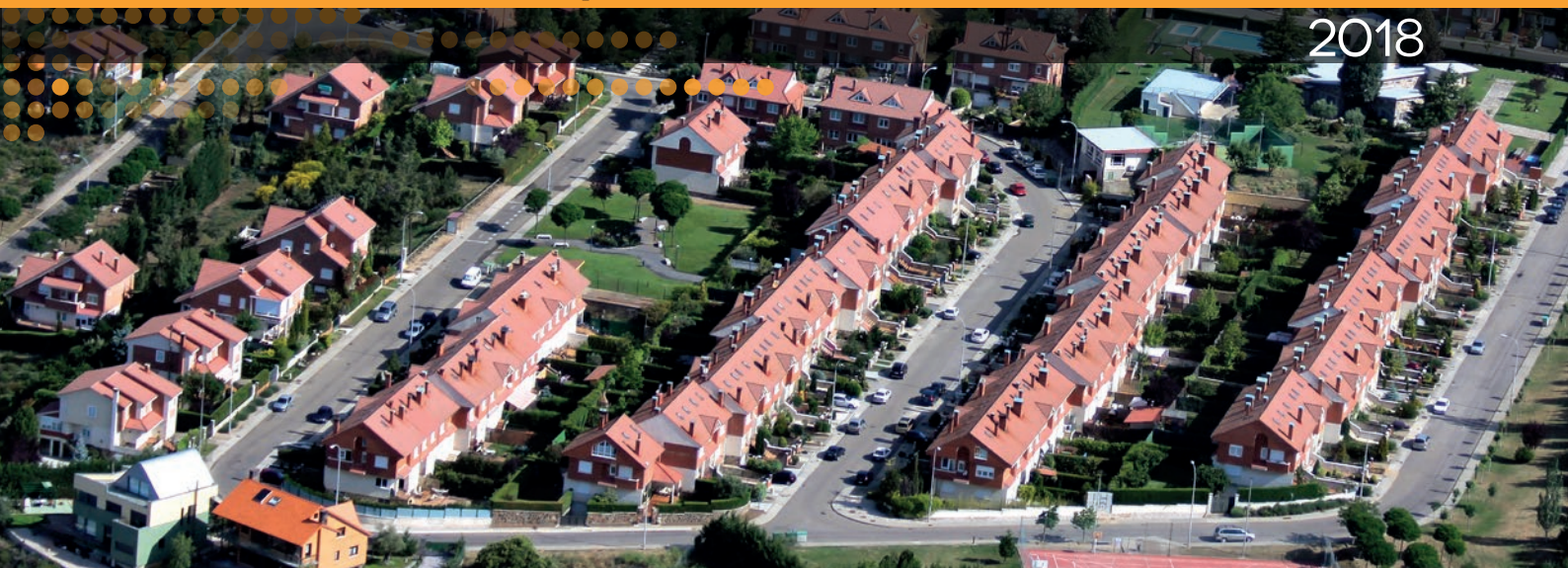


Televes®

QUAD PLAY SOLUTIONS OVER OPTICAL FIBRE

2018



TELEVES COST-EFFECTIVE QUAD PLAY SOLUTIONS OVER OPTICAL FIBRE

OLT512 Series



OLT3072 Series



COMPACT, RELIABLE, AFFORDABLE, AND EASY TO MANAGE GPON AND RF OVERLAY PRODUCTS.

MULTIPLE-PLAY SERVICE ENABLING HIGH SPEED DATA, VOIP , 802.11AC WI-FI,
VIDEO (IPTV AND RF OVERLAY), PoE, ETC.

