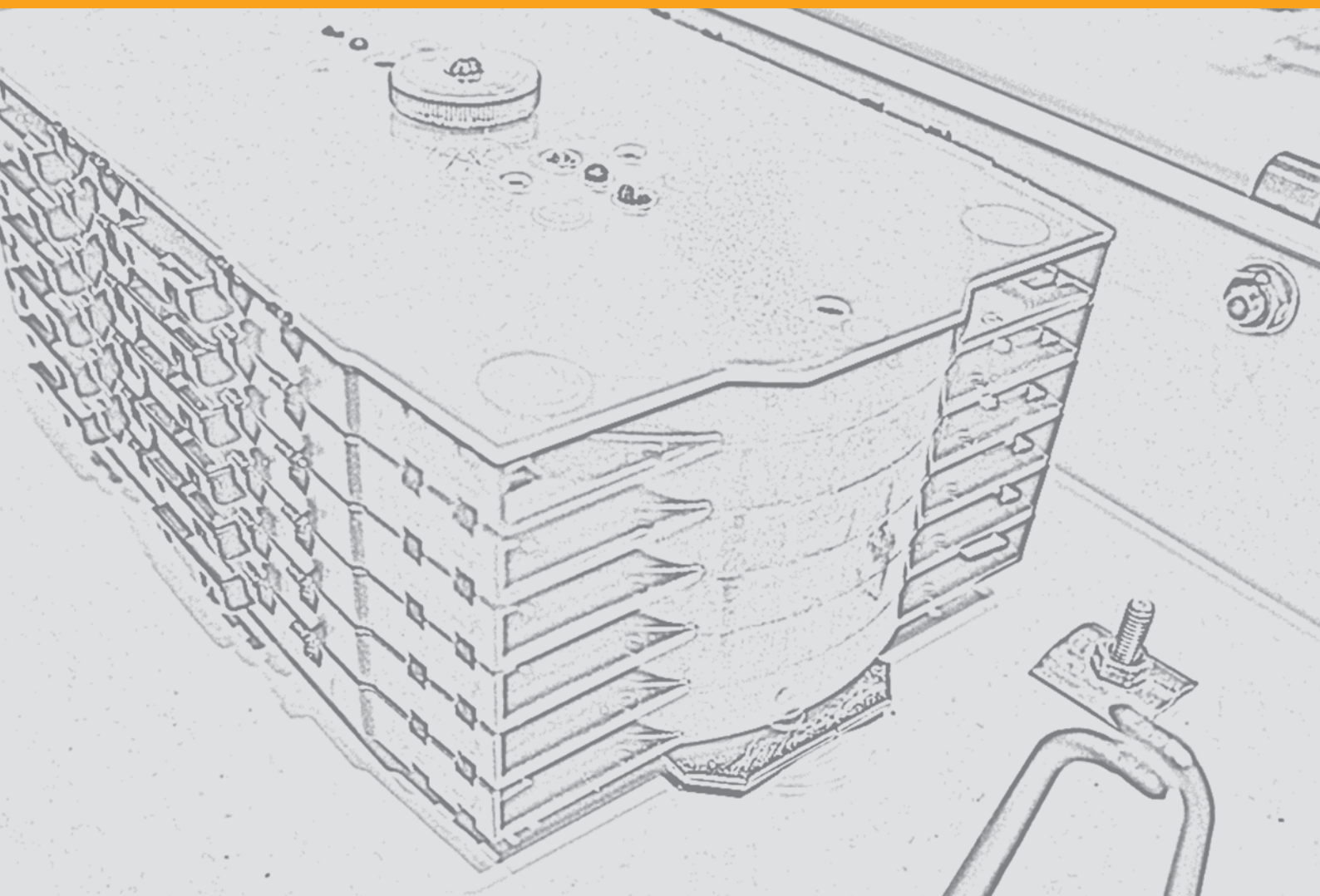
Televes

FIBER OPTICS



FIBER OPTICS DISTRIBUTION

A professional solution for large distribution networks

The use of **optical fiber** is the professional solution to solve the problem of the **distribution of the TV signal over wide areas**.

More and more often we find situations in which we need to distribute the TV signal in wider areas like, for example, shopping centres, stadiums or residencial resources.

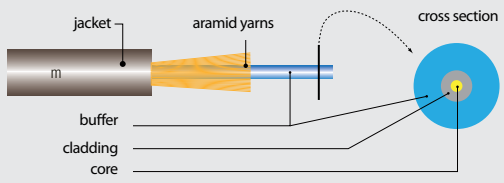
As distances covered by TV distribution networks increase, we start facing limitations due to the use of coaxial cable in long TV links: "higher attenuations that lead to the use of several cascaded amplification stages that will degrade the quality of the signal" (reduction of the C/N).

The problem is even worse when you must distribute other TV bands than the terrestrial like, for example, satellite signals. A possible solution to this situation comes from the use of optical fiber, which offers the following **advantages**:

- An attenuation about 0,3 dB/Km. Hence longer links can be realised without re-amplification.
- Immunity against noise and interferences.
- Transmissions are safe and reliable.
- Large bandwidth.
- Fully compatible with digital technologies
- Small dimensions and weight. Easy cabling through conduits.
- The raw material to manufacture optical fiber is one of the most abundant in the nature.

Against these advantages, optical fiber shows the following **disadvantages**:

- Only can subscribe persons living in those areas where the optical fiber network is already installed.
- Special care has to be taken along its installation: splicing, cleaning, safety,..., etc



Typical composition of an optical fiber

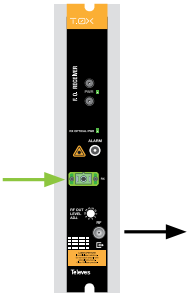
Televés, world leader in transmision and reception of digital signals, supplies a new and complete system of equipment in optical fiber to distribute TV signals.

FIBER OPTICS DISTRIBUTION

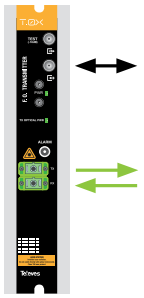
Depending on the services processed, the T.0X devices can be grouped within the following sections:

- **SMATV headends** *(see T.0X section)*
- **MATV headends** *(see T.0X section)*
- **Headend management and SW***(see T.0X section)*
- **Optical fiber headends**

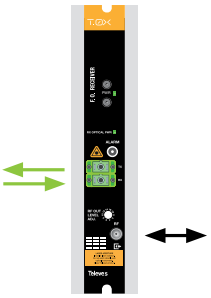
Transmitter
2333 / 233310
234304 / 234310



Receiver
2335



Transmitter
with Return Channel
2334 / 233410



Receeiverr
with Return Channel
2336

To configure headends, adapt signals and installation hardware, below is a list of Auxiliary equipment and Accessories:

- CDC IP: ref. 5559.
- CDC IP/GSM: ref. 555901.
- TSuite control software: ref. 216801.
- Amplifier Push-Pull High Power: ref. 5575.
- Power Supply Unit: ref. 5629.
- Portable Programmer Unit PCT 5.0: ref. 7234.
- Adapter USB-COM: ref. 5838.
- Terminal load F 75 Ω DC-block: ref. 4061.
- Terminal load F 75 Ω: ref. 4058.
- Wall support 498mm (PSU+7 Modules T.0X): ref. 5071.
- Wall support 560mm (PSU+8 Modules T.0X): ref.5239.
- Rack frame 19"/5U (PSU+7 Modules T.0X): ref.5301.
- Wall mount lockable cabinet (PSU+7 Modules T.0X) with ventilation unit: ref. 507202.
- Rack 19" 15U: ref. 5333.
- Rack 19" 28U: ref. 5331.
- Rack 19" 37U: ref. 5332.
- Blank plate: ref. 5673.
- Control Bus Jumper (1m): ref.422603.

Televés also has available "USA version" products specially adapted for the U.S. market, which can be consulted in this catalogue.

F.O. T.0X SERIES. - QUICK REFERENCE GUIDE

TYPE	OUTPUT / INPUT	OPT →	OPT ↔	RF →	RF ↔
TX	→RF	**2333 233310 234304 234310**	–	–	
	↔RF	–	**2334 233410**	–	
RX	→OPT	–		**2335**	–
	↔OPT	–			**2336**
OPTICAL SPLITTERS	2 →	**2337**	–		
	4 →	**2339**			
	8 →	**234401**			
	16 →	**234501**			
	32 →	**234601**			

Optical Transmitters

QR-A00151

Are transmitters that generate an optical output of 1310 or 1550 nm, modulated by the incoming RF signal.
In addition, Ref. 2334, 233411 and Ref. 233410 feature optical reception in the return channel.

- **SMATV compatible** RF input (87 - 2150 MHz).
- Optical **output power up to 10 dBm.**
- **Control of RF input** level for adjusting the quality parameters of optical transmission. In addition, Ref. 2334, 233411 and Ref. 233410 feature an output level control in the the return channel.
- Feature control signals for **monitoring the optical output** signal. Ref. 2334, 233411 and Ref. 233410 also monitor the optical signal in the return channel.
- Equipped with tension-free connections (relay) that allow implementing an **alarm** when the optical power falls.

▲ 2334

REF.	DESCRIPTION
2333	Optical Transmitter 1310nm "SC/APC" 6dBm w/o Return Ch.
233310	Optical Transmitter 1310nm "SC/APC" 10dBm w/o Return Ch.
2334	Optical Transmitter 1550nm "SC/APC" 4dBm w/o Return Ch.
233410	Optical Transmitter 1550nm "SC/APC" 10dBm w/o Return Ch.
234304	Optical Transmitter 1310nm "SC/APC" 6dBm with Return Ch. Optical Receiver 1200...1600nm
234310	Optical Transmitter 1310nm "SC/APC" 10dBm with Return Ch. Optical Receiver 1200...1600nm
USA version	
233306	Optical Transmitter 1310nm "SC/APC" 6dBm w/o Return Ch.
233311	Optical Transmitter 1310nm "SC/APC" 10dBm w/o Return Ch.
233411	Optical Transmitter 1550nm "SC/APC" 10dBm w/o Return Ch.
234305	Optical Transmitter 1310nm "SC/APC" 6dBm with Return Ch. Optical Receiver 1200...1600nm
234311	Optical Transmitter 1310nm "SC/APC" 10dBm with Return Ch. Optical Receiver 1200...1600nm

