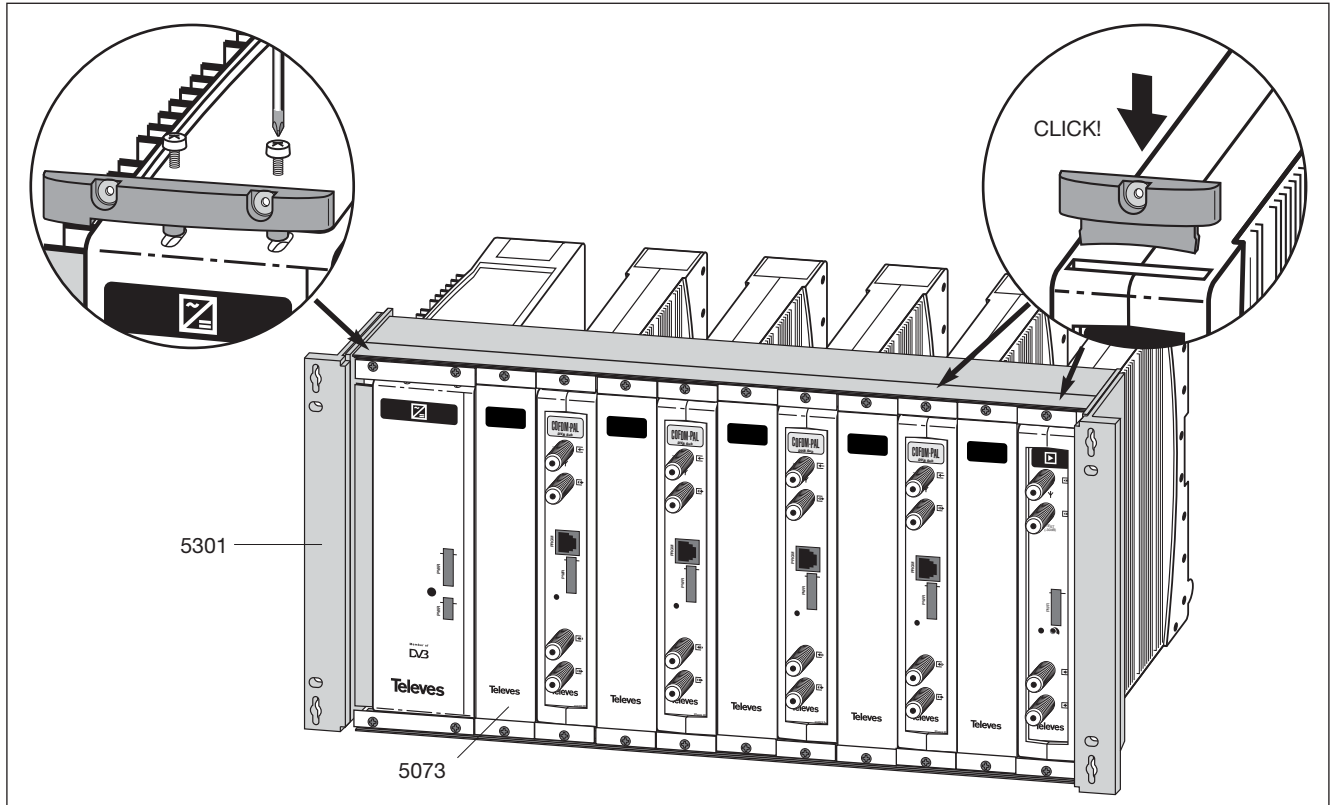
Ref. 8250

3.- MOUNTING

3.1.- Wall mounting

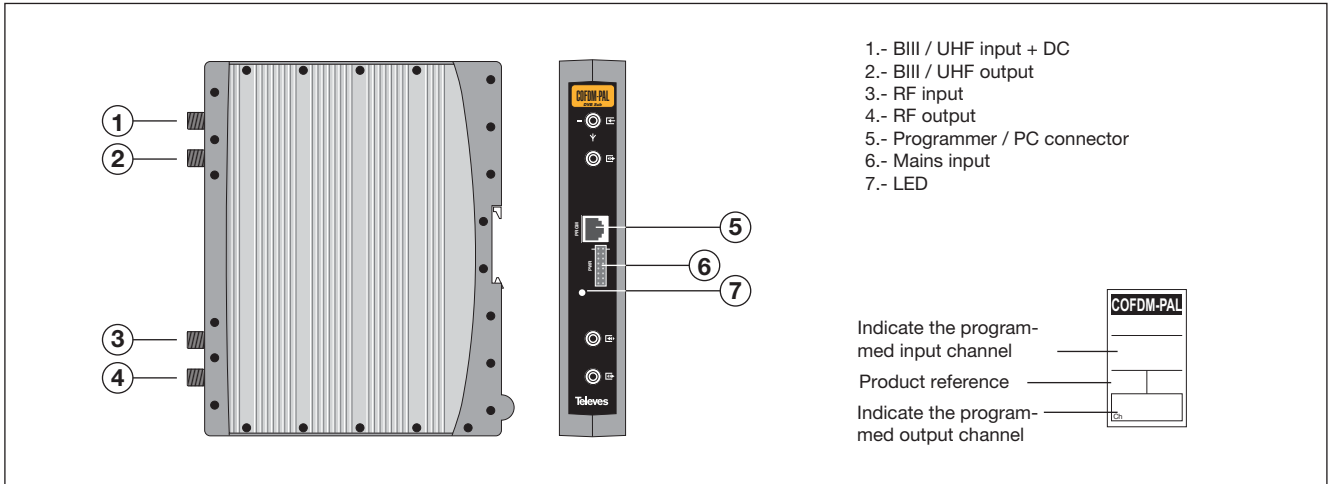


3.2.- 19" rack mounting



4. - ELEMENT DESCRIPTION

4.1.- COFDM-PAL



The COFDM transmodulator turns a TV or radio channel (chosen by the user) from the existing channels in a terrestrial digital television multiplex (COFDM modulation and an approximate bandwidth of 7/8 MHz) into a VHF/UHF channel (PAL modulation and a bandwidth of 7/8 MHz).