Televes®

QUAD PLAY SOLUTIONS OVER OPTICAL FIBRE

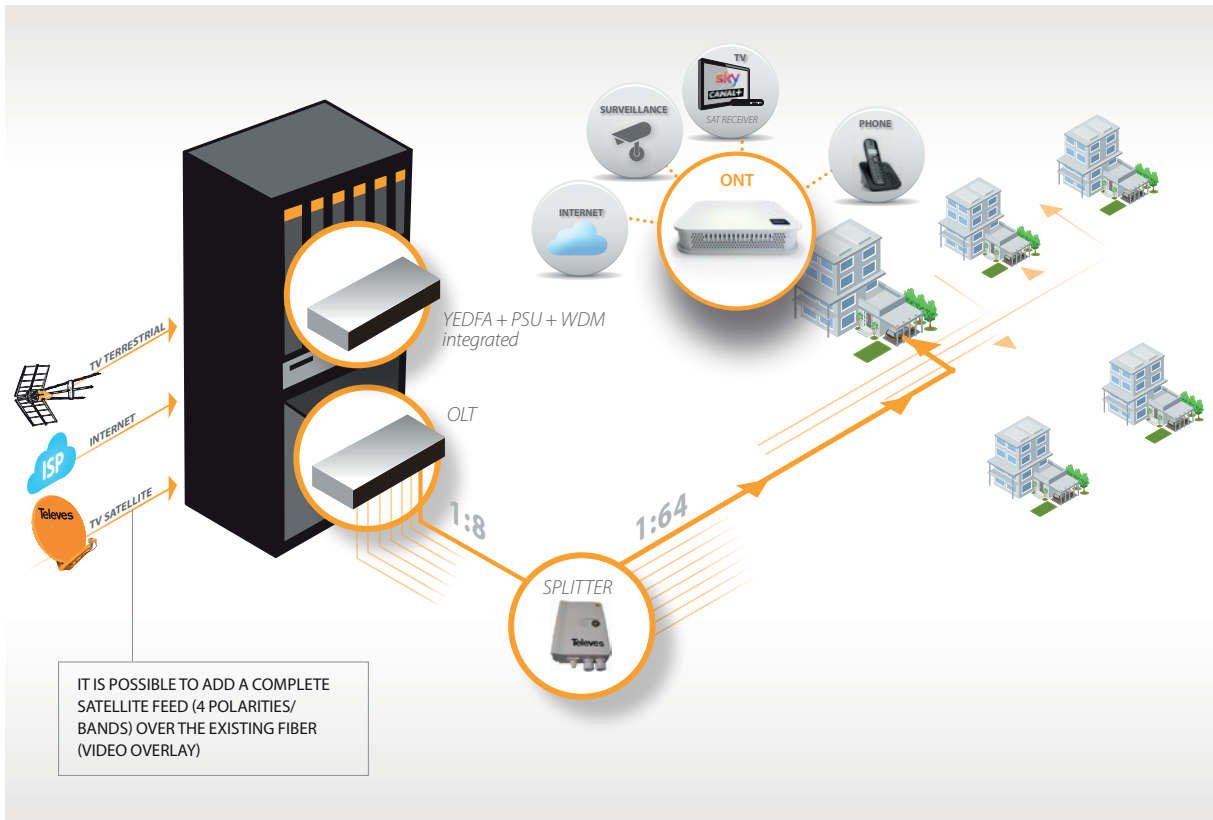


There is an increasing demand for high-speed broadband networks in order to accommodate new or existing services such as: Internet of Things (IoT), Smart Cities, Telecare, Over the Top TV (OTT), Ultra High Definition (UHD) and others. In this scenario only a network architecture based on fibre optic can guarantee the required bandwidth.

Televes is making available to small and medium ISPs its **FibreData solutions**, a comprehensive range of devices that allow the implementation and commercialization of QUAD play services over a passive optical network (PON)

Televes' FibreData solution allows the customization of the QUAD play offering in order to adapt it to your customers' needs.

FTTH APPLICATION



T.OX VIDEO OVERLAY HEADENDS



OPTICAL TRANSMITTER

Transmitters that generate an optical output of 1550 nm, modulated by the incoming RF signal.

Transmitters 234811 and 234806 incorporate an AGC in order to optimize the quality at the output, whilst reducing the requirement for high input levels at the input.

- ▶ Variable modulation depth (RF drive level) and precise optical power levels enables superior link optimization.
- ▶ Simple plug-and-play operation. OMI test point.
- ▶ User selectable Automatic Gain Control (AGC).
- ▶ Laser temperature control system.
- ▶ **T.OX Chassis (5U).**

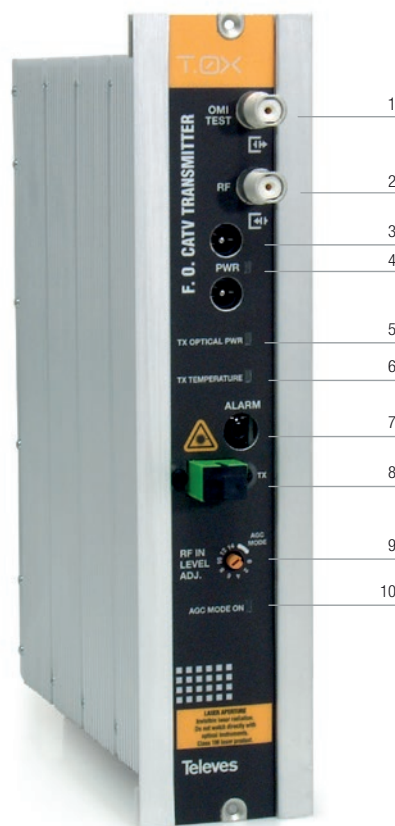
The design of the 234806 transmitter makes it ideal for projects with distances over 30km.

The 234305 transmitter has an input frequency range of up to 2150MHz to suit SMATV projects.

REF.	DESCRIPTION
234811	T.OX F.O.TX. CATV 1550nm 10dBm W/O RET AGC + TEMP.
234806	T.OX F.O.TX. MATV 1550nm 6dBm + AGC
234305	T.OX F.O.TX. SMATV 1550nm 4dBm

CONNECTIONS AND STATUS LEDs

1	OMI Test point
2	RF input
3	Power BUS
4	On power LED
5	Optical power led
6	Laser temperature led
7	Alarm connector
8	Optical Output (Laser aperture, class 1M laser)
9	RF control attenuation
10	AGC led: white AGC mode selected



▲ 234811

Reference			234811	234806	234305
RF	RF frequency range	MHz	47 - 1100	47 - 1218	54 - 2150
	RF input level	dBμV	90	92	85
	RF gain adjust	dB	0...14	0...14	0...18
	AGC control	dB	15	20	-
	Flatness	dB	±1	±1	±1,5
	CSO (CENELEC 42)	dB	60 ⁽¹⁾	60 ⁽²⁾	60 ⁽¹⁾
	CTB (CENELEC 42)	dB	60 ⁽¹⁾	60 ⁽²⁾	60 ⁽¹⁾
OPTICAL	Laser	type	MQW-DFB cooled	DBR-SOA, Mach-Zender	MQW-DFB
	Wavelength	nm	1550 ±20	1550 ±20	1550 ±20
	Output power	dBm	10	6	4
GENERAL	Powering	Vdc	12-24	12-24	12-24
	Power consumption	mA	360-220	560-320	265-140
	Dimensions (WxHxD)	mm inch	50 x 217 x 175 1.96 x 8.54 x 6.88	50 x 217 x 175 1.96 x 8.54 x 6.88	50 x 217 x 175 1.96 x 8.54 x 6.88

(1) 42 CENELEC channels plan. 1km of standard fibre followed by a 8 output splitter. Input power into reference receiver (M2Optics-FOS -FOS 1000A- equipment) is -1dBm.