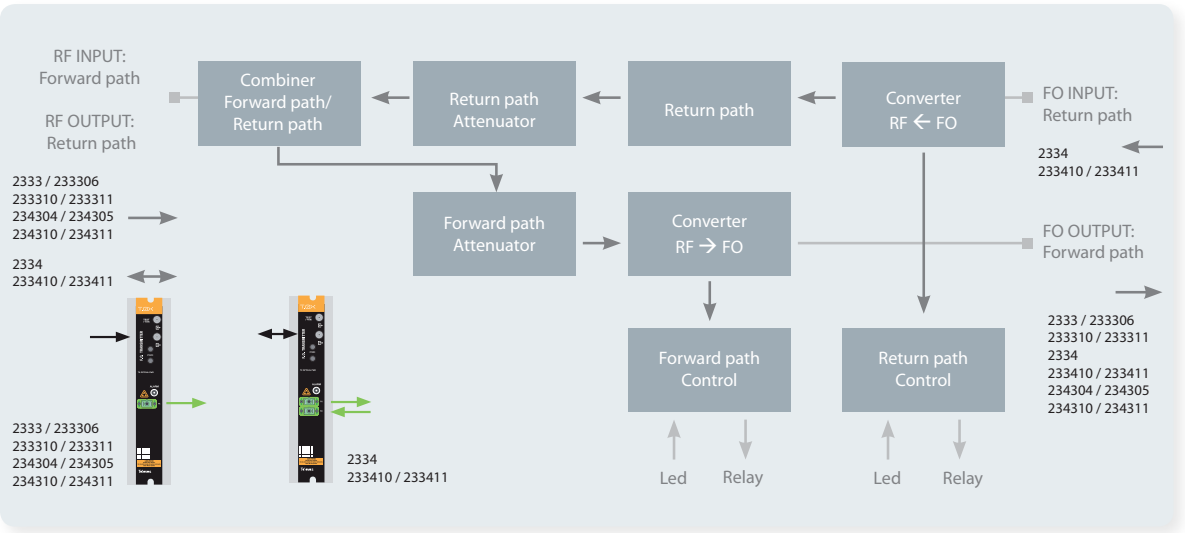
	CONNECTIONS
1	Test output (- 16 dB)
2	RF input
3	Power BUS
4	Alarms
5	Optical output (forward path)
6	Optical input (return path)
7	RF level adjustment (forward path)
8	RF level adjustment (return path)

T.0X HEADENDS

Reference					2333	233310	2334	233410	234304	234310
				USA version	233306	23311		233411	234305	234311
INPUT	RF	Frequency range		MHz	87...2150 54...2150 (1)					
		Max. input level for CSO & CTB >= 60dB (2)	MATV	dBµV/dBmV	91 / 31	87 / 27	91 / 31	87 / 27	85 / 25	87 / 27
			SAT IF		80 / 20					
		Equivalent input noise figure @ 850MHz		dBm/Hz	- 150					
		Equivalent input noise figure @ 2GHz			- 146					
		Regulation margin		dB	0 - 18					
		Return losses			≥ 10					
		Impedance		Ω	75					
	F.O. Return path	Wavelength		nm	-		1200...1600		-	
		Detection bandwidth		MHz	-		1...3000		-	
		Optical power received (max)		dBm	-		2/3		-	
		Optical connector			-		SC/APC		-	
OUTPUT	F.O. Forward path	Wavelength		nm	1310				1550	
		Optical power transmitted (max)		dBm	4/6	10/10	4/6	10/10	2,5/4	10/10
		Optical connector			SC/APC					
	RF Return path	Frequency range		MHz	-		1...65 5...42 (1)		-	
		Output level DIN45004B		dBµV/dBmV	-		112 / 52		-	
		Regulation margin		dB	-		0...18		-	
		Return losses			-		≥ 10		-	
		Impedance		Ω	-		75		-	
GENERAL		Powering voltage		Vdc	12 - 24					
		Consumption 24Vdc		mA	104	140	160	170	140	160
		Ingress protection		IP	20					
		Dimensions (WxHxD)		mm	50 x 216 x 175					

(1) Frequency range for USA references.
(2) Input: 41 TV CH CENELEC and 1 complete satellite transponder. The input attenuator in 0 dB position.

BLOCK DIAGRAM



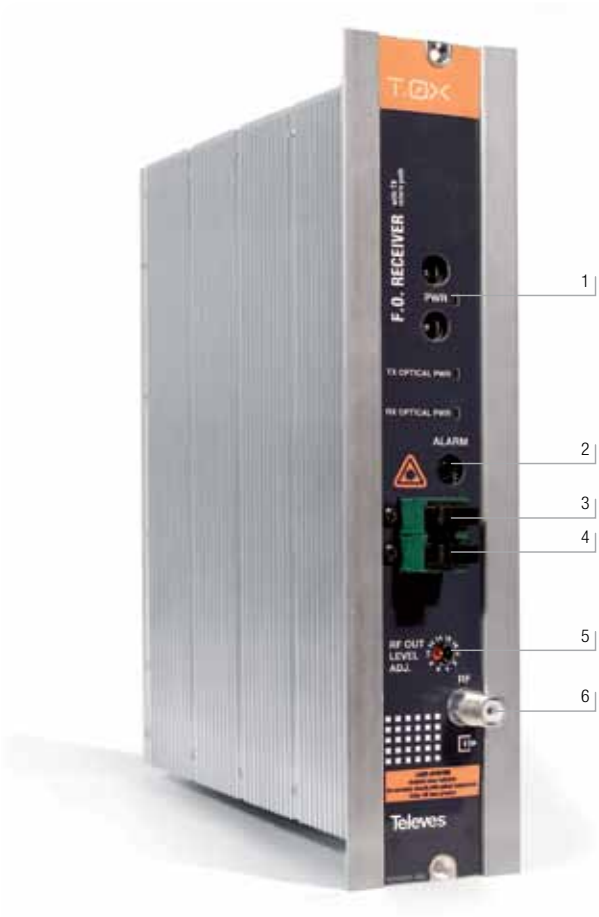
T.0X HEADENDS

Optical receivers

QR-A00025

Are optical receivers that deliver the original RF signal that has previously been converted by a fiber optic transmitter.

- Ref. 2336 and 233601 features return path optical transmitter.
- Multi-window input (1200 ···1600 nm).
- Wide input dynamic range (-10 to 6 dBm).
- RF amplified output capable of delivering: 114dBµV in MATV, and 117dBµV in SAT IF.
- Control signals available for monitoring optical input signal. Ref.2336 and 233601 also monitors the optical output signal in the return path.
- Equipped with tension-free connections (relay) for use as an alarm when the received optical power falls.



▲ 2336

REF.	DESCRIPTION
2335	Optical Receiver 1200...1600nm "SC/APC" w/o Return Ch.
2336	Optical Receiver 1200...1600nm "SC/APC" with Return Ch. Optical Transmitter 1310nm 3dBm
USA version	
233501	Optical Receiver 1200...1600nm "SC/APC" w/o Return Ch.
233601	Optical Receiver 1200...1600nm "SC/APC" with Return Ch. Optical Transmitter 1310nm 6dBm

	CONNECTIONS
1	Power BUS
2	Alarms
3	Optical output (return path)
4	Optical input (forward path)
5	RF level adjustment (forward path)
6	RF output (forward path) / RF input (return path)

T.0X HEADENDS

Reference				USA version	2335	2336
					233501	233601
INPUT	F.O. Forward path	Wavelength		nm	1200...1600	
		Detection bandwidth		MHz	1...3000	
		Optical power received (max)		dBm	4/6	
		Optical connector			SC/APC	
	RF Return path	Frequency range		MHz	-	1...65 5...42 (1)
		Return path input level DIN45004B		dBµV	-	95
		Equivalent input noise figure @ 30 MHz		dbm/Hz	-152,5	
		Return losses		dB	-	≥ 11
		Impedance		Ω	-	75
OUTPUT	RF Forward path	Frequency range		MHz	87...2150 54...2150 (1)	
		Max. output level for CSO & CTB >= 60 dB(2)	MATV	dBµV/dBmV	93 / 33	
			SAT IF		90 / 30	
		Regulation margin		dB	0 - 18	
		Return losses			≥ 11	
		Impedance		Ω	75	
	F.O. Return path	Wavelength		nm	-	1310
		Optical power transmitted (max)		dBm	-	2/3 4/6 (1)
		Optical connector			-	SC/APC
GENERAL		Powering voltage		Vdc	12 - 24	
		Consumption 24Vdc		mA	155	175
		Ingress protection		IP	20	
		Dimensions (WxHxD)		mm	50 x 216 x 175	

(1) Frequency range for USA references.
(2) Output: 42 TV CH CENELEC and 1 complete satellite transponder. The output attenuator in 0 dB position.

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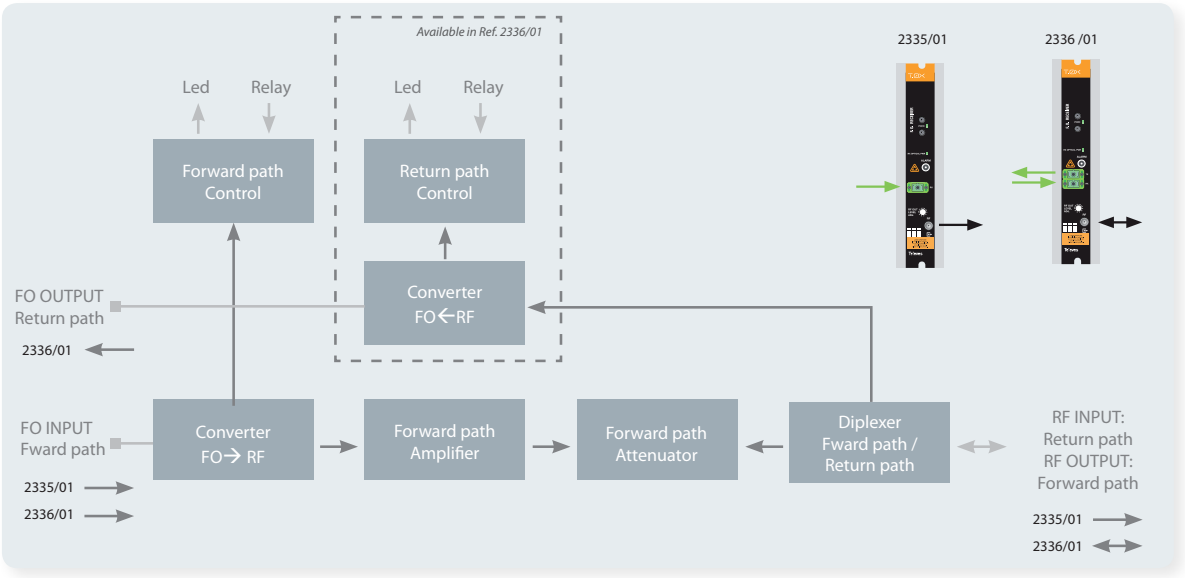

Optical splitters

QR-A00153

Passive optical splitters: 2, 4, 8, 16 and 32 outputs, to be used in optical fibre star networks.