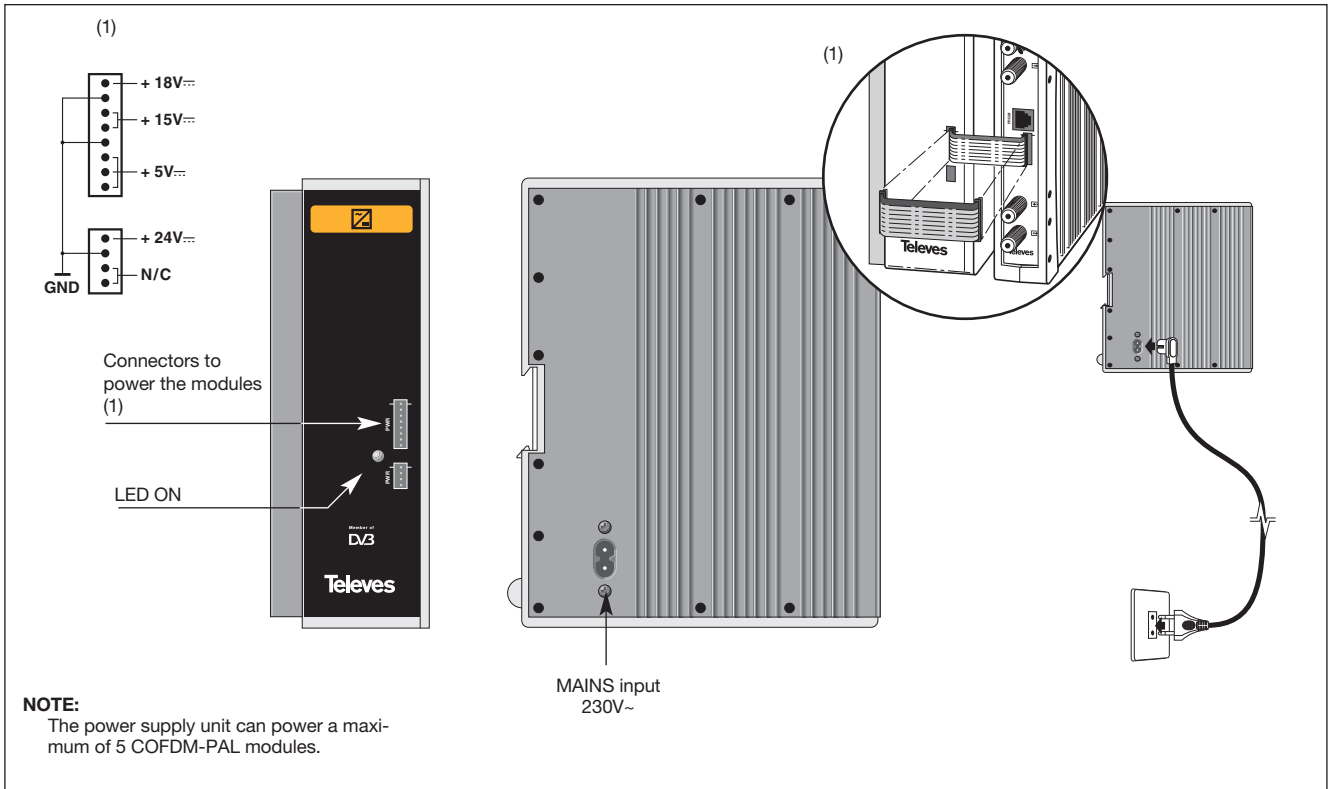
To do this, the unit carries out the COFDM demodulation of the input channel (multiplex), obtaining an MPEG-2 TS signal

(MPEG-2 transport stream), to carry out the subsequent modulation, according to the standard, of the audio and video signals of the selected program in any channel or frequency between 46 and 862 MHz.