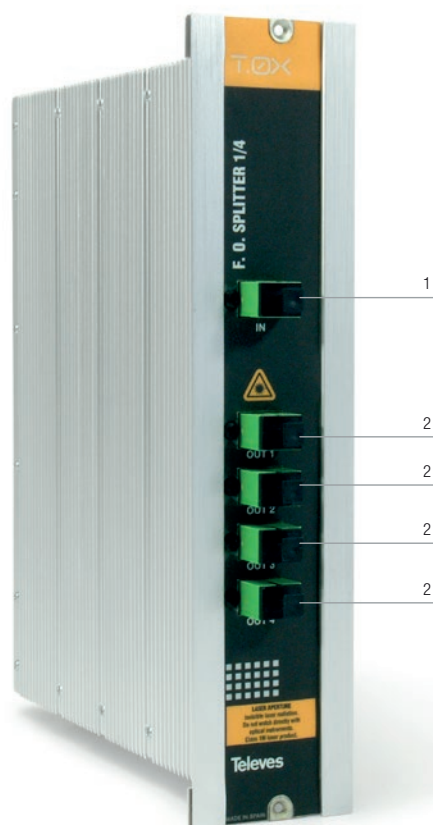
(2) 42 CENELEC channels plan. 40km of standard fibre followed by a 4 output splitter. Input power into reference receiver (M2Optics-FOS -FOS 1000A- equipment) is -0.5dBm.



OPTICAL SPLITTERS

Passive optical splitters: 2, 4, 8, 16 and 32 outputs, to be used in optical fibre star networks. Installation in 5U mounting chassis.

REF.	DESCRIPTION
2337	T.OX F.O.SPLITT. 1260...1650nm "SC/APC" 2W 4dB
2339	T.OX F.O.SPLITT. 1260...1650nm "SC/APC" 4W 7dB
234401	T.OX F.O.SPLITT. 1260...1650nm "SC/APC" 8W 10dB
234501	T.OX F.O.SPLITT. 1260...1650nm "SC/APC" 16W 14dB
234601	T.OX F.O.SPLITT. 1260...1650nm "SC/APC" 32W 17dB



▲ 2339

BLOCK DIAGRAM



CONNECTIONS

- 1 Input
- 2 Outputs

Reference	2337	2339	234401	234501	234601	
No. of outputs	2	4	8	16	32	
INPUT / OUTPUT	Wavelength	nm 1260...1650				
	Optical connector	SC/APC				
	Insertion losses 1310/1550 nm	≤ 4.1	≤ 7.5	≤ 11	≤ 13.7	≤ 17.5
	Uniformity	≤ 0.6	≤ 0.8	≤ 0.8	≤ 1.2	≤ 2
	Directivity	dB ≥55				
GENERAL	Return losses	dB ≥55				
	Ingress protection level	IP 20				
	Dimensions (WxHxD)	mm 50 x 217 x 169 inch 1.96 x 8.54 x 6.97	mm 73 x 216 x 169 inch 2.87 x 8.54 x 6.97			

T.OX VIDEO OVERLAY HEADENDS

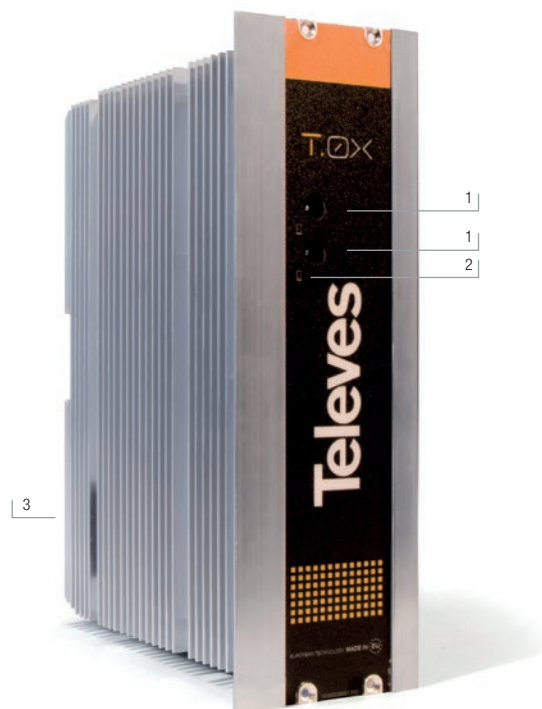


POWER SUPPLY UNIT

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 between 21 and 27 V.
- ▶ T.OX Chassis (5U).

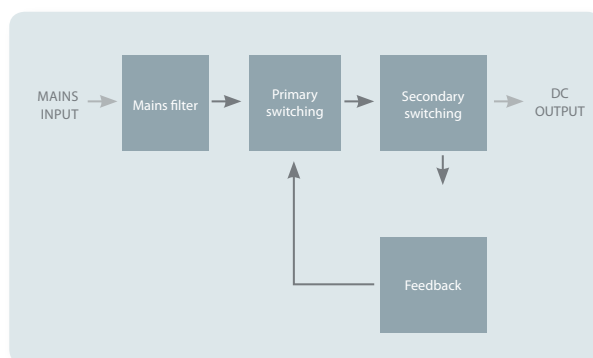


REF.	DESCRIPTION
5629	T.OX SM PSU 120W 24V-5A
563901	T.OX SM PSU 120W 24V-5A 110Vac UL

CONNECTIONS AND STATUS LEDs	
1	DC outputs
2	Status LED
3	Mains socket

Reference				5629	563901
MAINS	AC	Voltage	VAC	196...264	108...132
		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 inch	70 x 217 x 164 2.75 X 8.54 X 6.45		

