

Optical Systems

Active and passive components



As a supplier of broadband communication technology braun teleCom has stood for competence and continuity for more than 30 years.

With our long experience and constantly growing know-how we have become a leading supplier of systems and system components for multimedia cable TV networks. Further to our traditional CATV product line, consisting of active and passive components, we have continually expanded our range by integrating sophisticated optical system technologies as well as services encompassing CATV and FTTx network planning into our portfolio.

While, in many areas, our activities focus on the development and production of our own products, we also serve as distributor for selected high-performance cooperation partners.

We have set high quality standards for our entire range of products and services, while ensuring that we offer the best possible price-performance ratio to our customers.

braun teleCom
Quality on Line.

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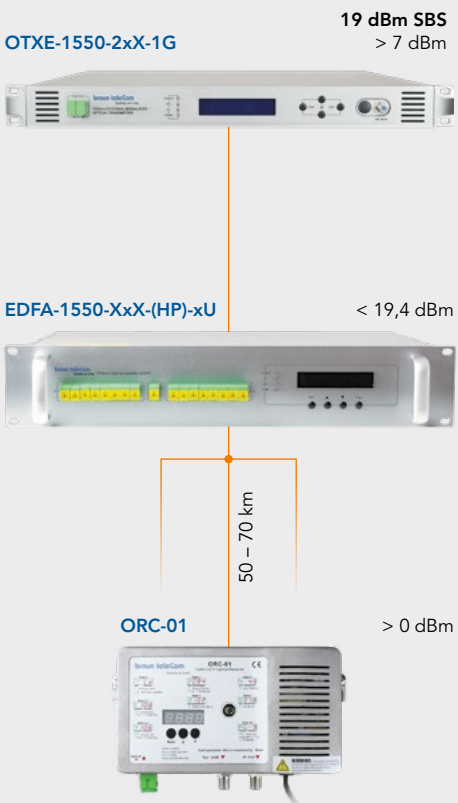
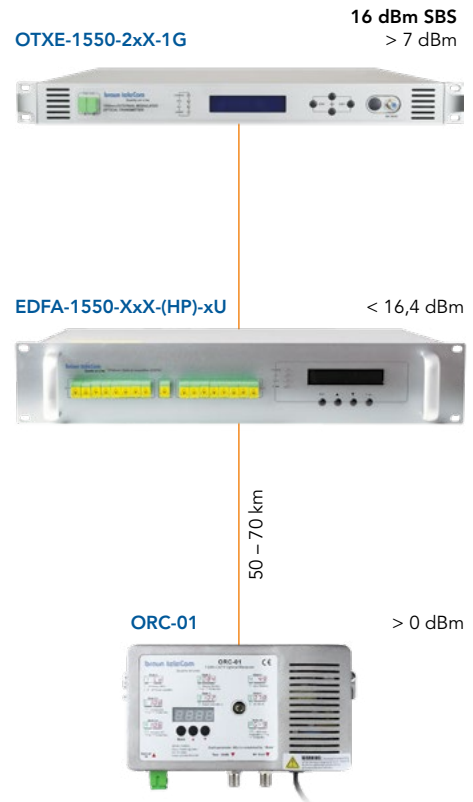
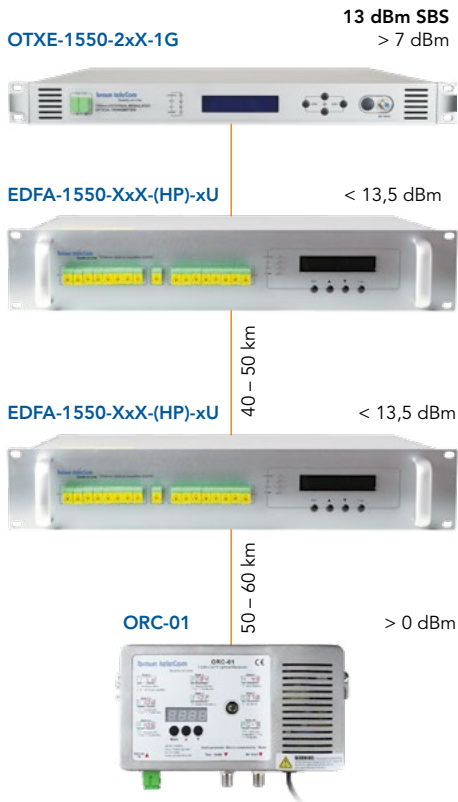
ACTIVE OPTICAL COMPONENTS

Do you have questions concerning our products or want to place an order?