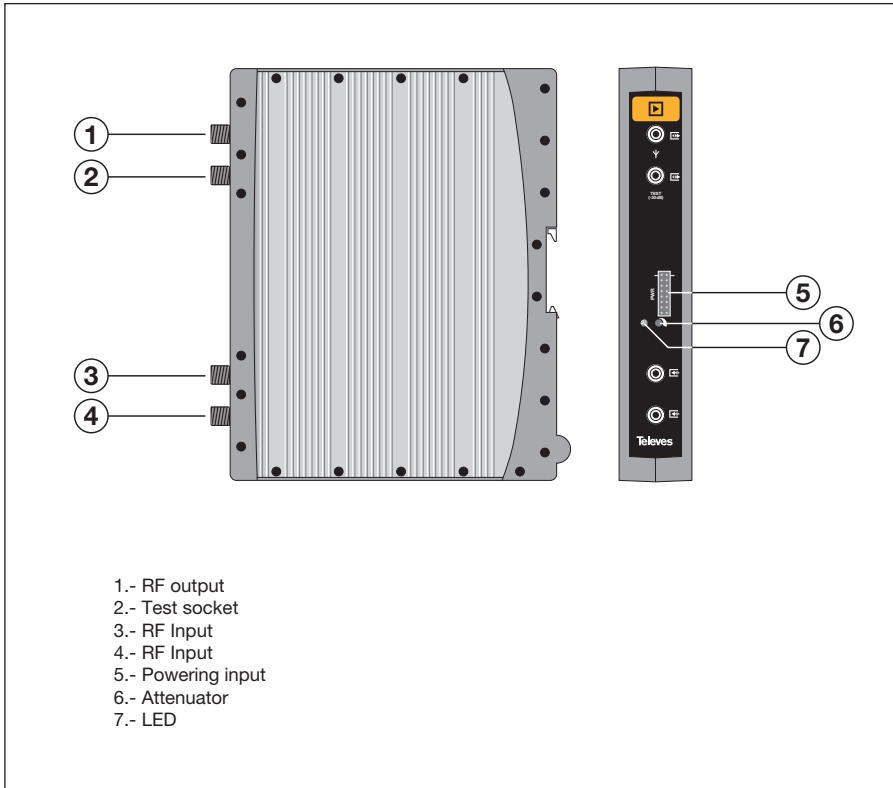
The COFDM-PAL transmodulator disposes of a BIII and UHF input and output in the upper F connectors with the aim of enabling the input signal to pass through to various modules.

It also has an RF input and output connector so as to be able to mix the output channel for their subsequent amplification.

4.2.- Power supply unit



4.3.- Amplifier



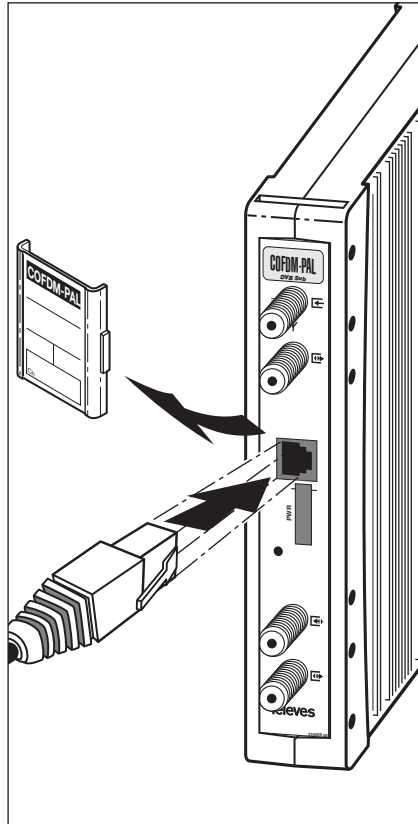
The amplifier carries out the amplification of the channels generated in the COFDM-PAL transmodulators, covering a frequency range of 47 - 862 MHz.

It disposes of two input signal connectors to mix the channels coming from two systems. If only one of the inputs is used, it is advisable to load the unused input with 75 ohm, Ref 4061.

The amplifier disposes of an output connector and a Test socket (-30dB) located at the top of the front panel.

The amplifier is powered with 15V via a cable, the same type as that used to power the other modules of this system.

4.4. -Programmer PCT 4.0



The programmer consists of 4 buttons:

- : (short press) - Selects a digit within a specific programming menu.
- ▲ ▼ : Modification of the parameter (increases/decreases) pointed by the cursor.
- : (short press) - Changes the programming menu.
- : (long press) - Changes from the main menu to the extended menu.
- : (long press) - Saves and adjusts (from any menu or submenu).
- + ● + ▲ : Increases the contrast of the screen.
- + ● + ▼ : Decreases the contrast of the screen.

NOTE: In order to program by means of the hand programmer PCT 3.0 check previous manual in www.televés.com

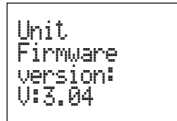
5. - HOW TO USE THE PRODUCT

5.1.- MAIN MENU

When the programmer connector is inserted in the “PROG” socket of the front pannel the first information displayed is the programmer version.

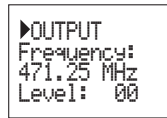


Then the unit version and build number are displayed:



a.- Output menu

The first main menu shows the output frequency/channel (depending on the freq. mode) and the output level.

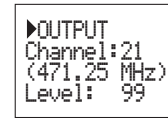


The output frequency range is 47-862 MHz. The output level control ranges from 00 to 99.

To change the frequency you must press the ● button until is located over the selected digit. By using ▲ and ▼ you can modify the value of the digit. The following decimal values are permitted for the output frequency:

- => .00 MHz
- => .25 MHz
- => .50 MHz
- => .75 MHz

To modify the output channel and the output level you must press ● until the cursor is situated over the desired parameter, the value can be modified by pressing ▲ and ▼.



To switch between frequency mode and channel mode see 5.2. EXTENDED MENU.

b.- Input menu

This menu displays the following input parameters: input frequency or input channel (depending on the selected mode), bandwidth selection (7-8 MHz) and preamplifier power supply (0, 12 or 24V).

Note: 24V not available

To modify a parameter you must press ● until the desired parameter flashes on and off. Then you can change the value using ▲ and ▼.

```

▶INPUT
Frequency:
474MHz 8MHz
Preampl: 12v
    
```

```

▶INPUT  --
Ch: 21 8MHz
(474.00 MHz)
Preampl: 12v
    
```

Should a shortcut is detected in the input connector (preamplifier powering enabled), the front led of the module will blink until this state disappears.

c.- Service menu

The name of the selected service is displayed along with the number of available services in the multiplex:

By pressing ▲ and ▼ buttons you can change the selected service.

```

▶SERVICE
1/5
TVE 1
    
```

d.- Audio menu

The next menu shows the selected audio channel (and the number of audio services available) and the audio mode.