BLOCK DIAGRAM





HIGH POWER 1550nm OPTICAL AMPLIFIER 8 CH WITH WDM

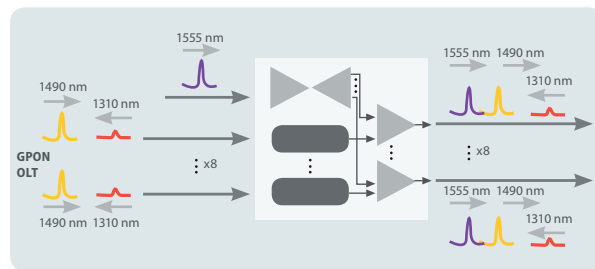
Based on **YEDFA technology**, it is a high power amplifier which allows the distribution of video overlay signals to up to 8 outputs with GPON multiplexing. It complements our FibreData OLT512 in those scenarios where video overlay is required.

- ▶ Video Overlay multiplexing with GPON signals.
- ▶ Amplification of the Video Overlay.
- ▶ Typical output power of 20 dBm.
- ▶ T.OX Chassis (5U).

REF.	DESCRIPTION
234228	Optical Amplifier/Multiplexer (1550nm), high power (20dBm) and 8 GPON outputs



Block Diagram



CONNECTIONS AND STATUS LEDs

- 1 Led optical input alarm
- 2 Power led
- 3 LEDs status OK
- 4 LED system error indication
- 5 Power, 24Vdc
- 6 1550nm input RF overlay
- 7 1310/1490/1550nm input/output to PON network
- 8 1310nm/1490nm input/output to/from OLT

Reference	234228		
OPTICAL Video Overlay INPUT	Input optical power range	dBm	-10...+10
	Input connector	type	1 x SC/APC
	Operating wavelength	nm	1548...1565
OPTICAL GPON INPUT	Insertion Loss (1310nm & 1490nm)	dB	<1
	Input connector	type	8 x SC/APC
	Operating GPON wavelength	nm	1310±20 - 1490±20
OPTICAL OUTPUT	Output optical power per port (1550nm)	dBm	20 ± 0,5
	Output connector	type	8 x SC/APC
	Noise figure	dB	Typ 5 (Pin=0dBm 1550nm). Max 7.
	Optical return losses	dB	≥ 40
GENERAL	Powering	Vdc	24
	Max. Consumption @ 24 Vdc	mA	700
	Ingress protection level	IP	20
	Dimensions (WxHxD)	mm inch	111 x 218 x 194 4.37 X 8.58 X 7.64

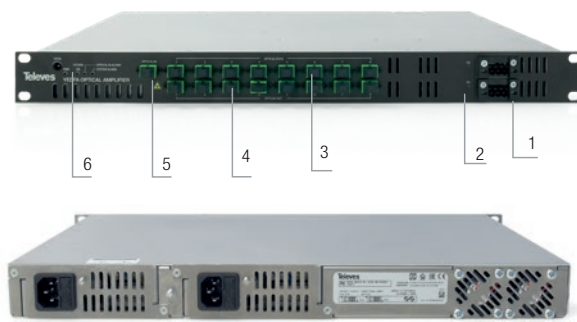
T.OX VIDEO OVERLAY HEADENDS



HIGH POWER 1550nm OPTICAL AMPLIFIER, WITH WDM AND DOUBLE PSU

High power amplifier with YEDFA technology and hot-swappable double power supply unit in a 1U rack mounting chassis.

- ▶ Video Overlay multiplexing with GPON signals.
- ▶ Video Overlay service amplification.
- ▶ Hot-swappable 48Vdc double PSU.
- ▶ Ref. 769610 and 769612 have the possibility of an external power for the OLT ref. 769410.
- ▶ Chassis produced in aluminium. Better dissipation and lower weight.



▲ 769610/769612

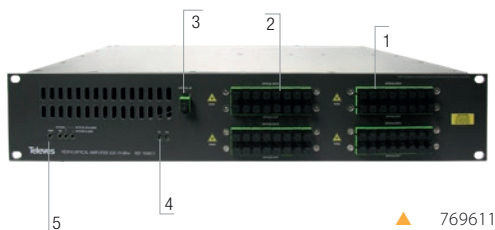
REF.	DESCRIPCIÓN
769610	Optical Amplifier/Multiplexer (1550nm), high power (20dBm) and 8 GPON outputs. Double power supply with -48Vdc outputs. Rack installation (1U).
769611	Optical Amplifier/Multiplexer (1550nm), high power (20dBm) and 32 GPON outputs. Double power supply with -48Vdc outputs. Rack installation (2U).
769612	Optical Amplifier/Multiplexer (1550nm), high power (17dBm) and 8 GPON outputs. Double power supply with -48Vdc outputs. Rack installation (1U).