REF.	DESCRIPTION
2337	Optical Splitter 1310/1550nm "SC/APC" 2D 4dB
2339	Optical Splitter 1310/1550nm "SC/APC" 4D 7dB
234401	Optical Splitter 1310/1550nm "SC/APC" 8D 10dB
234501	Optical Splitter 1310/1550nm "SC/APC" 16D 14dB
234601	Optical Splitter 1310/1550nm "SC/APC" 32D 17dB

▲ 2339

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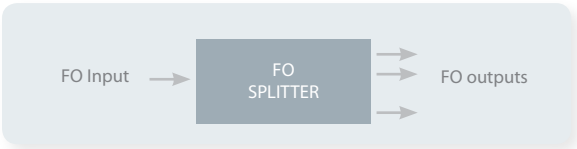

CONNECTIONS	
1	Input
2	Outputs

Reference			2337	2339	234401	234501	234601
No. of outputs			2	4	8	16	32
INPUT / OUTPUT	Wavelength	nm	1310 - 1550				
	Optical connector		SC/APC				
	Insertion losses 1310/1550 nm	dB	≤ 4,1	≤ 7,5	≤ 11	≤ 13,7	≤ 17,5
	Uniformity		≥55				
	Directivity		≥55				
	Return losses		≤ 0,6	≤ 0,8	≤ 0,8	≤ 1,2	≤ 2
GENERAL	Ingress protection level	IP	20				
	Dimensions (WxHxD)	mm	50 x 216 x 175		73 x 216 x 175		

Optical Amplifier

QR-A00152

Optical amplifier (EDFA) intended to be attacked with the signal from an optical transmitter with a wavelength of 1550nm (ref. 234304).

- High output power.
- Low noise figure.
- High input range.

REF.	DESCRIPTION
234220	Optical Amplifier 1550nm "SC/APC" 20dBm

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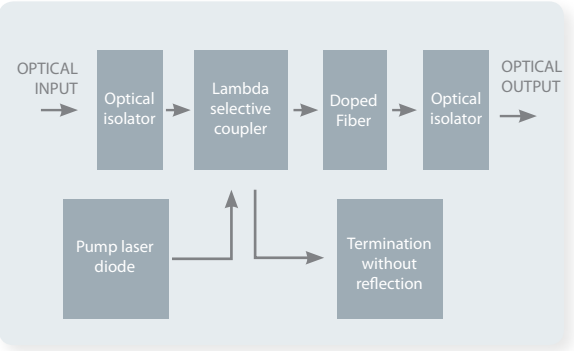

CONNECTIONS	
1	Power
2	Optical input
3	Optical output

Reference			234220
OPTICAL INPUT	Input optical power range	dBm	-3 ~ +10
	Input connector	type	SC/APC
OPTICAL OUTPUT	Output optical power	dBm	20 ± 0,8
	Output connector	type	SC/APC
	Noise figure	dB	≤ 5 (for 0 dBm)
	Optical return losses	dB	≥ 50
GENERAL	Wavelength	nm	1550
	Powering	Vdc	24
	Consumption @ 24 Vdc	mA	410 max.
	Ingress protection level	IP	20
	Dimensions (WxHxD)	mm	75 x 216 x 175

RF Amplifier

QR-A00064

High power amplifier specially designed for T.0X series devices.

- **Low distortion** of second and third order allowing high output voltage (typical values of 120dBµV).
- Features two inputs, which allows mixing of channels processed from its own headend and channels from other sources.
- Equipped with test output.

REF.	DESCRIPTION
5575	Amplifier Push-Pull (47... 862MHz)

CONNECTIONS	
1	RF Output
2	Test Output (-30dB)
3	Power
4	Attenuator
5	RF Input
6	RF Input

Reference				5575
RF INPUT	Frequency range		MHz	47...862
	Noise figure		dB	< 11
	Return losses			> 10
	Impedance		Ω	75
RF OUTPUT	Frequency range		MHz	46...862
	Gain		dB	44 ± 2,5
	Output level	DIN45004B	dBµV	120
		42 CH Cenelec		105
	Gain regulation		dB	0 - 20
	Return losses			> 8
	Impedance		Ω	75
GENERAL	Powering voltage		Vdc	24
	Consumption		mA	450 max.
	Ingress protection level		IP	20
	Dimensions (WxHxD)		mm	50 x 216 x 175

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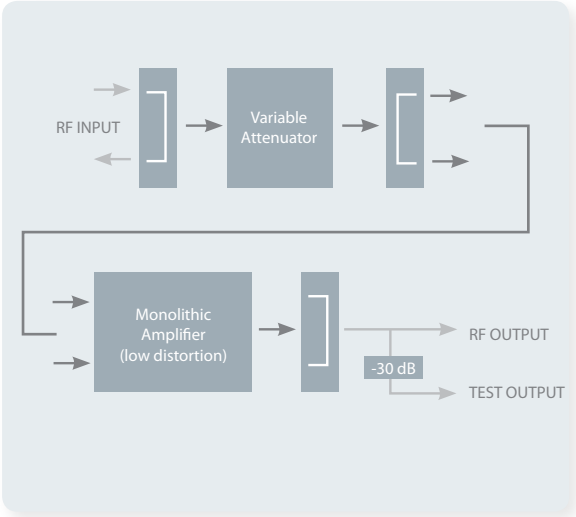

Power Supply Unit

QR-A00065

High power switched-mode PSU, flyback type and high efficiency (> 85%).

Capable of delivering 5A at 24V (120W).

- Equipped with two outputs monitored by LEDs to indicate the status of the voltage delivered.
- Detects either overload or short-circuit.
- 4A maximum current per output.
- It offers protection against output voltage variation.

REF.	DESCRIPTION
5629	Switched-mode Power Supply Unit

	CONNECTIONS
1	DC outputs
2	Status LED
3	Mains socket

Reference				5629
MAINS	AC	Voltage	VAC	196...264
		Frequency	Hz	50, 60
OUTPUT	DC	Voltage	Vdc	24
		Max. current	A	5 (4 max. per output)
		Max. power	W	120
		Efficiency	%	> 85
GENERAL		Consumption	W	140 max.
		Ingress protection	IP	20
		Dimensions (WxHxD)	mm	75 x 216 x 175

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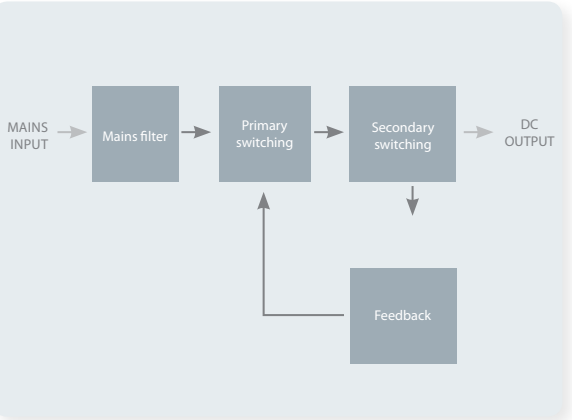
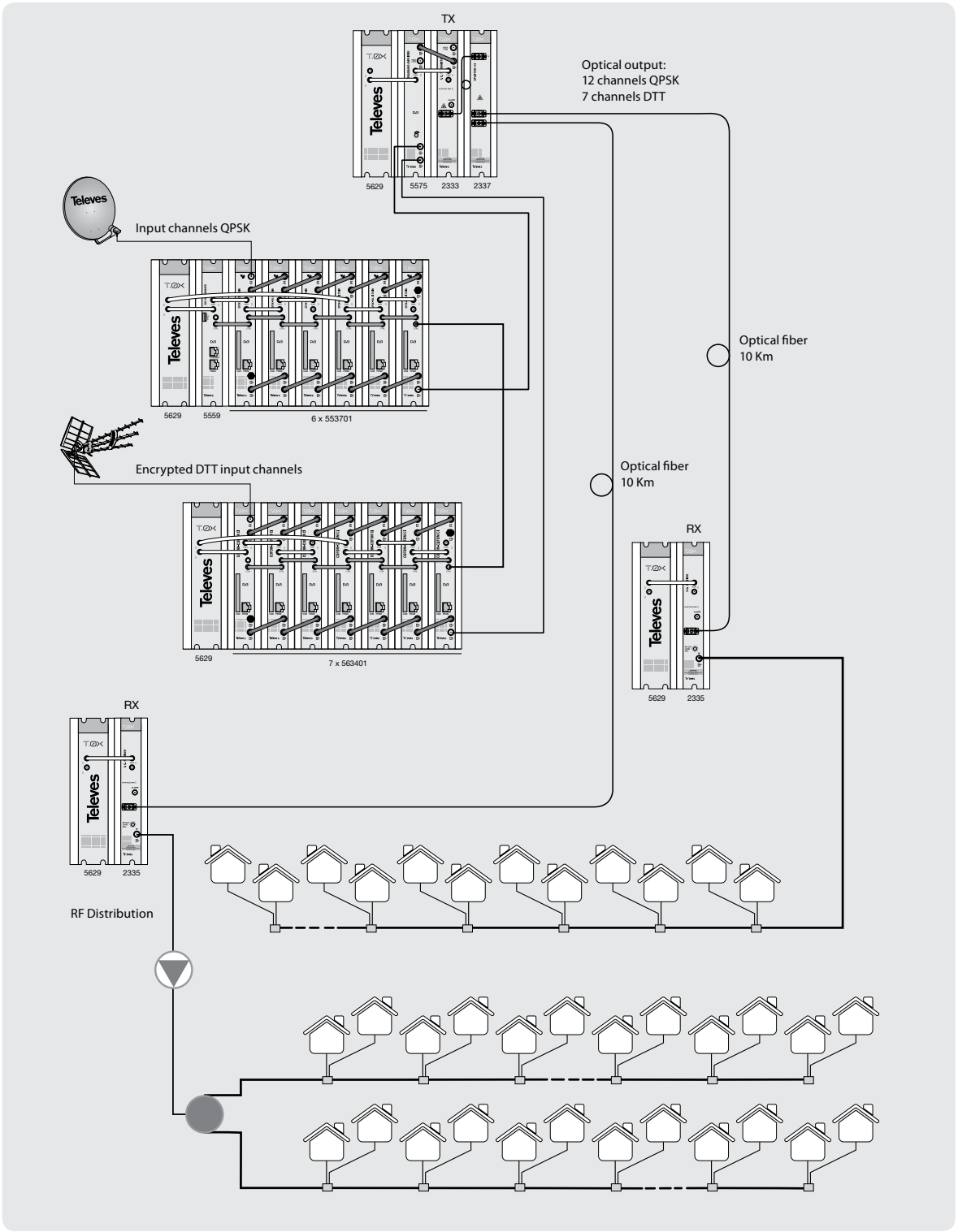


APPLICATIONS

Ref. 2333 / 2335 / 553701 / 563401

- 19 Channels



Optical Receivers

QR-A00021

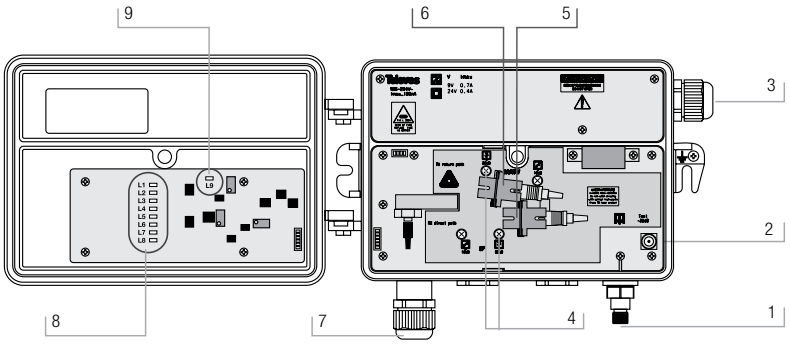
Outdoor optical receiver (Ref. 2310 includes return channel).