There are two different modes for the selection of the audio channel: for language search and for index.

In **audio for language** you can choose two favourite languages for the audio. The unit will search for the audio correspondent to the first selected language. If it doesn't find it it will search for the second favourite. If it can't find any of the favourite languages the unit will select the first audio service of the program.

In this mode the unit searches for the selected audio even when this language is broadcasted in one of the channels of a dual service.

```

▶AUDIO
Audio1: fin
Audio2: den
    
```

The list of languages that can be selected is:

'eng'	English
'fra'	French
'den'	Danish
'nor'	Norwegian
'spa'	Spanish
'ger'	German
'swe'	Swedish
'fin'	Finnish
'ita'	Italian
'dut'	Dutch
'por'	Portuguese
'pol'	Polish
'rus'	Russian
'mdr'	Chinese
'hun'	Hungarian
'jpn'	Japanese
'lit'	Lithuanian
'est'	Estonian
'ara'	Arabic
'scc'	Serbian (Latin 1)
'cro'	Croatian
'ukr'	Ukrainian
'slo'	Slovakian
'bel'	Belarusian
'tur'	Turkish
'chi'	Chinese
'cze'	Czech
'rum'	Rumanian
'gre'	Greek
'lav'	Latvian

'kor'	Korean
'srp'	Serbian (Cyrillic 1)
'bul'	Bulgarian
'heb'	Hebrew
'che'	Chechen
'mol'	Moldavian
'slv'	Slovenian
'tlh'	Klingon

NOTE: Sometimes the transmitted service does not identify the audio language correctly (for instance, it sends '---' instead of an audio identifier such as 'eng'), so the receiver cannot identify the selected language. Should this happens, it is recommended to use the manual mode to select the audio.

In **Indexed Audio**, the user selects the audio service from the list of available audios for the current program. We will have the following options:

- Indexed Audio:

```
▶AUDIO
Audio: 01/02
Audio mode:
R+L
```

It will be modulated on the respective auxi-

liary audio line (L+R)/2.

```
▶AUDIO
Audio: 01/02
Audio mode:
Right
```

R will be modulated on the auxiliary audio line.

```
▶AUDIO
Audio: 01/02
Audio mode:
Left
```

L will be modulated on the auxiliary audio line.

Note: If the audio service is dual (one language on the L channel and another one on the R channel) the user must select the suitable option (Right or Left). If R+L is selected, both languages will be heard simultaneously.

To carry out the modification the ● key must be pressed until the desired parameter flashes. Then the correspondent field can be modified using the ▲ and ▼ keys.

e.- Monitor menu

This menu shows the following information: estimation of the BER (bit error rate before

Viterbi) and the firmware version of the MPEG decoder.

```
▶MONITOR >>
CBER: 2.4E-3
V.MPEG:
3.02
```

f.- Monitor menu 2

This menu indicates current temperature on a 1-10 scale, as well as the maximum temperature recorded at any time by the equipment. By pressing the ● key, the maximum is reset and updated according to current temperature.

```
▶MONITOR
Now: 04
Max: 06
●reset
```

The recommended operation ranges are as follows:

- Optimal function:** 0-6
- High temperature:** 7-8
- Excessive temperature:** 9-10

In the event that the maximum recorded lies outside the optimum range, the installation

should be altered to bring down temperature. Should the COFDM-PAL modules be in a Ref 5069 cabinet installed and the working temperature be over the optimal level, the installation of a ventilation unit Ref 5334 is strongly recommended. To check whether this change has been successful, you can reset the maximum and check temperature value after a certain time.

5.2.- EXTENDED MENU

By pressing the ● key for more than three seconds, you can access a series of options that are less frequently used and that are called extended menus.

a. Subtitles menu

The unit allows both DVB and teletext subtitling.

Two favourite languages can be selected for the subtitles, so that if the first language is not available it will choose the second one. It is also possible to disable the subtitles. The second favourite language can only be selected when the first language has already been enabled.

The selected language has preference over the subtitling type.

```

▶SUBTITLES
Subt1: fin
Subt2: ---
Ttx subt:aut
    
```

If the service does not show the subtitles automatically, you are requested to introduce the teletext page number where the subtitles are available.

The following options are possible for subtitling selection:

- **Subt. OFF** All subtitles disabled.
- **Ttx Subt aut** Only Ttx subtitling, either auto or user selected ttx page.
- **DVB subt.** DVB subtitling only
- **DVB + Ttx** DVB and TTX subtitling (*priority for DVB*).

If the **Ttx Subt** option is enabled the user can choose between “**aut**” mode (the unit searches for the page of the teletext automatically) or selecting a page of the teletext for the subtitles (usually page 888). This page will only be displayed if the unit doesn't find the teletext subtitles for the selected languages.

The list of available languages for subtitling is the same as the audio list (see pages 14, 15).

b. Audio mode menu

In this menu the user can select the way the unit handles the audio service. Two options are possible: for **language** or for **index**.