CONNECTIONS AND STATUS LEDs 769610/769612

- 1 -48Vdc outputs
- 2 Powering LED
- 3 1310/1490nm inputs/outputs for OLT
- 4 1310/1490/1550nm inputs/outputs to PON network
- 5 1550nm RF Overlay input
- 6 Control LEDs and 24Vdc output

CONNECTIONS 769611

- 1 1310/1490nm inputs/outputs for OLT
- 2 1310/1490/1550nm inputs/outputs to PON network
- 3 1550 nm RF Overlay input
- 4 Powering LEDs
- 5 Control LEDsm



▲ 769611

References			769610	769611	769612
OPTICAL INPUT Video Overlay	Input optical power	dBm	-10...+10	-5...+10	-10...+10
	Input connector	type	1 x SC/APC		
	Operating Wavelength	nm	1543...1565		
OPTICAL INPUT GPON	Insertion loss (1310nm & 1490nm)	dB	<1		
	Input connector	type	8 x SC/APC	32 x SC/APC	8 x SC/APC
	GPON wavelength	nm	1310±20 - 1490±20		
OPTICAL OUTPUT	Output optical power (1550nm)	dBm	20 ± 0,5		17 ± 0,5
	Output connector	type	8 x SC/APC	32 x SC/APC	8 x SC/APC
	Noise figure	dB	Tip 5 (Pin=0dBm 1550nm). Max. 7		
	Return loss	dB	≥ 40		
POWER SUPPLY UNIT	AC voltage	VAC	99 - 253	99 - 264	99 - 253
	Frequency	Hz	50 - 60		
	Efficiency	%	89		
	Ingress Protection Level	IP	20		
	Dimensions (WxHxD)	mm inch	483 x 43 x 395 19.02 x 1.69 x 15.55	483 x 88 x 440 19.02 x 3.46 x 17.32	483 x 43 x 402 19.02 x 1.69 x 15.83

GPON HEADENDS

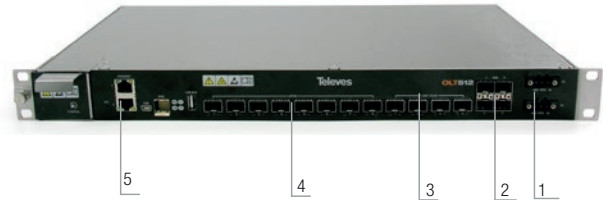


OLT512

The Optical Line Terminal **OLT512** manages and adapts the services available to the different profiles of the users and its devices, allowing the distribution and commercialization of QUAD Play services.

Specially designed for the small/medium residential environment it can connect up to 512 subscribers.

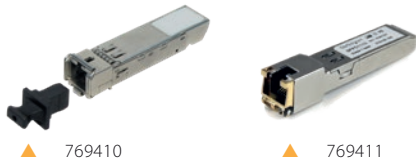
- ▶ Total rate 2,5Gbps/1,24Gbps downstream/upstream bandwidth in each GPON port.
- ▶ Range up to 60Km.
- ▶ Standard Gigabit Ethernet Uplinks 4x1GbE / 4x10GbE
- ▶ Equipped with test output.
- ▶ Remote operation and monitoring.



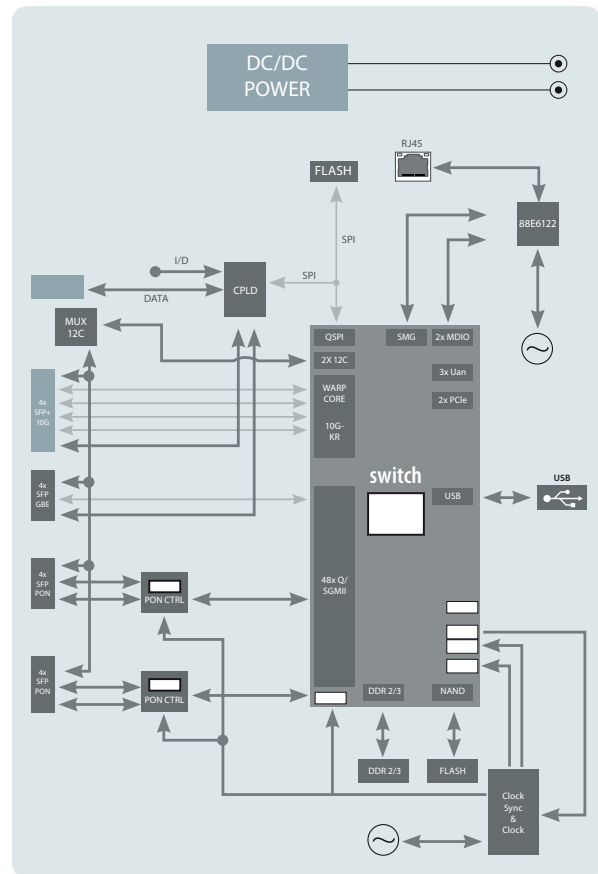
CONNECTIONS

- 1 -48 Vdc Power
- 2 4 x 1Gbe uplink port
- 3 4 x 1/10 Gbe uplink port
- 4 8 x GPON ports
- 5 2 x ETH management interface

REF.	DESCRIPTION
769401	OLT512 in 1U rack
769410	SFP GPON "SC/PC" B+
769411	SFP Gbe (RJ45)
769412	SFP 10Gbe B+ (2fibres)
769413	SFP 10Gbe C+ "SC/APC" (1fbre)



BLOCK DIAGRAM



Reference	769401	
GPON		
Downstream / Upstream bit rate	Gbps	2,5 / 1,24
AES Encryption		
ONT per PON (512 subscribers).		64
Max. Recommended.		64
Logical Range	Km	60
Maximun Differential Distance	Km	20
GPON Type B redundancy		
L2 layer		
IEEE 802.1Q VLAN tagging and Q-in-Q VLAN stacking		
VLAN-ID conversion to GEM port-ID		
Load balancing		
Priority management		
Full wire speed GPON Performance		
IPTV Features		
IGMP v2 / v3		
Multicast		
IPTV streams		>1024
Management		
Local management by CLI and HTTP/HTTPS browser		
Remote management using SSH, Telnet and SNMP protocols		
General		
Temperature conditions	°C/°F	5 to +45/41 to 113
Relative Humidity Range	%	95
Power supply	Vdc	-40.5 to -57.0
Power consumption	W	<110
Ventilation noise level	dB	<60
Dimensions (WxHxD)	mm	483 x 44.45 x 248
	inch	18.93 X 1.75 X 9.75

GPON HEADENDS



OLT3072

The Optical Line Terminal **OLT3072** is the solution to provide multiple services on mid-size networks of up to 3072 subscribers.