This node is intended to be used as a launch amplifier in a final coaxial distribution network; it becomes the link between the end of the optical network trunk and the end users.

- High RF output power amplifier.
- It is equipped with separate stages of RF and IF, with controls for equalisation and attenuation.
- **Graphical scale (LEDs)** to inform about the optical input power.
- **LED OK/ NOT OK** indicates the correct optical output level of the return channel.
- Features a external test output to avoid cutting services to the user in maintenance operations.
- **Shielded enclosure IP61.**

▲ 2310

REF.	DESCRIPTION
2310	Outdoor Optica Receiver 1200...1600nm "SC/APC" with Return Channel 1310nm + Amplifier (87...862/950...2150MHz)
231201	Outdoor Optica Receiver 1200...1600nm "SC/APC" w/o Return Ch. + Amplifier (87...862/950...2150MHz)



CONNECTIONS	
1	RF output/input
2	Test
3	Power
4	Attenuators
5	FO input, FW path
6	FO output, RF path
7	FO input
8	LEDs forward optical power received
9	LED return optical power transmitted

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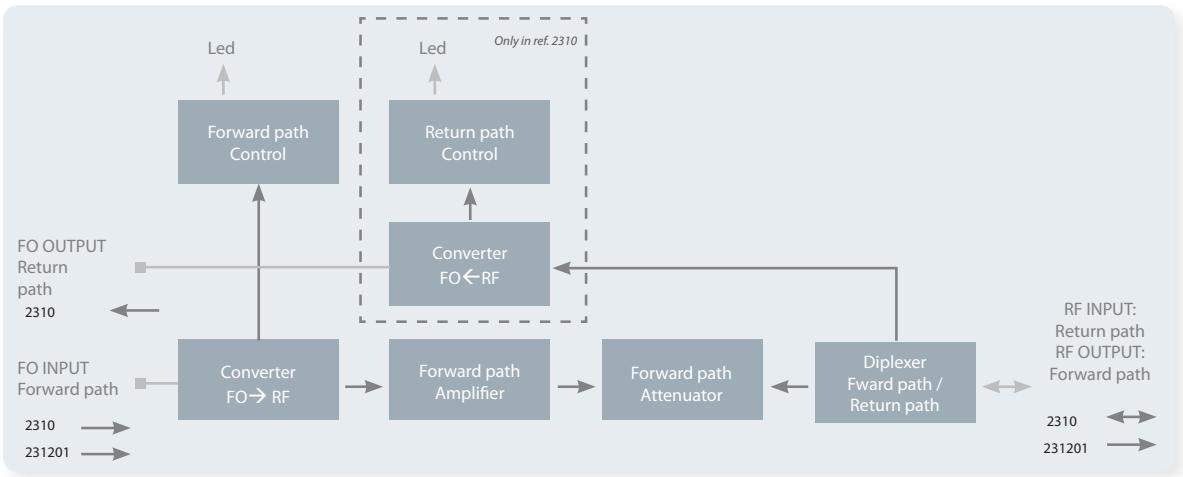

OUTDOOR EQUIPMENT

Reference				2310		231201	
ENTRADA	F.O. Forward channel	Wavelength	nm	1200...1600			
		Optical input range (recommended)	dBm	-5...+2			
		Max. permanent optical input level		+ 3			
		Optical connector		SC/APC			
	RF Return channel	Frequency range	MHz	5 - 65		-	
		Max. input level [2]	dBµV	90		-	
		Flatness	dB	± 2		-	
		Return losses		> 10		-	
		Impedance	Ω	75		-	

OUTPUTS	RF Forward channel	Output frequency	MHz	87...862	950...2150	87...862	950...2150
		Max. MATV output level (42 CH CENELEC)	dBµV	104	-	104	-
		Max. SAT IF output level (DIN VDE0885/12)		-	120	-	120
		C/N for analogue channels [1]	dBc	> 45	-	> 45	-
		Inter-stage attenuator	dB	0 - 20		0 - 20	
		Equaliser		0-15	0-10	0-15	0-10
		Flatness		± 1,5	± 3	± 1,5	± 3
		Return losses		> 10	> 7,5	> 10	> 7,5
		Impedance	Ω	75		75	
		Connector	type	F-PG11		F-PG11	
		Internal test socket attenuation	dB	25 ± 1,5	27 ± 1,5	25 ± 1,5	27 ± 1,5
	F.O. Return channel	Laser	type	Fabry-Perot (Clase 1M)		-	
		Wavelength	nm	1310		-	
		Max. optical power emitted	dBm	3		-	
		Optical connector		SC/APC		-	

GENERAL	Mains voltage	Vac	196~264
	Current consumption	mA	180 (36 VA max.)
	Power consumption	W	18
	Operating temperature	ºC	-5...+45
	Weight	gr	1825
	Housing material		Aluminium
	Ingress protection level	IP	61
	Dimensions (W×H×D)	mm	232 x 140 x 90

1. *Measures performed with 88dBµV at the optical transmitter input (device ajusted for delivering 104dBµV) , followed by a 4 way splitter connected to one of the optical receiver output.*
2. *2 carriers on 10 and 25 MHz and 90 dBµV level, for IM>50 dB at 35 MHz.*

Optical receiver with automatic output level

QR-A00022

Designed for FTTH applications, provides a stable RF output signal level no matter of input signal variations.

REF.	DESCRIPTION
2311	Optical receiver with automatic output level

	CONNECTIONS
1	RF output
2	SC/APC optical connector
3	Input optical power LED
4	Mains socket
5	ON/OFF power LED

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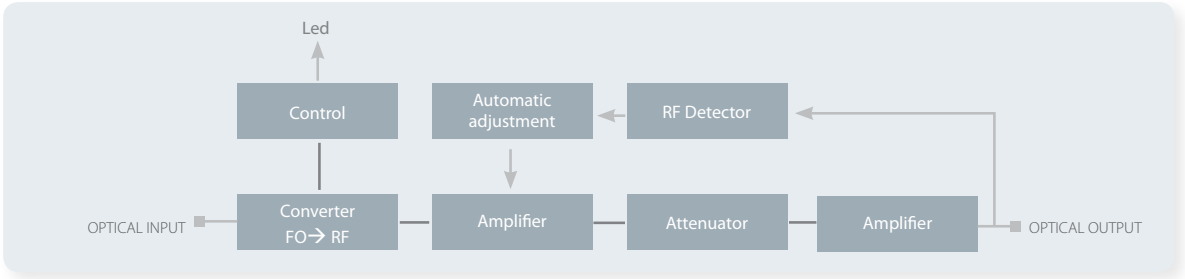


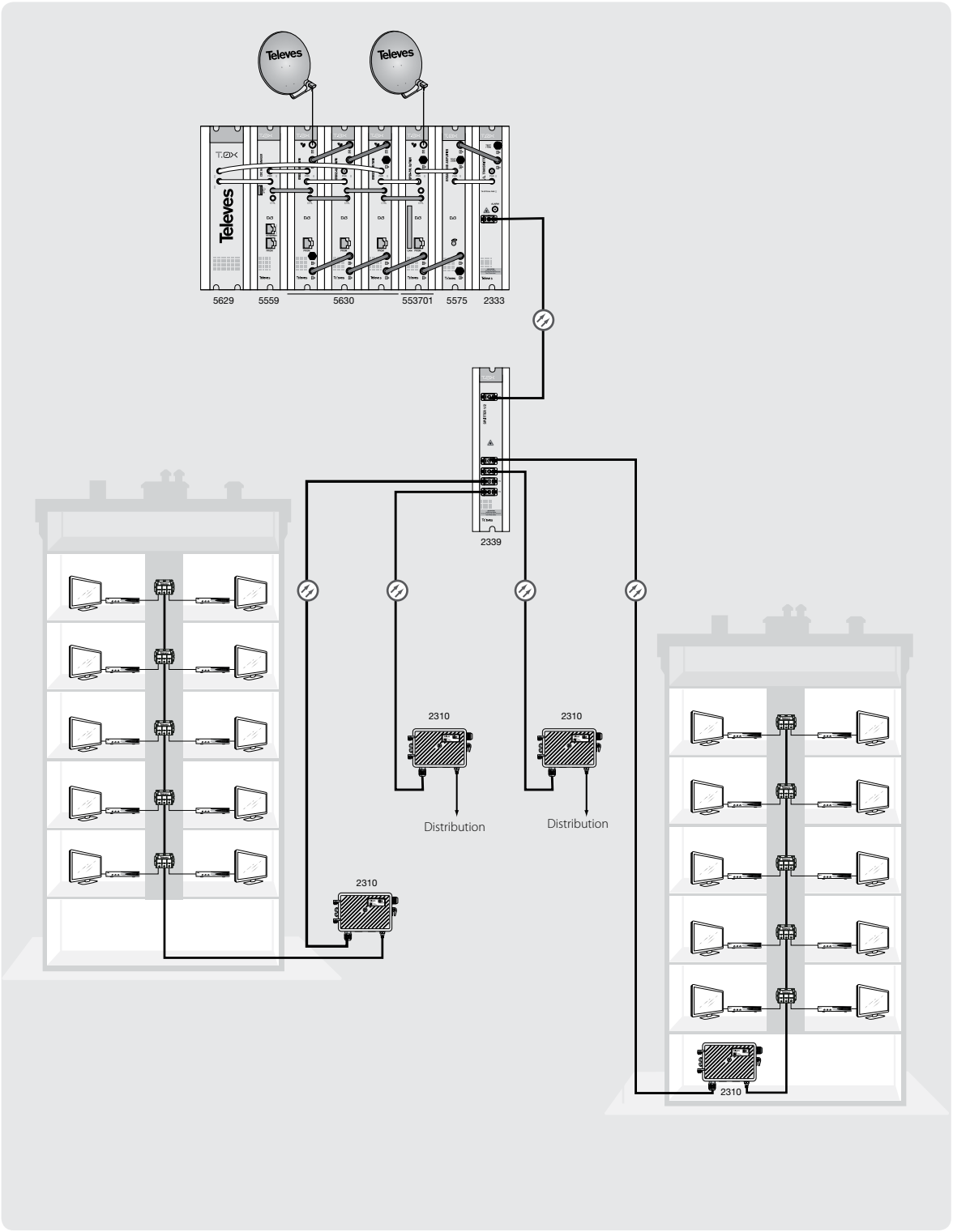
Reference			2311	
OPTICAL INPUT	Optical device	type	InGaAs pin photodiode	
	Wavelength	nm	1200...1600	
	Detection bandwidth	MHz	1...3000	
	Optical input power range	dBm	-10 ~ +3	
	Optical return losses	dB	> 60	
RF OUTPUT	Frequency range	MHz	87... 860	950...2150
	Impedance	ohm	75	
	Output return losses	dB	≥ 11	
	Optical AGC operating range	dB	0 ...18	
	Max. output level [1] (2 tone, IMD ≥ 60 dB)	dBµV	110/tone	107/tone
	Output level 42 CH CENELEC & 1 complete SAT Transponder [2]	dBµV	93/channel	90/channel
GENERAL	Mains voltage	Vac	230 ± 30%	
	Current consumption	mA	35 max.	
	Power consumption	W	3 max.	
	Conector de salida RF	type	F female	
	Conector de entrada óptica		SC/APC	
	Operating temperature	ºC	0 ...45	
	Weight	gr	230	
	Ingress protection level	IP	20	
	Dimensions (WxHxD)	mm	145 × 60 × 35	