- **Language:** two favourite languages can be selected for the audio in the audio menu. In this mode the unit automatically searches for the selected audio.

```

▶AUDIO MODE
Language
    
```

- **Index:** the audio is selected from the available audios of the service. This option can be used if the audio information is not properly broadcasted.

```

▶AUDIO MODE
Index
    
```

c.- Modulador menu 1

This menu shows the following parameters of the output modulation: video modulation depth (VMD), video to audio carrier ratio and subcarrier ratio frequency in MHz.

```

▶MODULATOR>>
VMD: 72.8%
Pict5 1: -12
Sound: 5.5MHz
    
```

Video modulation depth: the possible values for the video modulation depth are:

- | | |
|----------|----------|
| 1. 68.5% | 5. 79.0% |
| 2. 72.0% | 6. 80.0% |
| 3. 75.5% | 7. 81% |
| 4. 77.0% | 8. 82.5% |

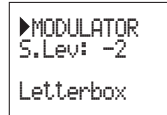
Video to audio carrier ratio: for the carriers ratio there are 8 possible values between -11 and -18 dB.

Audio subcarrier frequency: this enables us to comply with PAL B-G-H-I-D standards. For audio subcarrier frequency the possible values that are selected 4.5, 5.5, 6.0 and 6.5 MHz.

To carry out a modification the ● key must be pressed until the selected parameter flashes. Then the correspondent parameter can be modified by pressing the ▲ and ▼ keys.

d.- Modulator menu 2

This menu shows the following parameters: audio level and video format.



Audio level: the value displayed indicates the necessary audio input level to get a deviation of ±50KHz considering an input signal of 1KHz. This means that -15 dBm will generate a greater audio level than 7 dBm.

Audio input level (dBm)
7
5
3
1
0
-1
-2
-3
-4
-5
-7
-9
-13
-15

Video format: allows the selection of the video mode for programs in 16:9 format.

Three possible modes are available:

- Pan & Scan: wide screen is scanned and panned left and right to give a full screen picture
- Letterbox: picture with black bars on top and bottom of picture.
- Full Screen: the picture adapts to the whole screen but its contents are deformed.

To carry out a modification the ● key must be pressed until the desired parameter flashes. Then the parameter can be modified just pressing the ▲ and ▼ keys.

e.- COFDM parameters menu

The parameters of the COFDM transmission are displayed in this menu:

- FFT size (number of carriers): 8K-2K.
- Constellation (type of modulation): QPSK - 16 QAM - 64QAM.
- Guard interval: 1/4, 1/8, 1/16 o 1/32
- Viterbi rate (coderate): 1/2, 2/3, 3/4, 5/6 o 7/8.

```

▶COFDM
 8K - 640AM
Guard: 1/32
CodeRate:3/4
    
```

f.- Configuration menu

Through this menu the address of the unit can be selected (so that it could be controlled by the Headend Controller CDC, not available in this reference).

From this menu you can switch between frequency and channel table mode.

```

▶CONFIG
CDCAddr: 001
Mode:
Frequency
    
```

```

▶CONFIG
CDCAddr: 001
Chan. table:
CCIR N.Z. Ind
    
```

The following channel tables are available:

Table 1: CCIR, New Zealand and Indonesia. Italian channels.

Table 2: China, Taiwan and CCIR hyperband.

Table 3: M/N, Chile.

Table 4: France.

Table 5: Australia.

Table 6: Southafrica, K1 (8 MHz), I (Ireland, 8MHz).

Table 7: Former URSS and OIRT.

To carry out a modification the ● key must be pressed until the desired parameter flashes. Then the correspondent parameter can be modified by pressing ▲ and ▼.

g. Scan transponder menu

This menu allows the user to repeat the exploration of the input signal, for example, if the names of the services haven't been found. To force a new exploration just press ▲ or ▼.

```

▶SCAN TRANSP
Press ▲ or ▼
to scan
again
    
```

This menu only appears when the unit is hooked.

h.- Language selection menu

The last extended menu allows the selection of the menus language (English/Spanish/German).

```

▶LANGUAGE
English
    
```

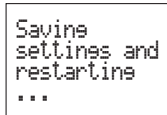
By pressing ▲ or ▼ you switch between different languages.

Note: It is necessary for the unit to be locked onto COFDM so that the following menus can be selected:

- Audio menu
- Audio for language/index (audio mode)
- Video format (letterbox, fullscreen...)
- Subtitles menu

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:



The command should not be with drawn until the message disappears.

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

Whenever the input channel or frequency is modified, and once the unit has managed to lock onto the COFDM signal, an automatic search of all the available services will be carried out. While the analysis is taking place, the display will show the following message:



The time that this process will last depends on the number of services in the COFDM multiplex.