It supports GPON and Ethernet services.

- ▶ Total rate 2,5Gbps/1,24Gbps downstream/upstream bandwidth in each GPON port.
- ▶ Range up to 60Km.
- ▶ Standard Gigabit Ethernet Uplinks 2x10Gbe
- ▶ Equipped with test output.
- ▶ Remote operation and monitoring.
- ▶ Chassis 5U



REF.	DESCRIPTION
769420	OLT3072
769421	BLACKPLANE CONTROLLER
769422	16xPON CARD
769423	48x1Gbps PORTS ETHERNET CARD

CONNECTIONS

- 1, 5 Back Plane Switch 2x10 Gbps
- 2, 3, 4 16PON card

“HOT-SWAPPABLE” DOUBLE PSU, ON 1U RACK

Double power supply unit, hot-swappable, for OLTs ref. 769401 and 769420 powering.

- ▶ High efficiency.
- ▶ “Hot swappable” double PSU of -48Vdc.



REF.	DESCRIPTION
769601	Double PSU in 1U rack

CONNECTIONS

- 1 2 -48Vdc outputs
- 2 Powering LED



Reference				769601
MAINS	AC	AC voltage	VAC	99 - 253
		Frequency	Hz	50/60
OUTPUT	DC	DC voltage	Vdc	-48
		Max. current	A	7,8 per module
		Max. power	W	375 per module
		Efficiency	%	89
GENERAL		Ingress Protection Level	IP	20
		Dimensions (WxHxD)	mm inch	483 x 43 x 395 19 X 1.69 X 15.55

FIBRE OPTIC SPLITTERS

A range of **optical splitters for FTTx networks, PON, etc.**, they are ideal for a rack mounting (with accessories as splice boxes) or even inside patch boxes. Its main features are:

- ▶ High reliability.
- ▶ Low insertion losses.
- ▶ High uniformity between outputs.
- ▶ Made with single-mode (SM) fibre of 900µm.



▲ 234650

REF.	DESCRIPTION
SPLITTERS	
233750	PLC F.O.SPLITT.1260...1650nm "SC/APC" 2W 4dB
233950	PLC F.O.SPLITT.1260...1650nm "SC/APC" 4W 7dB
234450	PLC F.O.SPLITT.1260...1650nm "SC/APC" 8W 10dB
234550	PLC F.O.SPLITT.1260...1650nm "SC/APC" 16W 14dB
234650	PLC F.O.SPLITT.1260...1650nm "SC/APC" 32W 17dB
PATCH CORDS	
232621	F.O. PATCH CORD LSFH "SC/APC" 2m B4
232622	F.O. PATCH CORD LSFH "SC/APC"- "SC/PC" 0.2m
ASSEMBLY	
231502	F.O. PATCH BOX 4OUTS
533152	19" SPLICE BOX 1RU - 24 SC CONNECTORS



▲ 232622

▲ 232621

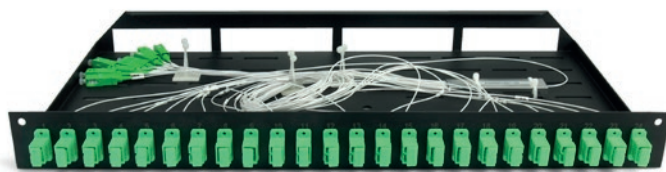
Reference	233750	233950	234450	234550	234650
No. of outputs (ways)	2	4	8	16	32
Connectors	SC/APC				
Fibre	Single-mode (SM) G657A1				
Diameter	900				
Wavelength	1260...1650				
Insertion loss (IL)	≤4.1	≤7.5	≤10.5	≤13.5	≤17.5
Return loss (RL)	≥55				
Uniformity	≤0.6	≤0.8	≤0.8	≤1.2	≤2

Splitters assembly options are:

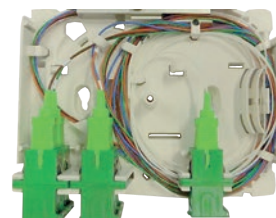
- 2 or 4 outputs inside of the F.O. Patch Box (119x94x34 mm). The box could be screwed in the wall or be installed in DIN rail. Ref. 231502.
- up to 24 outputs in 19" rack panel and 1U high. Ref. 533152.



▲ 231502



▲ 533152



OPTICAL ATTENUATORS

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

REF.	DESCRIPTION
236410	OPTICAL ATTENUATOR 1310/1550nm "SC/APC" 2dB
236411	OPTICAL ATTENUATOR 1310/1550nm "SC/APC" 5dB
236412	OPTICAL ATTENUATOR 1310/1550nm "SC/APC" 10dB



▲ 236410

Reference		236410	236411	236412
Attenuation	dB	2	5	10
Connectors	type	SC/APC		
Wavelength	nm	1310/1550		
Return loss	dB	≥ 65		
Max. power	mW	500		
Max. power	dBm	27		

WDM GPON + RF OVERLAY MODULE

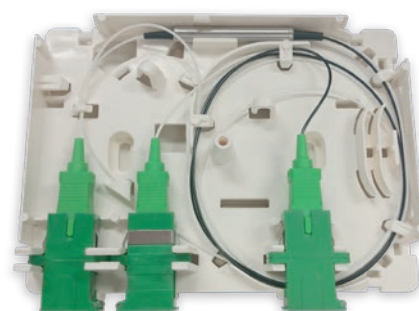
This module allows multiplexing/demultiplexing of the different wavelengths (Data 1310/1490nm & RF Overlay 1550nm). In this way, it is possible to separate the lambdas before the ONT/ONU, allowing the delivery of the Data or RF Overlay signals separately (ONT/ONU and fibre converter to RF). This configuration allows us to overcome the restriction in RF of the ONT (47 - 862MHz) by separating the video overlay from the data giving us a feed that can be connected to a separate fiber or RF converter.