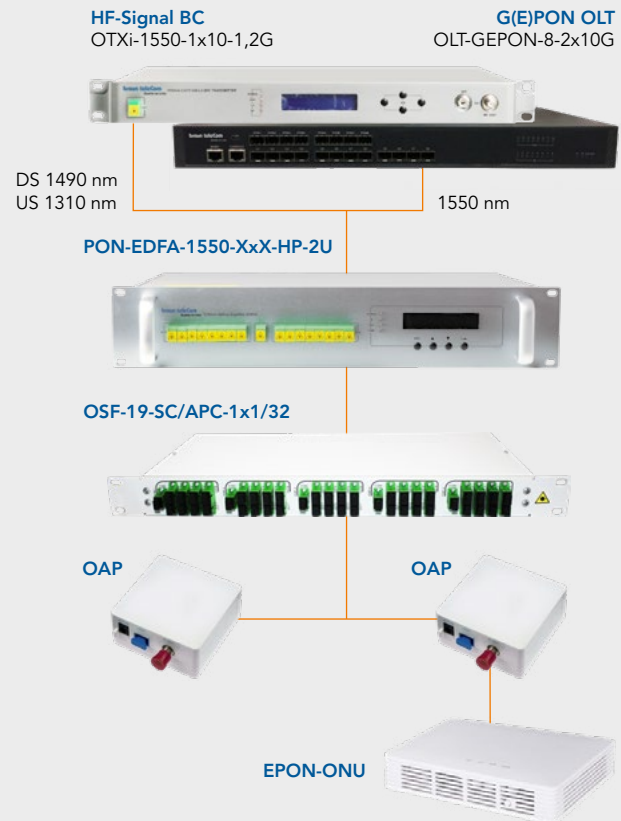
We look forward to your call!
+49 511 757086

Various possible combinations

of our active optical components



Network example with EPON OLT and HF Broadcast



1550 nm optical transmitters

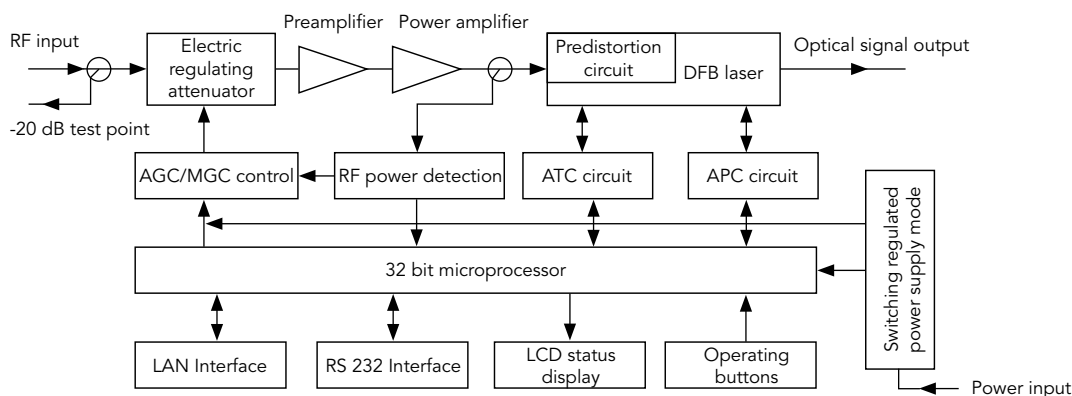
1550 nm directly modulated optical transmitter (45 – 1.218 MHz)

10420211
OTXi-1550-1xX-1,2G



- Cost effective 1550 nm optical transmitter for use in HFC networks with short fiber lengths and modest requirements
- Conversion of RF signals in amplitude-modulated optical signals for the forward path in CATV HFC networks
- Equipped with either ORTEL or AOI DFB lasers for a very good linearity and high optical output power
- Independently developed digital automatic processing technology in the RF drive part, automatic processing of the drive level power according to the actual RF input signal level and the channel loading to ensure the optimal value of system parameters
- Advanced multi-frequency RF pre-distortion technology, combined with GaAs amplifier stages, ensures an effective improvement of the system parameters
- Advanced 32 bit processor, built-in blue screen 160 x 32 dot matrix LCD monitor
- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- SNMP network management functionality via RJ 45 interface
- 2 power supplies, each with 50 % load sharing, in case one power supply fails the second takes over 100 %
- Dimensions: 19"/1RU (483 x 370 x 44 mm (W x D x H))
- Weight: approx. 3,7 kg
- Connector types: SC/APC (optical) and F-females (RF and test point) – E2000/APC alternative available
- Ready for DOCSIS® 3.1