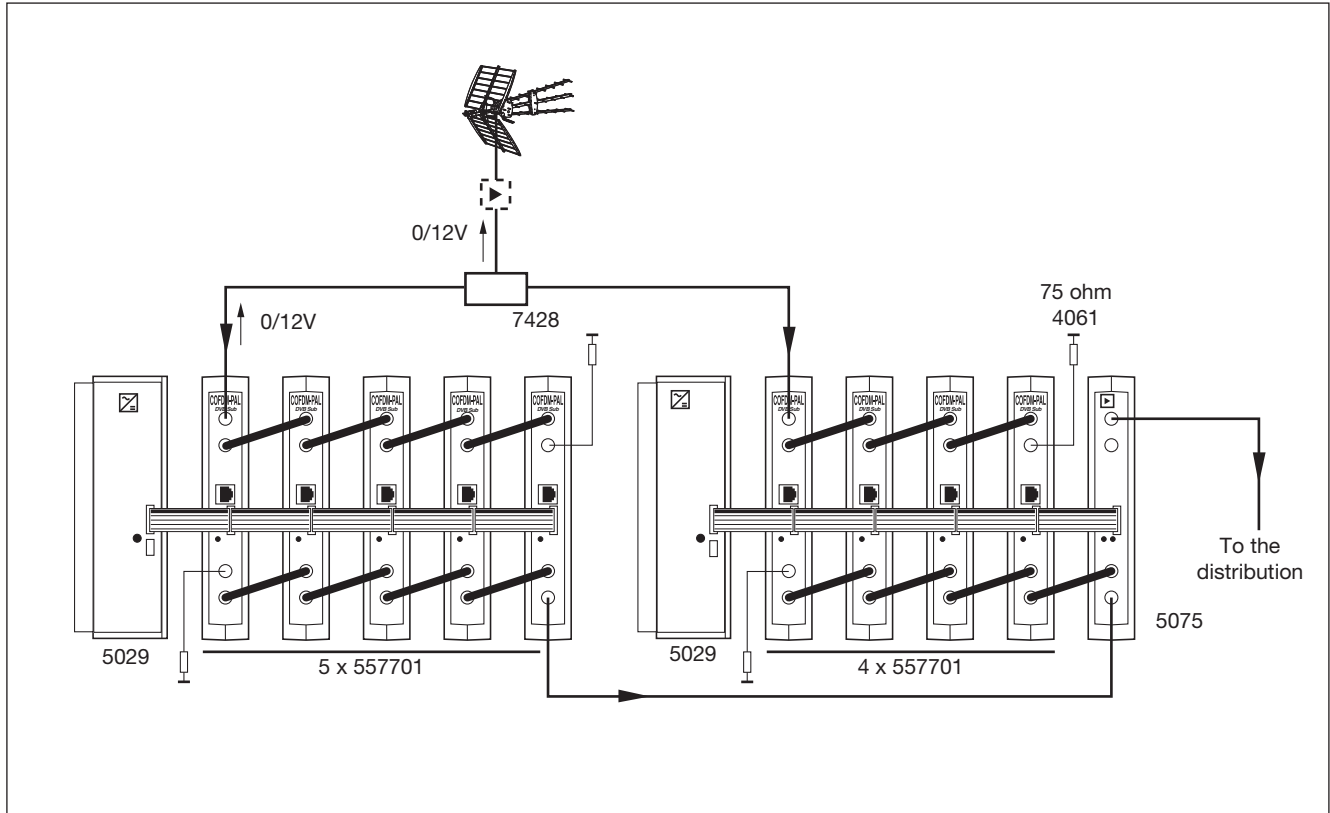
Finally, the LEDs indicate the following operational status:

- Left LED (A) = Enough input level (orientative).
- Central LED (B) = COFDM demodulator locked.
- Right LED (C) = MPEG synchronization (audio and/or video synchronized).

When the LEDs are ON indicate a correct operation. If any of them is OFF it indicates an abnormal operation.

TIP: The LED C will turn off any time that the selected program can't be correctly synchronize. This will happen either when the service is coded or has errors.

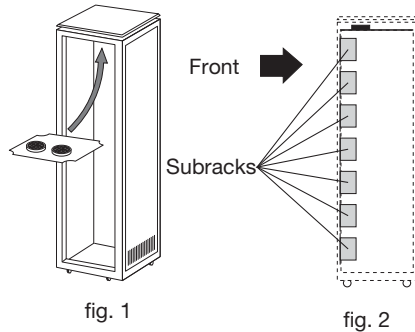
6.- TYPICAL APPLICATION



7.- NORMS FOR RACK MOUNTING (max. 35 COFDM-PAL - 7 subracks with 5 units in height - 8.7")

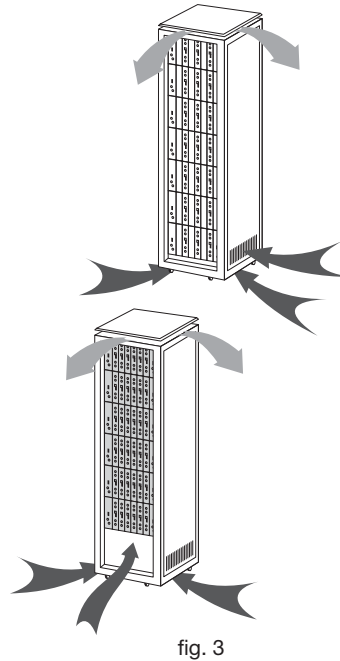
7.1.- Installation of the rack with ventilation facilities.

To facilitate the renewal and circulation of the air in the rack and reduce the temperature of the units thereby improving their characteristics, it is advisable to place 2 ventilation units of 25W, particularly when the rack with the COFDM-PAL is located in warm place, with a temperature higher than 40°C.

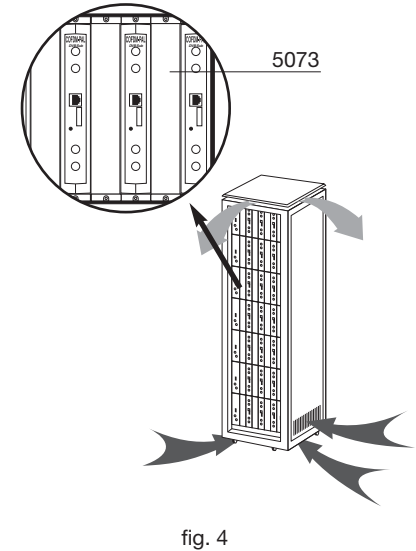


These ventilators will be placed on a tray, that is screwed onto the top part of the Rack, fig. 1 and 2, so that they can extract the air from the COFDM-PAL and expel it via the gap (approx. 3-5 cm) at the top part of

the Rack. The air will enter again through the lower part of the device, fig 3.