1. *Max. output level for CSO and CTB >= 60dB.*
1. *The LED indicator for received optical power, will glow red when the incident optical power exceeds the specified maximum value; it will glow green whenever the optical power is between -10 to +3 dBm; and will glow amber when the incident power is less than-10 dBm.*

DOMESTIC EQUIPMENT

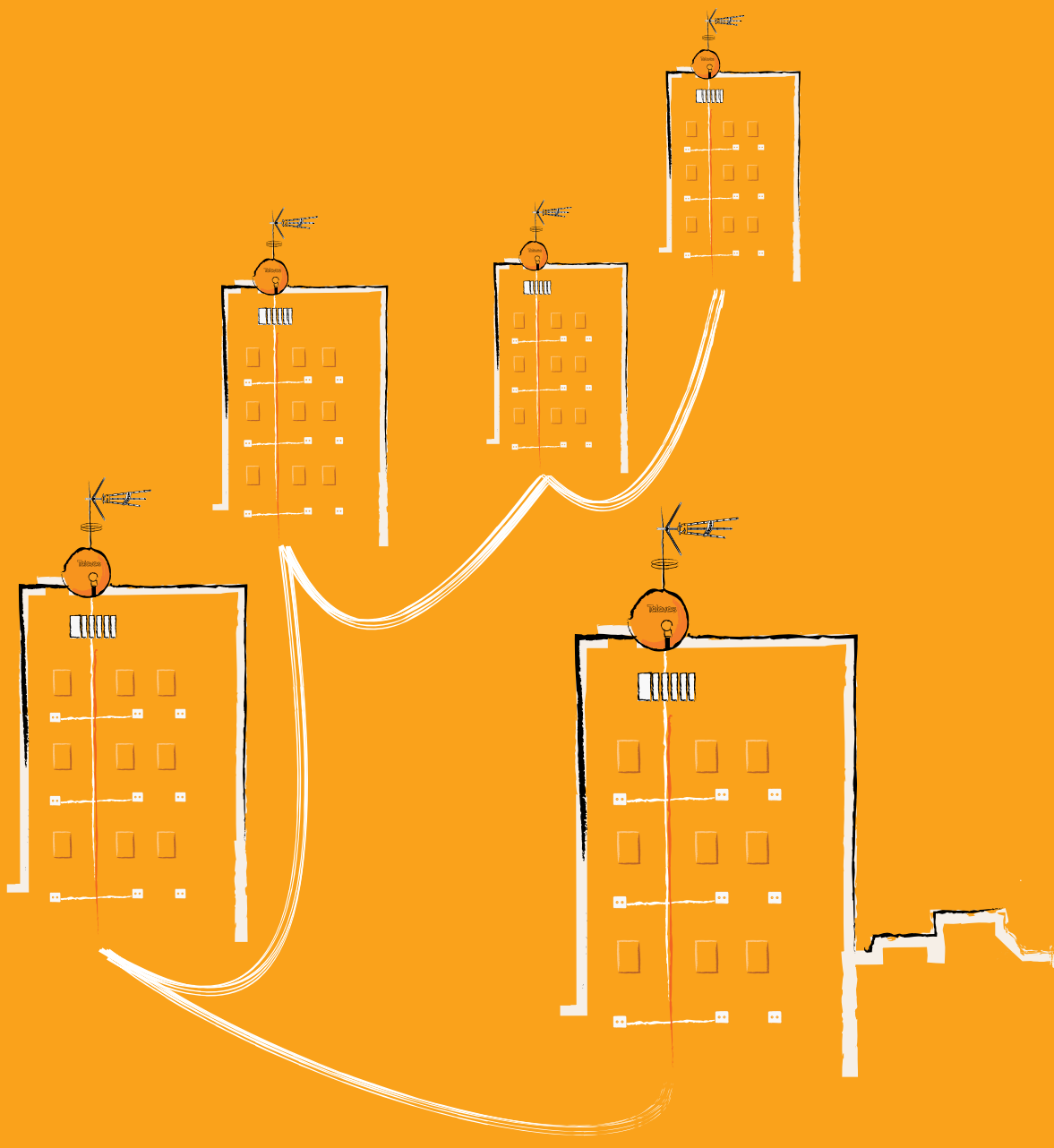
Refs. 2333 / 2310

- 8 Channels



Televes

FIBER OPTICS DISTRIBUTION



OPTICAL FIBER DISTRIBUTION

Main Terminal Enclosures

QR-A00184

- They allow the orderly deployment of optical cables and fibers, as well as stowing of splices.
- Provide reliable protection to secure, install, strip and laying of optical cables.
- Designed to protect the fibers of the distribution network into their corresponding trays and ensure minimum bend radius.
- Includes a variety of accessories that prevent unexpected damage to fibers.
- Painted with electrostatic spraying.

REF.	DESCRIPTION
233001	Indoor main terminal enclosure for optical fibers. Up to 48 SC/APC connectors (not included). Dimensions (W x H x D): 370 x 350 x 95 mm
233101	Outdoor main terminal enclosure for optical fibers. Up to 48 SC/APC connectors (not included). Dimensions (W x H x D): 370 x 350 x 95 mm

▲ 233001

▲ 233101

OPTICAL FIBER DISTRIBUTION

Splitting Terminal Enclosures

QR-A00185

- Designed for installation in the dividing of each plant, as per Spanish ICT-2 regulation.
- They may act as either a pass-through element or a terminal box.

REF.	DESCRIPTION
231301	Indoor splitting terminal enclosure for optical fibers. (Up to 8 output for fibers) Dimensions (W x H x D): 153 x 264 x 67 mm
231401	Outdoor splitting terminal enclosure for optical fibers. (Up to 4 output for fibers) Dimensions (W x H x D): 250 x 215 x 55 mm

▲ 231301

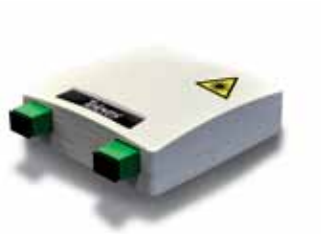
▲ 231401

User Access Point (UAP)

QR-A00186

- As per Spanish ICT-2 regulation, they make the link between the dispersion network, and user domestic network.
- They can be used as an end outlet for fiber optics.

REF.	DESCRIPTION
2315	Optical fiber UAP, with 2 SC-Female adapter (included) Dimensions (W x H x D): 80 x 80 x 25 mm
231501	Optical fiber UAP, up to 4 SC-Female adapter (2 included) Dimensions (W x H x D): 150 x 110 x 32 mm



▲ 2315

▲ 231501

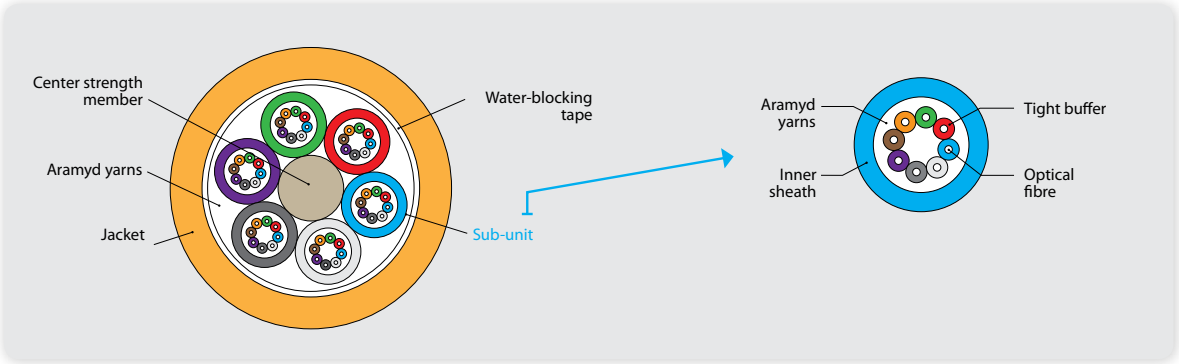
Optical Fiber Cables

QR-A00187

2, 24 or 48 multi-mode fibers; low bending sensitivity; in accordancde with ITU-T G.657-A2 standard.