Parameter	Frequency [MHz]	OTXi-1550-1xX-1,2G
Operating wavelength [nm]		1550 ± 20
Optical output power [mW/dBm]		10/10
Optical return loss [dB]		≥ 50
RF frequency range [MHz]		45 – 1.218
RF input level range [dBμV]		72 ... 88
Frequency response [dB]		± 0,75
AGC control range [dB]		± 5
MGC control range [dB]		0 – 10
Return loss [dB]	45 – 550	≥ 16
	550 – 1.218	≥ 14
System parameters		42 channels CENELEC, 4 % OMI, 20 km fiber length, Rx = 0 dBm
Composite Second Order (CSO) [dBc]		≥ 60/≥ 63
Carry-to-Noise (C/N) [dBc]		≥ 48
Optical connectors		SC/APC
Supply voltage [VAC]		2 x 110 – 250/50 Hz (50 – 50 load sharing)
Power consumption [W]		< 30
Operating temperature range [°C]		0 ... +45
Storage temperature range [°C]		-20 ... +65
Max. relative humidity (operation and storage)		max. 95 %, no condensation
Order No.		10420211



1550 nm externally modulated optical transmitter (47 – 1.006 MHz)

10420327
OTXE-1550-2x7-1G



- Narrowband and very low noise DFB laser for a very good linearity and excellent system parameters
- Designed for the operation with optical amplifiers (normal-power EDFAs and high-power EDFAs)
- Suitable for the realization of optical transmission links of over 100 km
- Setting of an automatic gain control (AGC) or a manual gain control (MGC)
- Perfect SBS suppression circuit, adjustable SBS threshold
- Optical modulator with 2 optical outputs
- 2 fans with intelligent fan control for a very long lifespan and reduction of power consumption
- Advanced 32 bit processor, LCD display
- System parameter setting by front panel keypad, user-friendly web interface or serial interface (RS 232)
- SNMP network management functionality via RJ 45 interface
- 2 redundant and hot-pluggable power supplies each with 50 % load sharing, in case one power supply fails the second takes over 100 %
- Dimensions: 19"/1RU (483 x 455 x 44 mm (W x D x H))
- Weight: approx. 5,5 kg
- Connector types: SC/APC (optical) and F-females (RF and test point) – E2000/APC alternative available

Parameter	OTXE-1550-2x7-1G	OTXE-1550-2x8-1G	OTXE-1550-2x9-1G	OTXE-1550-2x10-1G
Operating wavelength [nm]	1545 ... 1560	1545 ... 1560	1545 ... 1560	1545 ... 1560
Wavelength adjustment range [GHz]	± 50	± 50	± 50	± 50
Output power per port [dBm]	7	8	9	10
Amount of output ports	2	2	2	2
Equivalent noise intensity (RIN) [dBc/Hz]	< -160	< -160	< -160	< -160
Side Mode Suppression Ratio (SMSR) [dB]	> 30	> 30	> 30	> 30
SBS threshold value [dBm]	+13 ... +19 (continuously adjustable)	+13 ... +19 (continuously adjustable)	+13 ... +19 (continuously adjustable)	+13 ... +19 (continuously adjustable)
Laser linewidth [MHz]	0,3	0,3	0,3	0,3
RF frequency range [MHz]	47 – 1.006	47 – 1.006	47 – 1.006	47 – 1.006
RF input level range [dBμV]	78 ... 96 (AGC mode)	78 ... 96 (AGC mode)	78 ... 96 (AGC mode)	78 ... 96 (AGC mode)
Frequency response [dB]	± 0,75	± 0,75	± 0,75	± 0,75
System parameters	42 channels CENELEC, 4 % OMI, 20 km fiber length, Rx = 0 dBm			
Composite Second Order (CSO)/ Composite Triple Beat (CTB) [dBc]	≥ 64/≥ 65	≥ 64/≥ 65	≥ 64/≥ 65	≥ 64/≥ 65
Carry-to-Noise (C/N) [dBc]	≥ 55,5	≥ 55,5	≥ 55,5	≥ 55,5
Return loss [dB]	≥ 16	≥ 16	≥ 16	≥ 16
AGC control range [dB]	± 3	± 3	± 3	± 3
MGC control range [dB]	0 – 15	0 – 15	0 – 15	0 – 15
Operating temperature range [°C]	-5 ... +45	-5 ... +45	-5 ... +45	-5 ... +45
Storage temperature range [°C]	-30 ... +70	-30 ... +70	-30 ... +70	-30 ... +70
Max. relative humidity (operation and storage)	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation
Supply voltage	90 ... 265 VAC, 50 Hz or 36 ... 72 VDC			
Optical connectors	SC/APC	SC/APC	SC/APC	SC/APC
Power consumption [W]	< 60	< 60	< 60	< 60
Order No.	10420327	10420328	10420329	10420330

A practical example as well as a block diagram of the 1550 nm externally modulated optical transmitters can be found on the following page.