To mount the units in the rack with ventilation, you must mount blank plates ref. 5073 between the modules to allow the correct ventilation of the equipment, fig. 4.



It is very important for this process to work correctly, therefore the following must be observed:

- Do not open the side doors, as this would cause the ventilators to extract air from the outside rather than from 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 5.

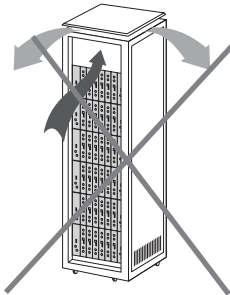
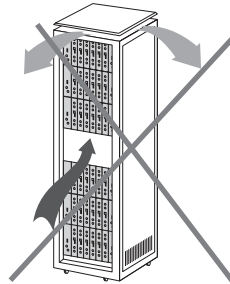
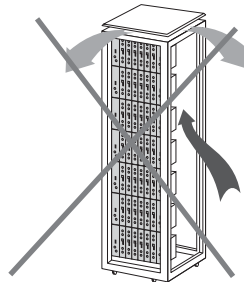


fig. 5



7.2.- 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 40°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. The use of the blank plates ref. 5073 is optional, fig. 6.

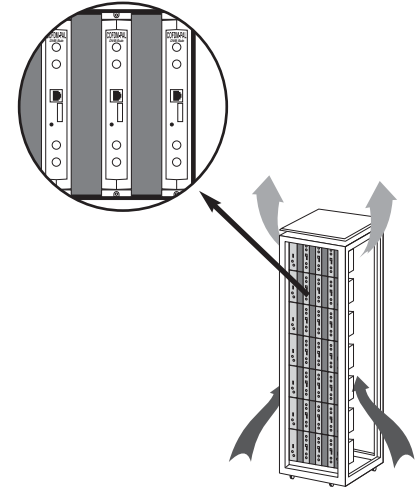


fig. 6

8.- NORMS FOR CABINET MOUNTING

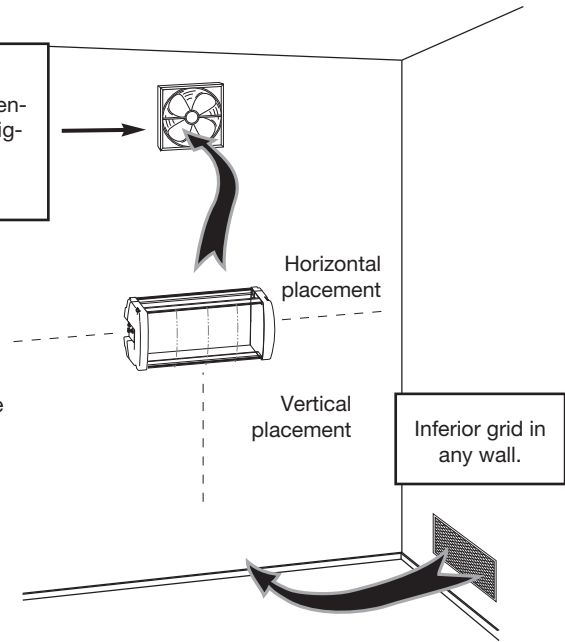
IMPORTANT

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 40°C in both ways of placement, horizontal or vertical way.

EXTRACTOR for forced ventilation must be onto the highest module.

Should the maximum temperature indicator in any of the modules (check "measurements menu 2") be higher than 6, we strongly recommend the use of ventilation unit **Ref. 5334**.
(Only compatible with Ref. 5069)



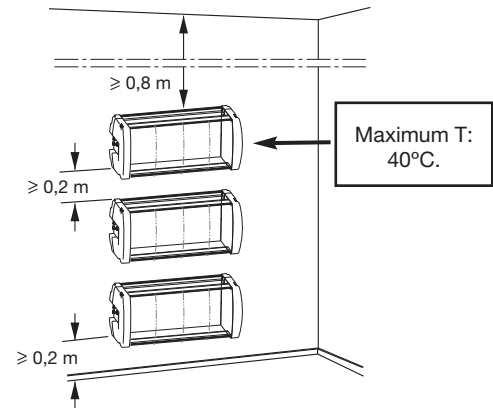
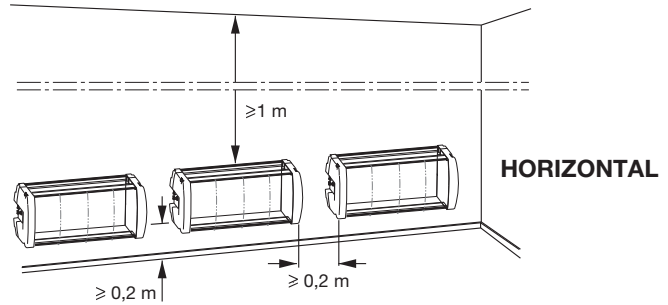
IMPORTANT

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.