REF.	DESCRIPTION	
Multi-fiber cables (ITU-T-G657A2)		**pack**
231701	48 monomode fibers, LSFH	800 m
231702	48 monomode fibers, LSFH	sold in meters

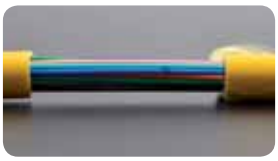
▲ 231701/231702

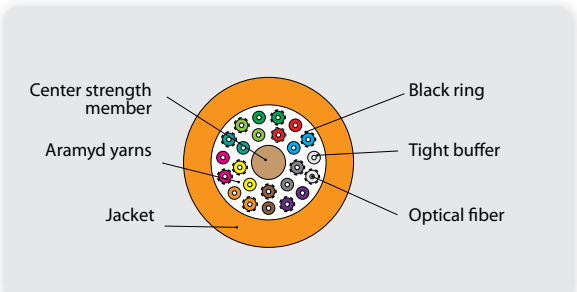


▲ 231701/231702

QR-A00188

REF.	DESCRIPTION	
Multi-fiber cables (ITU-T-G657A2)		**pack**
231601	24 monomode fibers, LSFH	2 Km
231603	24 monomode fibers, LSFH	sold in meters





▲ 231601/ 231603

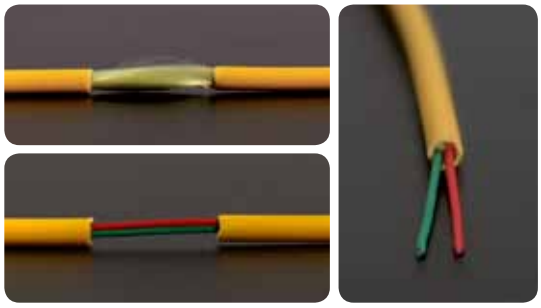
▲ 231601/231603

OPTICAL FIBER DISTRIBUTION

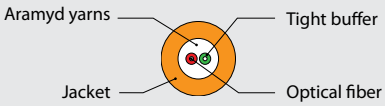
Optical fiber cables

QR-A00189

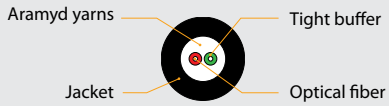
REF.	DESCRIPTION	
Multi-fiber cable (ITU-T-G657A2)		**pack**
231901	2 monomode fiber, LSFH indoor	300 m
232001	2 monomode fiber, LSFH indoor	200 m



▲ 231901



▲ 231901



▲ 232001

Reference		231701	231702	231601	231603	231901	232001
No. of fibers		48		24		2	
Fiber type		9/125 (G657A2)					
Attenuation	dB/Km	≤ 0.4 (1310 nm); ≤ 0,3 (1550 nm)					
Fibre's tight buffer	mat'l	LSFH & flame retardant					
	Ø mm	0,9 ± 0,05					
Cable jacket	mat'l	LSFH & flame retardant					
	Ø mm	15,0 ± 0.2		8,0 ± 0.2		3,5 ± 0.2	4,8 ± 0.2
	color	orange					black
Bending radius		10 x Ø				5 x Ø	10 x Ø
Short tension	N	1320				500	1200
Short crash	N/100mm	1000				500	1000
Oper. temperature	ºC	-20...+70					
Pack		800 m	sold in meters	2 Km	sold in meters	300 m	200 m

Accessories

QR-A00190

REF.	DESCRIPTION
2327	Splicing protection sleeve. Splicer Ref. 2321
2328	Mechanical splice. Splicers Ref. 2322 & 2341
2329	SC/APC connectors (with mounting tool)
232601	Single-mode pigtail SC/APC(m)-SC/APC(m)
233202	Adapter SC/APC(f) – SC/APC(f)

▲ 232601

▲ 2327

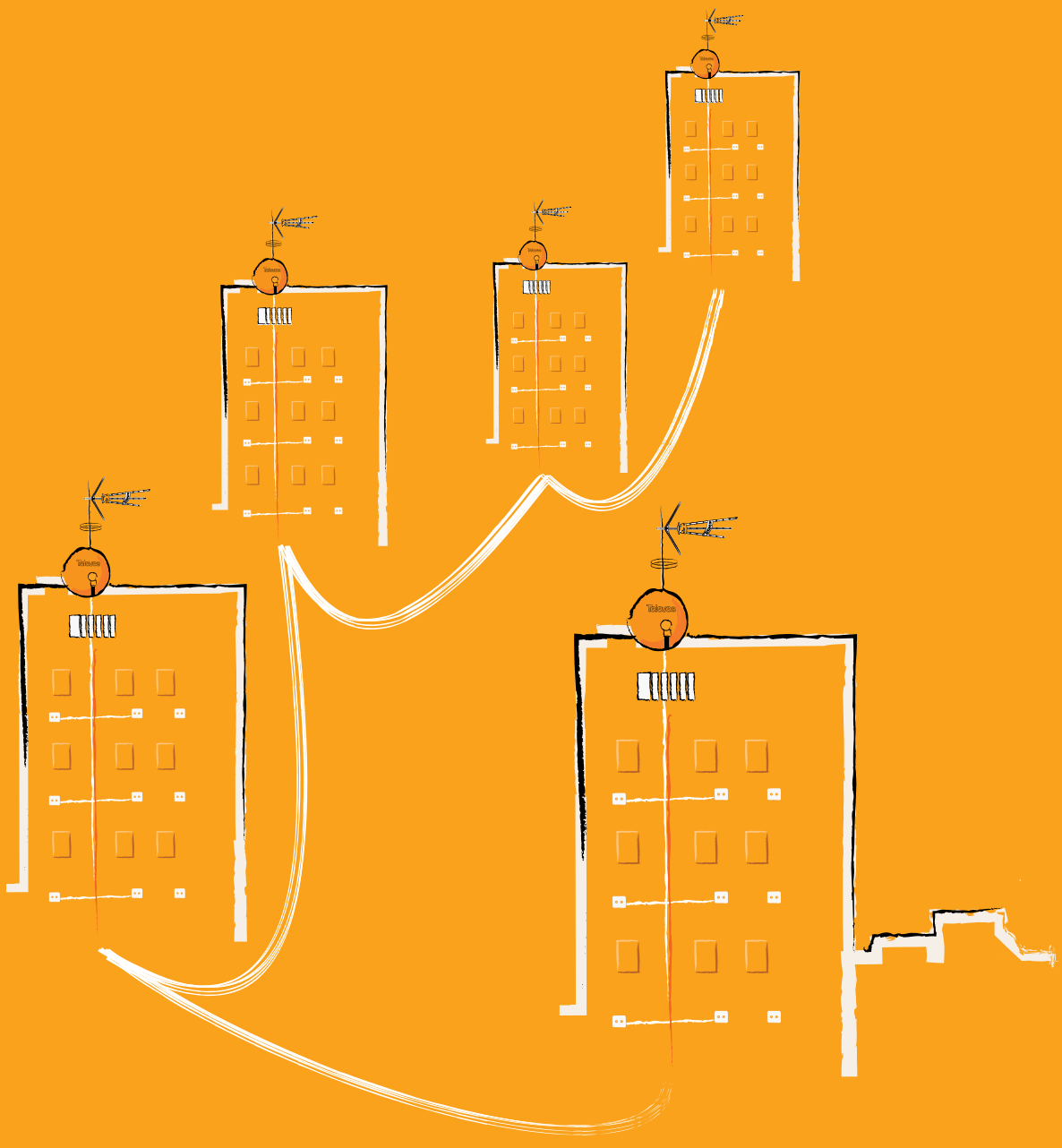
▲ 2328

▲ 2329

▲ 233202

Televes

FIBER OPTICS DISTRIBUTION (OPTICAL LNB)



OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

Optical LNBs

QR-A00191

- Converts the 4 Universal IF bands to a single optical output:
  (HHi - HLo - VHi - VLo = Single Optical Output)
- Capable of supplying all converted signals up to 32 distribution points spread over a 10 Km radius.

▲ 2353

▲ 2363

REF.	DESCRIPTION
2353	Optical LNB 1310nm "FC/PC" G 72dB, Offset feedhorn
2363	Optical LNB 1310nm "FC/PC" G 72dB without feedhorn

Reference				2353	2363
Description				Optical LNB (offset focus dish) Feedhorn Ø 40mm	Optical LNB (prime focus dish) flange C120
Input frequency			GHz	10,7...12,75	
Output frequency			GHz	0,95...5,45	
Wavelength			nm	1310	
Local oscillators			GHz	9,75(Vertical) / 7,3 (Horizontal)	
Optical output power	from -30 to +60 ºC		dBm	7±2	
Noise figure			dB	0,5 typ.	
Gain	from -30 to +60 ºC		dB	72±2	
Phase noise maximum limit	offset frequency (KHz)	1	dBc/Hz	-55	
		10	dBc/Hz	-80	
		100	dBc/Hz	-100	
		1000	dBc/Hz	-110	
Local oscillator stability			MHz	±2	
Cross polar rejection			dB	30 typ.	
Powering			Vdc	12	
Current consumption			mA	<250	<450
Operating temperature			ºC	-30 to +60	
Connectors		DC input	tipo	F-female	
		Optical output	tipo	FC/PC	
Weight			gr	435	350
Dimensions			mm	68 x 98 x 170	45 x 101 x 120
Accessories					
FC/PC connector protection			units	1	
Female F to Female F connector			units	1	
Stand alone AC PSU	mains input	voltage	Vac	100-240	
		frequency	Hz	50/60	
	output	voltage	Vdc	12	
		current	mA	500	

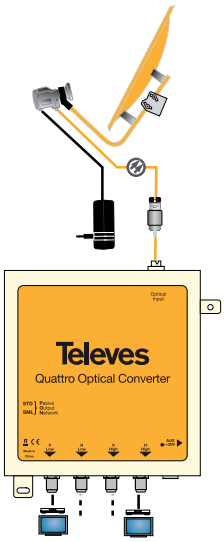
OPTICAL FIBER / RF CONVERTERS: SATELLITE

QR-A00192

Convert optical signal from optical LNBs to RF satellite signal in the IF band:

- As a QUAD device (4 polarities per output).
- As a QUATTRO device (polarity per output).
- FC/PC connector and monomode fiber.
- **Local or remote** powering.