10420330
OTXE-1550-2x10-1G

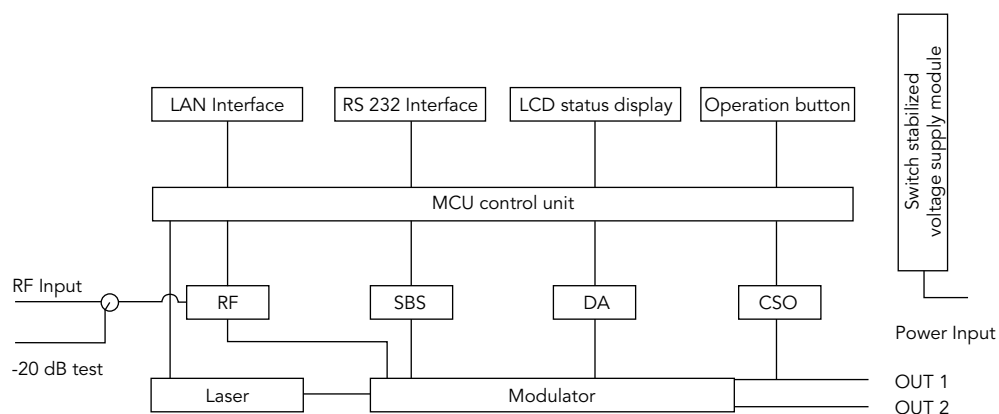


Practical example of CSO, CTB, and C/N as a function of SBS

Testing conditions: RF Mode = AGC, RF input level = 80 dBμV, Rx input power = 0 dBm, EDFA with 5 dB noise figure

Test name	SBS	1st stage EDFA	1st fiber cable length	2nd stage EDFA	2nd fiber cable length	optical receiver input power
Tx/Rx	13,5 dBm	none	none	none	none	0 dBm
Link 1	13,5 dBm	none	35 km	none	none	0 dBm
Link 2	16 dBm	16 dBm	65 km	none	none	0 dBm
Link 3	13 dBm	13 dBm	50 km	13 km	50 km	0 dBm

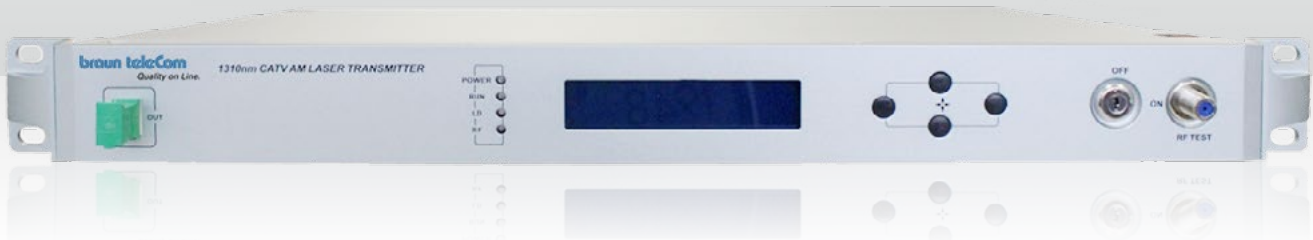
Test model	C42	D59	D84	D30
Channel plan	CENELEC 42	PAL D59	PAL D84	PAL D
Channel number TV/FM/QAM64	42/0/0	59/0/0	84/0/0	30/0/48
Bandwidth noise [dBc]	5	5	5	5
C/N Tx/Rx [dBc]	55,5	54	52,5	54,5
C/N Link 1 [dBc]	55	53,5	52	54
C/N Link 2 [dBc]	53	52,5	50,5	52,5
C/N Link 3 [dBc]	50,5	50,5	49	51
CSO Tx/Rx and Link 1 [dBc]	64	65	65	70
CSO Link 2 [dBc]	63	65	65	70
CSO Link 3 [dBc]	62	64	63	65
CTB [dBc]	65	65	65	68



1310 nm optical transmitters

OTX-1310-1xX-1G directly modulated transceivers (45 – 1.006 MHz)