REF.	DESCRIPTION
234740	WDM GPON+RF OVERLAY MODULE (1319/1490nm)-(1550nm)



▲ 234740

Reference		234740
Wavelengths of work	Operating (nm)	1260...1620
	Transmission (nm)	1540...1565
	Reflection (nm)	1270..1350 & 1475..1505
Fibre type		S.M. (9/125)
Connector type & fibre colour	COM	SC/APC (Black)
	Transm./Reflection	SC/APC (White)
Insertion loss	Transm./Reflection(dB)	<0.5
Return loss	dB	>50
Max. Power supported	dBm	+25
Working temperature	°C	-5...+45
Dimensions (WxHxD)	mm	119 x 94 x 34
Weight	g	130



CUSTOMER PREMISE EQUIPMENT (CPE)



ONT

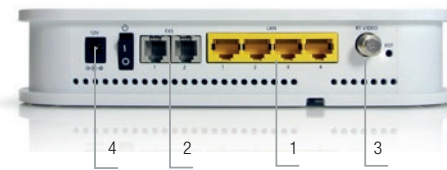
The Optical Network Terminal solutions from Televes are the right choice for those who implement a GPON optical network at the subscriber's home.

Supports **multiple-play service** enabling data High Speed Internet (HSI), VoIP, WiFi, TV (IPTV and RF Overlay).

- ▶ Complete remote management transparent to the subscriber
- ▶ Several configuration and mounting options.



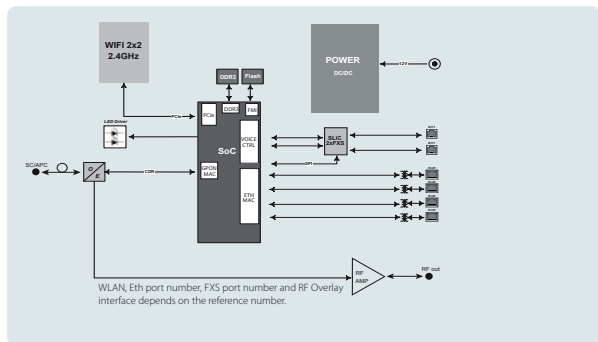
▲ 769502



REF.	DESCRIPTION
769501	ONT Office: 4xGB Ethernet+2x FXS+2x USB, WLAN b/g/n
769502	ONT Home: 4xGB Ethernet+2x FXS+2x USB, WLAN b/g/n, RF Overlay
769504	ONT Home AC: 4xGB Ethernet+2x FXS+2x USB, WLAN b/g/n/ac, RF Overlay
769506	ONT Office: 4xGB Ethernet+2x FXS+2x USB, WLAN b/g/n/ac
769507	ONU BASIC: 1xGb Ethernet
769508	ONU STANDARD: 1xGb Ethernet, RF Overlay

CONNECTIONS	
1	RJ45 Gbe port
2	RJ11 phone port
3	F RF connector
4	Power

BLOCK DIAGRAM



▲ 769508 ONUs



Reference			769501	769506	769502	769504	769507	769508
Models			ONT				ONU	
			OFFICE	OFFICE	HOME	HOME	BASIC	STANDARD
RF-Overlay			-	-	✓	✓	-	✓
WiFi (802.11 b/g/n) (2x2) 2.4	GHz		✓	✓	✓	✓	-	-
WiFi (802.11 b/g/n/ac) (2x2) 2.4/5	GHz		-	✓	-	✓	-	-
USB			2	2	2	2	-	-
Ports FXS			2	2	2	2	-	-
Ports ETH 10/100/1000BASE-T			4	4	4	4	1	1
NAT/NAPT			✓	✓	✓	✓	-	-
Firewall			✓	✓	✓	✓	-	-
VPN pass-through			✓	✓	✓	✓	-	-
Terminal PPPoE			✓	✓	✓	✓	-	-
OMCI			✓	✓	✓	✓	-	-
TR-069			✓	✓	✓	✓	-	-
CLI			✓	✓	✓	✓	-	-
WebGUI			✓	✓	✓	✓	-	-
General								
Temperature conditions	°C/°F		-5... 65/23...149					
Relative Humidity	%		0...95					
Consumption	W		19	19	19	19	7	7
Dimensions (WxHxD)	mm		210 x 40 x 210				142 x 30.5 x 112	

CUSTOMER PREMISE EQUIPMENT (CPE)



OPTICAL TV RECEIVER WITH CONTROL ON OPTICAL LEVEL (OLC)

Designed for FTTH applications, it provides a stable RF output regardless of input signal variations.