Place the cabinets with as less height as possible



A.- CHANNEL TABLE

CH	Tab1	Tab2	Tab3	Tab4	Tab5	Tab6	Tab7
	CCIRR N. Zealand Indonesia	China Taiwan Hyper-CCIRR	M/N Chile	France	Australia	South Africa K1 (8Mhz) I (8Mhz Ireland) French Terr. Angola (4....9)	USSR OIRT
0				47.75	46.25		
1		49.75		55.75	57.25		49.75
2	48.25	57.75	55.25	60.50	64.25	53.75	59.25
3	55.25	65.75	61.25	63.75	86.25	61.75	77.25
4	62.25	77.25	67.25		95.25	175.25	85.25
5	175.25	85.25	77.25		102.25	183.25	93.25
6	182.25	168.25	83.25		175.25	191.25	175.25
7	189.25	176.25	175.25		182.25	199.25	183.25
8	196.25	184.25	181.25		189.25	207.25	191.25
9	203.25	192.25	187.25		196.25	215.25	199.25
10	210.25	200.25	193.25	176.00	210.25	223.25	207.25
11	217.25	208.25	199.25	184.00	217.25	231.25	215.25
12	224.25	216.25	205.25	192.00	224.25		223.25
13		471.25	211.25	200.00		247.43 (247.5)	
14		479.25	471.25	208.00			
15		487.25	477.25	216.00			
16		495.25	483.25				
17		503.25	489.25				
18		511.25	495.25				
19		519.25	501.25				
20		527.25	507.25		138.25 (5 A)		
21	471.25	535.25	513.25		203.25 (9 A)		
22	479.25	543.25	519.25		209.25		
23	487.25	551.25	525.25		216.29		
24	495.25	559.25	531.25				
25	503.25	607.25	537.25				
26	511.25	615.25	543.25				
27	519.25	623.25	549.25		521.25		
28	527.25	631.25	555.25		527.25		
29	535.25	639.25	561.25		534.25		
30	543.25	647.25	567.25		541.25		

CH	Tab1	Tab2	Tab3	Tab4	Tab5	Tab6	Tab7
31	551.25	655.25	573.25		548.25		
32	559.25	663.25	579.25		555.25		
33	567.25	671.25	585.25		562.25		
34	575.25	679.25	591.25		569.25		
35	583.25	687.25	597.25		576.25		
36	591.25	695.25	603.25		583.25		
37	599.25	703.25	609.25		590.25		
38	607.25	711.25	615.25		597.25		
39	615.25	719.25	621.25		604.25		
40	623.25	727.25	627.25		611.25		
41	631.25	735.25	633.25		618.25		
42	639.25	743.25	639.25		625.25		
43	647.25	751.25	645.25		632.25		
44	655.25	759.25	651.25		639.25		
45	663.25	767.25	657.25		646.25		
46	671.25	775.25	663.25		653.25		
47	679.25	783.25	669.25		660.25		
48	687.25	791.25	675.25		667.25		
49	695.25	799.25	681.25		674.25		
50	703.25	807.25	687.25		681.25		
51	711.25	815.25	693.25		688.25		
52	719.25	823.25	699.25		695.25		
53	727.25	831.25	705.25		702.25		
54	735.25	839.25	711.25		709.25		
55	743.25	847.25	717.25		716.25		
56	751.25	855.25	723.25		723.25		
57	759.25		729.25		730.25		
58	767.25		735.25		737.25		
59	775.25		741.25		744.25		
60	783.25		747.25		751.25		
61	791.25		753.25		758.25		
62	799.25		759.25		765.25		
63	807.25		765.25		772.25		
64	815.25		771.25		779.25		
65	823.25		777.25		786.25		
66	831.25		783.25		793.25		
67	839.25		789.25		800.25		
68	847.25		795.25		807.25		

CH	Tab1	Tab2	Tab3	Tab4	Tab5	Tab6	Tab7
69	855.25		801.25		814.25		
70	53.75		807.25				
71	62.25	303.25 (S21)	813.25				
72	82.25	311.25	819.25				
73	175.25	319.25	825.25				
74	183.75	327.25	831.25				
75	192.25	335.25	837.25				
76	201.25	343.25	843.25				
77	210.25	351.25	849.25				
78	217.25	359.25	855.25				
79	224.25	367.25	861.25				
80	105.25	375.25					
81	112.25	383.25					
82	119.25	391.25					
83	126.25	399.25					
84	133.25	407.25					
85	140.25	415.25					
86	147.25	423.25					
87	154.25	431.25					
88	161.25	439.25					
89	168.25	447.25					
90	231.25	455.25					
91	238.25	463.25 (S41)					
92	245.25						
93	252.25						
94	259.25						
95	266.25						
96	273.25						
97	280.25						
98	287.25						
99	294.25						

 Italian channels

 "S" bands

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EN 50083-2:2001 + A1:2005: Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment

Santiago de Compostela, 02 de Septiembre de 2008



José L. Fernández Curmero
Technical Director



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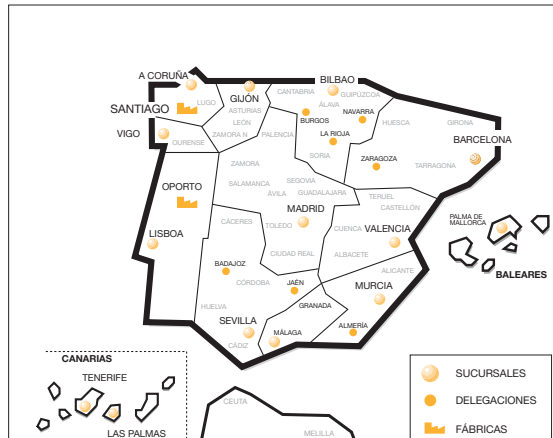
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