▲ 2350

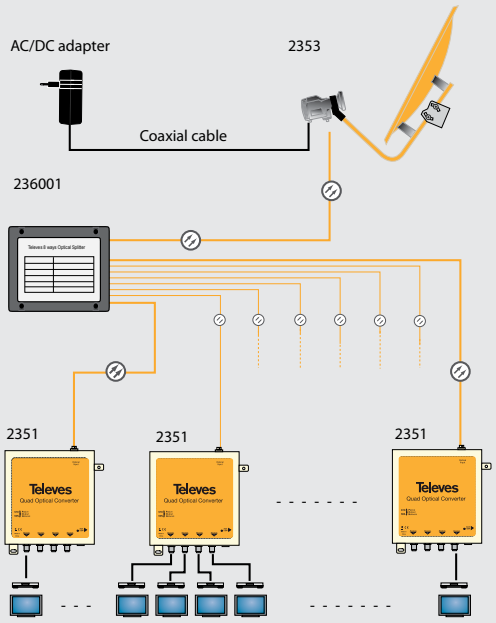


REF.	DESCRIPTION
2350	Converter MDU 1310nm, FC/PC-F, Quattro IF + AC/DC adptr
2351	Converter MDU 1310nm, FC/PC-F, Quad IF

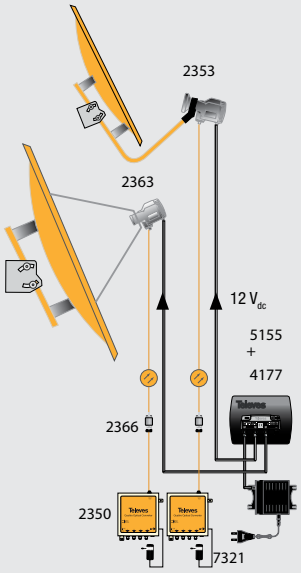
Reference					2350	2351
Description					Quattro MDU	Quad MDU
Input parameters						
Frequency range				GHz	0,950...5,45	
Optical return loss				dB	20	
Optical power		SML PON setting		dBm	-13 min / 0 max	
		STD PON setting			-18 min /-14 max	
SAT transponders				nº	120	
Optical input connector				tipo	FC/PC female	
Output parameters						
Frequency range	Low Band	V	950~1950	MHz	fixed output	< 14,5 Vdc
		H				> 15,5Vdc
	High Band	V	1100~2150			< 14,5Vdc 22KHz
		H				> 15,5Vdc 22KHz
Nominal output level/transponder				dBm	-65 min. /-25 max.	
Gain ripple across band				dB	5	
Return losses				dB	10	
Rejection between outputs				dB	30	
Noise figure				dB	4	
Nominal impedance				ohm	75	
Powering		voltage		Vdc	20	from receiver
		consumption		mA	<300	
Connectors				tipo	F	
Operating temperature				ºC	0-50	
Weight				gr	400	
Dimensions (W×H×D)				mm	160 × 185 × 30	

OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

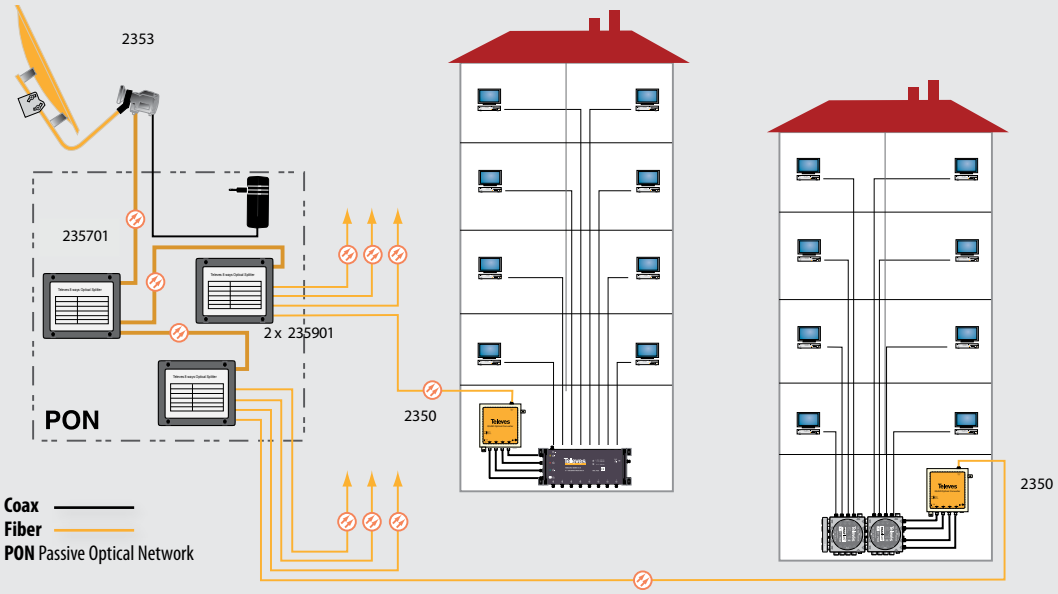
OPTICAL FIBER / RF CONVERTERS: SATELLITE



Example of signal distribution by means of a QUAD converters

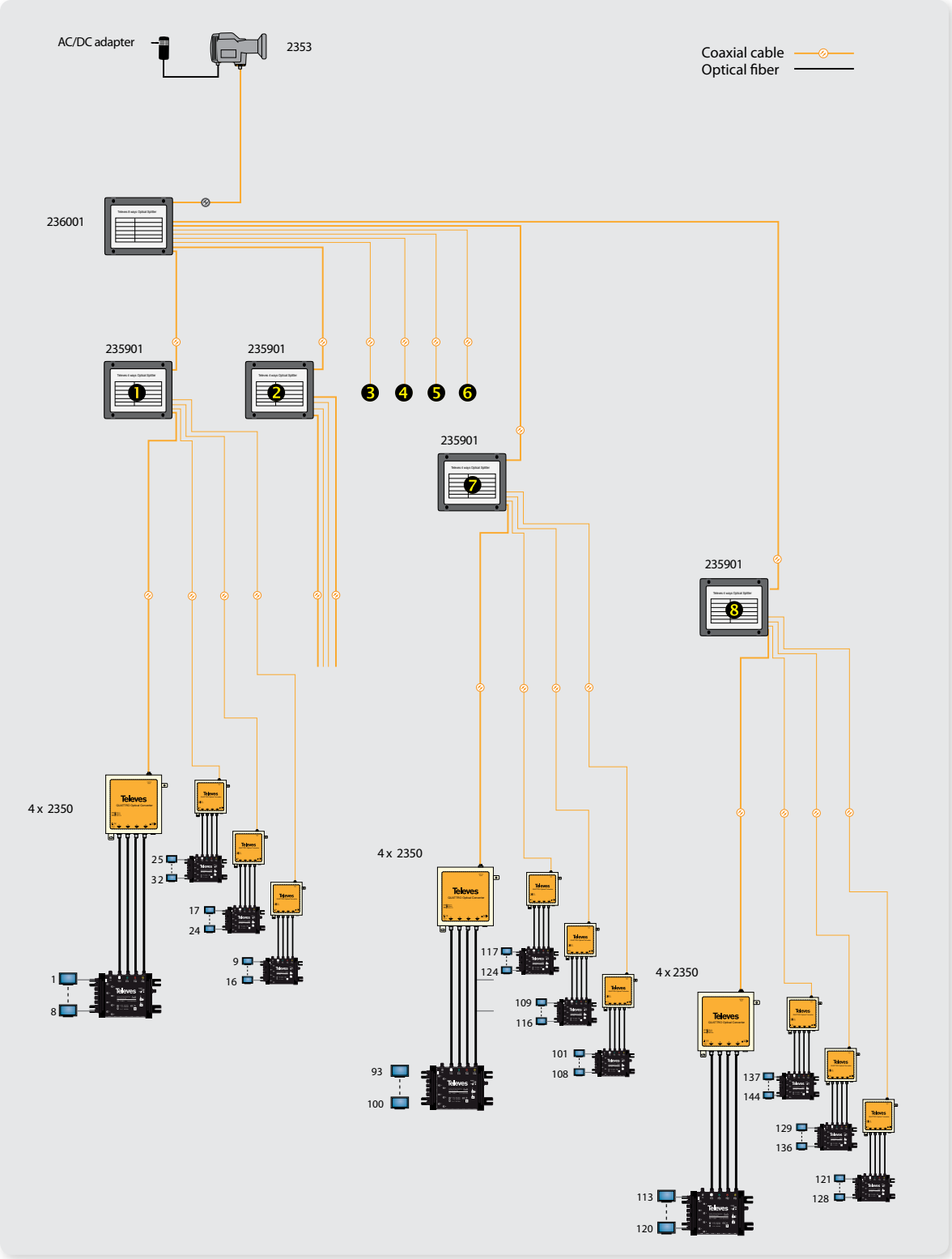


Example of two different LNBs powered by a single PSU



Application converter Quad/Quattro and multiswitches

Converter Quattro and multiswitches



OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

OPTICAL FIBER / RF CONVERTERS: SATELLITE + TERRESTRIAL

QR-A00193

This kit allows converting the 4 universal SAT IF bands and the DTT terrestrial band into a single optical output.

- LNB with coaxial output. It stacks the 4 SAT IF polarities creating a single IF frequency ranging from 950 to 5450 MHz.
- ODU32 is a converter that combines the SAT IF signals coming from the LNB with the **DAB/DTT** terrestrial ones, transmitting them through **2 optical outputs.**
- Optical power from **6 to 8 dBm.**

Kit Ref. 236801 consists of:

- Optical LNB offset.
- Converter ODU32, RF to optical signal.
- AC/DC adapter unit.
- Low losses lead (2m/ 50Ω/ N connectors).
- Protective sleeve for the connector.
- Mast support for converter ODU 32.

▲ 236801

REF.	DESCRIPTION
236801	RF/Optical Converter ODU32 "F"-"N"-"FC/PC": DAB/UHF-SAT + Offset LNB + AC/DC Adapter + Interconnection Accessories

Reference				236801
OPTICAL	Wavelength		nm	1310
	Opticalpower per output connector		dBm	6 a 8
DAB / DVB-T	Input frequency	DAB / DVB-T	MHz	217...230 / 470...862
	Impedance		Ohm	75
	Input levels * (DAB must be 15 dB below DTT)	1 channel	dBµV	70 a 95 *
		4 channel		90
		8 channel		85
	Gain		dB	15...45
	DTT flatness	In-band		4
		In-channel		0.5
	AGC range			25
	Noise figure at max gain			10
	OIP3[1]		dBµV	134
	Rejection (950-2150 MHz)		dB	20
SAT	Input frequency	Vertical/Horizontal polarisations	MHz	950...3000 / 3400...5450
	Impedance		Ohm	50
	Input level		dBµV	96 a 111
	In-band gain flatness	Vertical Polarisation	dB	4
		Horizontal Polarisation		7 (3 dB slope)
	Gain flatness	per 30 MHz segment		1
	AGC range (min)			15
	Noise figure at max gain			12
	OIP3 (min) [1]		dBµV	129
	Rejection (217-862 MHz) (min)		dB	20
ELECTRICAL	Powering voltage (through F connector)		Vdc	12
	LNB powering voltage (through F connector)		Vdc	6,2
	Current consumption (including optical LNB)		mA	500
MECHANICAL	Connectors	Optical output	Typ	FC/PC
		Satellite input		N female
		DVB-T/DAB input		F female
		Power input		F female
	Operating temperature		ºC	-30 to +60
	Weight		gr	545
	ODU Dimensions (W x H x D)		mm	168 × 160 × 30

(1) The theoretical output level at which the third-order two-tone distortion products are equal in power to the desired signals.

OPTICAL FIBER / RF CONVERTERS: SATELLITE + TERRESTRIAL

QR-A00194

Devices that receive signals SAT(IF) and DAB/DTT via optical fiber and then are delivered via coaxial as SAT(IF) in QUAD format (4 polarities per output + terrestrial) or QUATTRO (1 polarity per output + terrestrial).