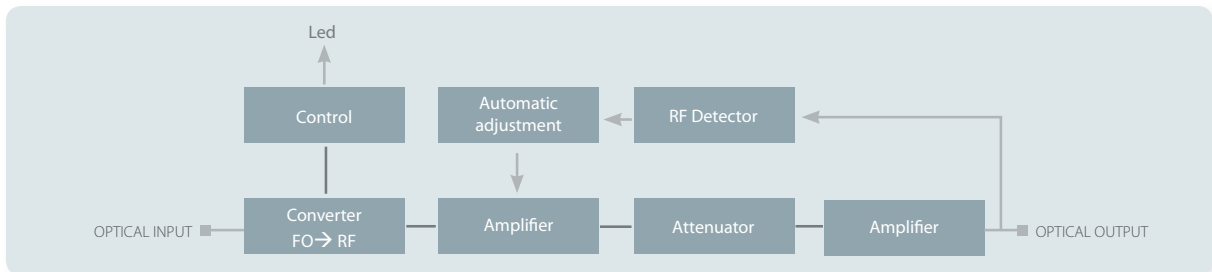
▲ 231111

REF.	DESCRIPTION
231111	DOMESTIC F.O.RX MATV OLC 1550nm
2311*	DOMESTIC F.O.RX SMATV OLC 1200...1600nm
231181	DOMESTIC F.O.RX MATV OLC 1550nm 110Vac

*Ref. 234740 will be required with this receiver

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

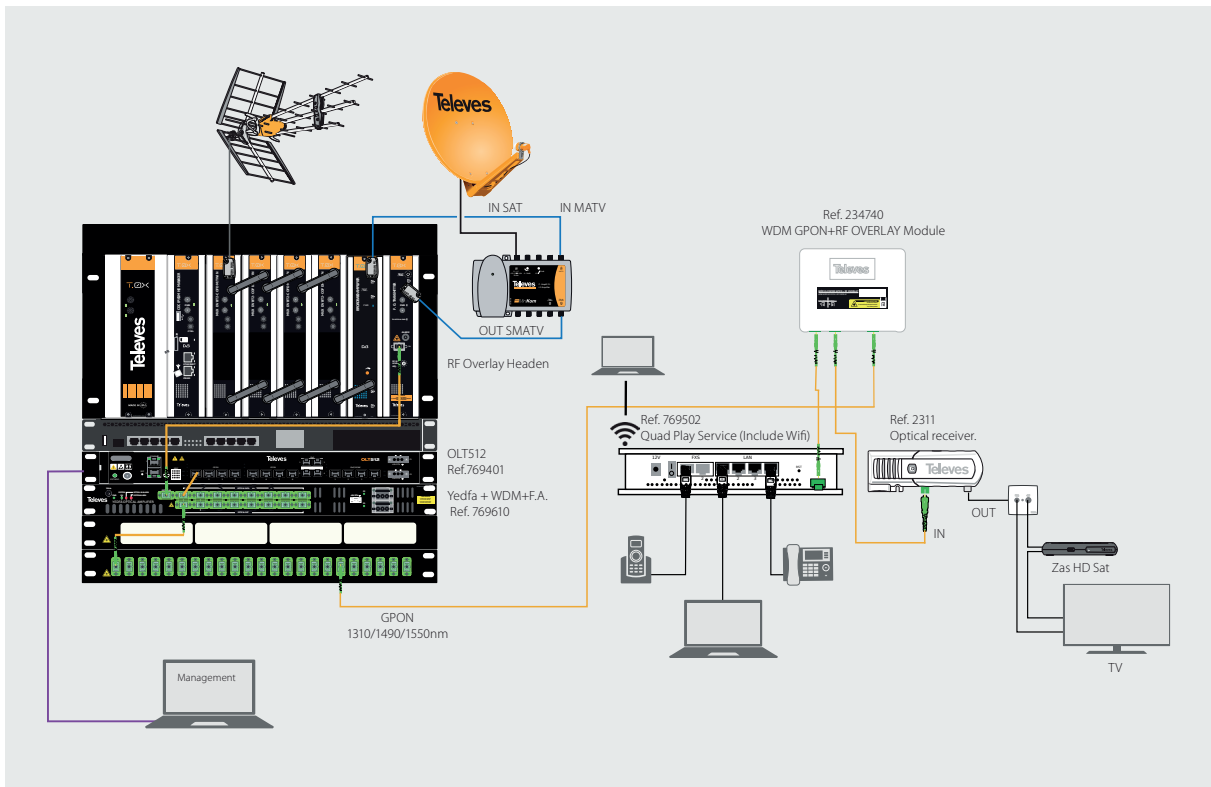
BLOCK DIAGRAM



Reference			231111	2311	231181	
OPTICAL INPUT	Optical device	type	InGaAs pin photodiode			
	Wavelength	nm	1550	1200...1600	1550	
	Detection bandwidth	MHz	1...3000			
	Optical input power range	dBm	-10 ~ +2			
	Optical return losses	dB	> 40			
RF OUTPUT	Frequency range	MHz	47... 1006	47...2150	47...1006	
	Impedance	ohm	75			
	Output return losses	dB	≥ 11			
	Max. output level	dBμV	80	84	80	
GENERAL	Mains voltage	Vac	196 - 264		108 - 132	
	Current consumption	mA	19 max.	30 max.	32 max.	
	Power consumption	W	1.7 max.	3 max.	1.6 max.	
	Output RF connector	type	F female			
	Input optical connector	type	SC/APC			
	Operating temperature	°C/°F	-5...+45 / 23...113			
	Weight	gr/lb	230 / 0.51			
	Ingress protection level	IP	20			
	Dimensions (WxHxD)			145 × 60 × 35		
				5.68 X 2.36 X 1.38		

The LED indicator for received optical power, will turn red when the incoming optical power exceeds the specified maximum value; it will turn green whenever the optical power is between -10 to +3 dBm; and it will turn amber when the incoming power is less than -10 dBm.

TYPICAL APPLICATION



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