- FC/PC input connector and monomode fiber.
- **Local or remote powering** through any one of its outputs.
- The outputs of Ref. 237001 (QUATTRO), work in the same way that a standard **LNB QUATTRO.**
- The outputs of Ref. 236901 (QUATTRO), work in the same way that a standard **LNB QUAD.**

▲ 237001

▲ 236901

Recommendations to keep in mind for proper installation

The typical output optical power of the optical converter RF / FO ref. 236801 is 7 dBm. On the other hand, the dynamic range of converters FO/RF (References 236901 and 237001), ranges from -15 to 0 dBm:

- When there is no splitter in the optical fiber line, you must insert an optical attenuator Ref. 2366 (15 dB).
- Whenever are being used optical splitters, can be used attenuators of less losses (References 2365 and 2364).
- In the case that insertion losses are high enough to be within the dynamic range of the converter FO / RF, there will not be necessary to use attenuators.

REF.	DESCRIPTION
236901	Optical/RF Converter GTU "FC/PC"-"F" Quad DAB/UHF-SAT + AC/DC Adapter
237001	Optical/RF Converter GTU "FC/PC"-"F" Quattro DAB/UHF-SAT + AC/DC Adapter
236902	Optical/RF Converter, Quad FM/DAB/UHF-SAT
237002	Optical/RF Converter, Quattro FM/DAB/UHF-SAT

OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

OPTICAL FIBER / RF CONVERTERS: SATELLITE + TERRESTRIAL

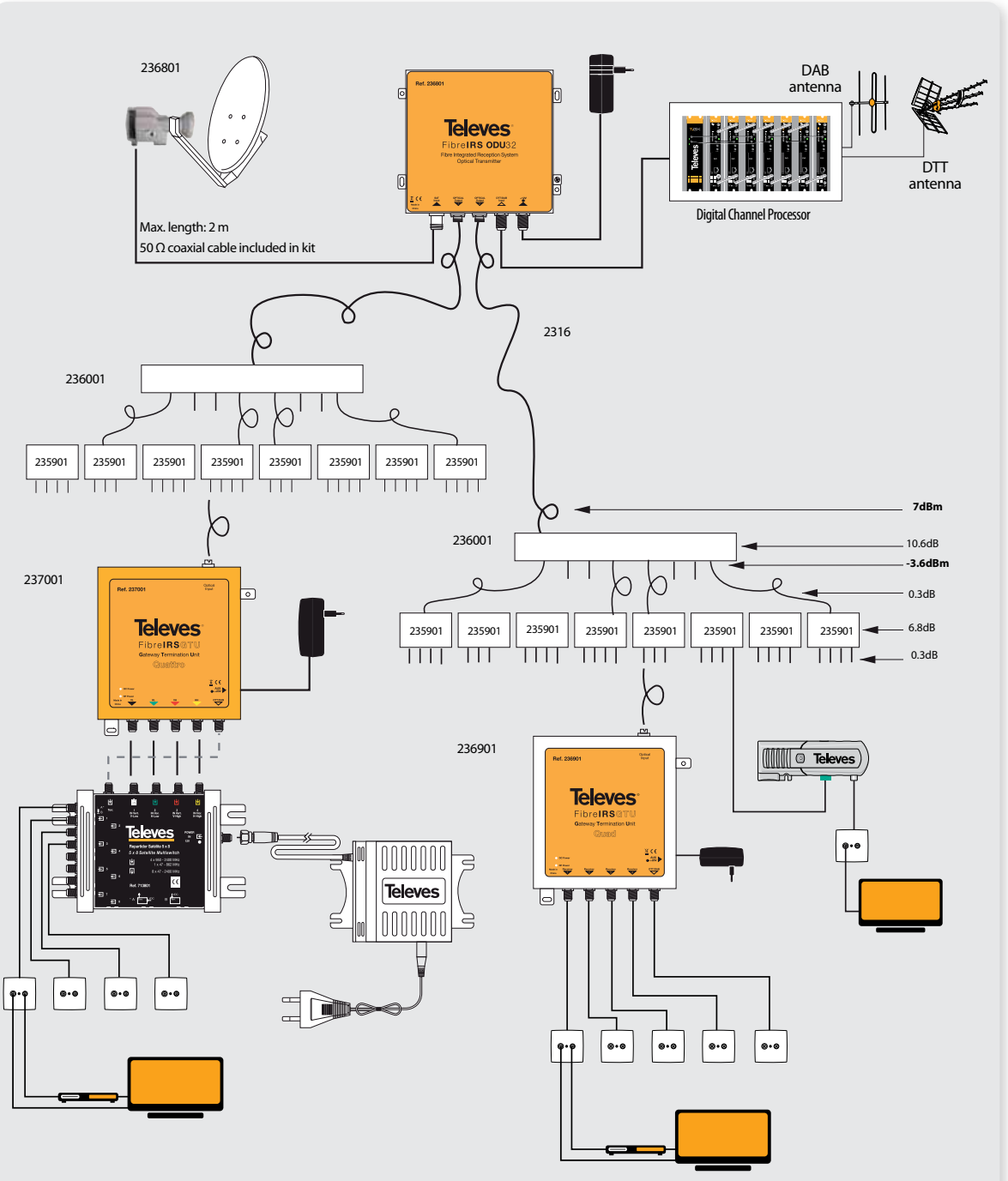
Reference				236901	237001
OPTICAL	Wavelength		nm	1310	1310 /1550
	Return losses		dB	45	
	Input power range		dBm	-15...0	
	Nominal levels	Satellite Xpdr		-72...-42	
		DVB-T MUX		-65...-35	
		DAB MUX		-79...-49	
DVB-T/DAB	Input frequency	DTT/DAB	MHz	47... 862	
	Impedance		ohm	75	
	Return losses (min)		dB	10	
	Nominal output levels	DVB-T	dBµV	69	
		DAB		56	
	Gain	Max	dB	29	
		Min		6	
	DTT Gain flatness	In-band		6	
		In-channel		0,5	
	OIP3[1]		dBµV	100	
	Rejection (950-2150 MHz)		dB	25	
SATELLITE	Nominal output level		dBµV	-37 to 70	
	Output frequency bands	Vertical High	MHz	1100...2150	
		Vertical Low		950...1950	
		Horizontal High		1100...2150	
		Horizontal Low		950...1950	
	Selection of the satellite output frequency band	VHi (1100 - 2150 MHz)	Vdc/KHz	13/22	-
		VLo (950 - 1950 MHz)		13/ –	-
		HHi (1099 - 2149 MHz)		18/22	-
		HLo (949 - 1949 MHz)		18/ –	-
	Impedance		ohm	75	
	Return losses (min)		dB	10	
	Gain		dB	39	
	AGC dynamic range			35	
	Gain slope			2	
	Gain flatness	In-band		6	
		per 30 MHz segment		1	
	OIP3 (min) [1]		dBµV	112	
	Rejection (min)		dB	30 (856 MHz)	30 (856 MHz)
	Noise figure			7	
ELECTRICAL	Powering voltage		Vdc	20	
	Current consumption		mA	800	
MECHANICAL	Connectors	Optical output	tipo	FC/PC	
		DVB-T/DAB input		F female	
		Powering input		Jack female	
	Operating temperature		ºC	-30 to +60	
	Weight		gr	595	
	Dimensions		mm	168 × 180 × 30	

(1) The theoretical output level at which the third-order two-tone distortion products are equal in power to the desired signals.

OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

OPTICAL FIBER / RF CONVERTERS: SATELLITE + TERRESTRIAL

- Ensure a good filtering of DAB and DTT signals, using channel processors.
- For a better C/N is necessary to use an attenuator. Total losses between the unit ODU32 Ref 236801 and optical converters FO/RF should be about 15 dB.



Reception of Satellite, DAB, and DTT with optical fiber transmision

OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

Optical splitters

QR-A00195

These devices are used when the optical signal is required for different active links and at the same time a non-intrusive element, like a test or monitoring equipment, has to be connected.

REF.	DESCRIPTION
235701	1310/1550nm, FC/PC, 2W 4dB
235801	1310/1550nm, FC/PC, 3W 5,5dB
235901	1310/1550nm, FC/PC, 4W 7dB
236001	1310/1550nm, FC/PC, 8W 10,1dB

▲ 235701

Reference		235701	235801	235901	236001
Outputs		2	3	4	8
Connectors	type	FC/PC			
Wavelength	nm	1310 / 1550			
Insertion losses	dB	4	5,5	7	10,1
Fiber type		Monomode (SM)			
Dimensions (W x H x D)	mm	115 x 151 x 23			

▲ 236001

Optical attenuators

QR-A00196

Used to adjust the input levels to the dynamic range of devices.

REF.	DESCRIPTION
2364	1310/1550nm, FC/PC, 5dB
2365	1310/1550nm, FC/PC, 10dB
2366	1310/1550nm, FC/PC, 15dB

▲ 2364

Reference		2364	2365	2366
Attenuation	dB.	5	10	15
Connectors	type	FC/PC		
Wavelength	nm	1310 / 1550		

OPTICAL FIBER DISTRIBUTION (OPTICAL LNB)

Pre-terminated patch cords single-mode

QR-A00219

Pre-connectorized patch cords, made of monomode G657A type fiber.

- High transmission speed and low attenuation.
- Low Smoke and Halogen Free (LSFH).
- Min. bending radius: 30 mm.
- Ø 3mm cable terminated with connectors FC/PC (9mm).
- **Flexible inner shielding** (1.3 mm diameter) consisting of a stainless steel fold and aramid yarns.

REF.	DESCRIPTION
2361	LSFH, FC/PC, 3m
236101	LSFH, FC/PC, 5m
236102	LSFH, FC/PC, 10m
236103	LSFH, FC/PC, 20m
236104	LSFH, FC/PC, 30m
236105	LSFH, FC/PC, 40m
236106	LSFH, FC/PC, 50m
236107	LSFH, FC/PC, 75m
236108	LSFH, FC/PC, 100m
236109	LSFH, FC/PC, 200m

Reference			2361	236101	236102	236103	236104	236105	236106	236107	236108	236109
Insertion losses	A1,A2	dB	≤ 0.2									
Return losses	A1,A2		≥ 45									
Attenuation		dB/Km	0,3									
Connectors		type	FC/PC									
Fiber			Monomode (SM) G657A									
Outer sheath		material	LSFH PVC									
		Ø mm	3									
		color	gris									
Available jumper lengths		m	3	5	10	20	30	40	50	75	100	200

Optical accessories

QR-A00198

REF.	DESCRIPTION
2354	F.O. conector for 2 "FC– FC" pre-terminated patch cords interconnection.
2356	F.O. conector for a "FC– SC" connector change of 2 pre-terminated patch cords.

▲ 2354

▲ 2356