10420409
OTX-1310-1x8-1,2G



- Cost effective 1310 nm optical transmitter for use in HFC networks with short fiber lengths and modest requirements
- Conversion of RF signals in amplitude-modulated optical signals for the forward path in CATV HFC networks
- Equipped with high-performance coaxial DFB laser for a very good linearity and high optical output power
- Advanced multi-frequency RF pre-distortion technology, combined with GaAs amplifier stages, ensures an effective improvement of the system parameters
- Advanced 32 bit processor, built-in blue screen 160 x 32 dot matrix LCD monitor
- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- SNMP network management functionality via RJ 45 interface
- 2 power supplies, each with 50 % load sharing, in case one power supply fails the second takes over 100 %
- Dimensions: 19"/1RU (483 x 370 x 44 mm (W x D x H))
- Weight: approx. 3,7 kg
- Connector types: SC/APC (optical) and F-females (RF and test point) – E2000/APC alternative available
- Ready for DOCSIS 3.1

Parameter	OTX-1310-1x8-1,2G	OTX-1310-1x10-1,2G	OTX-1310-1x12-1,2G	OTX-1310-1x14-1,2G
Operating wavelength [nm]	1310 ± 20	1310 ± 20	1310 ± 20	1310 ± 20
Optical output power [mW]	6	10	16	26
Optical output power [dB]	8	10	12	14
Optical link loss [dB]	9	11	13	15
Optical return loss [dB]	≥ 50	≥ 50	≥ 50	≥ 50
RF frequency range [MHz]	45 – 1.218	45 – 1.218	45 – 1.218	45 – 1.218
RF input level range [dBμV]	75 ... 85	75 ... 85	75 ... 85	75 ... 85
Frequency response [dB]	± 0,75	± 0,75	± 0,75	± 0,75
AGC control range [dB]	± 5	± 5	± 5	± 5
MGC control range [dB]	0 – 10	0 – 10	0 – 10	0 – 10
Return loss [dB]	≥ 16 (45 – 550 MHz) ≥ 14 (550 – 1.218 MHz)			
System parameters	42 channels CENELEC, 4 % OMI, 20 km fiber length, Rx = 0 dBm			
Composite Second Order (CSO)/ Composite Triple Beat (CTB) [dBc]	62/67	62/67	62/67	62/67
Carry-to-Noise (C/N) [dBc]	52	52	52	52
Optical connectors	SC/APC	SC/APC	SC/APC	SC/APC
Supply voltage	2 x 110 – 250/50 Hz (each 50 % load sharing)			
Power consumption [W]	< 30	< 30	< 30	< 30
Operating temperature range [°C]	0 ... +45	0 ... +45	0 ... +45	0 ... +45
Storage temperature range [°C]	-20 ... +65	-20 ... +65	-20 ... +65	-20 ... +65
Max. relative humidity (operation and storage)	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation
Order No.	10420409	10420411	10420413	10420415

Further OTX models are available on request!

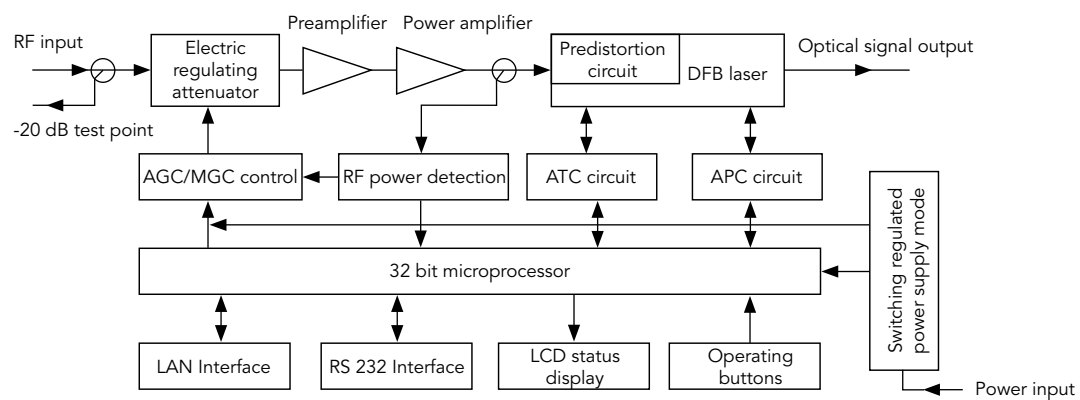
The optical link carrier to noise ratio degradation as well as a block diagram of the 1310 nm optical transmitters can be found on the following page.

10420413
OTX-1310-1x12-1G



Optical link carrier to noise ratio degradation

Optical power	Optical link loss [dB]																	
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
6 mW				53,0	52,0	51,0	50,1	49,1	48,1									
10 mW						52,9	51,9	51,0	50,1	49,1	48,2							
16 mW									52,0	51,0	50,1	49,1	48,1					
26 mW											51,5	50,2	49,2	48,5	47,6			



Optical amplifiers

EDFA-1550-XxX-HP-1U high power optical amplifiers

10420718

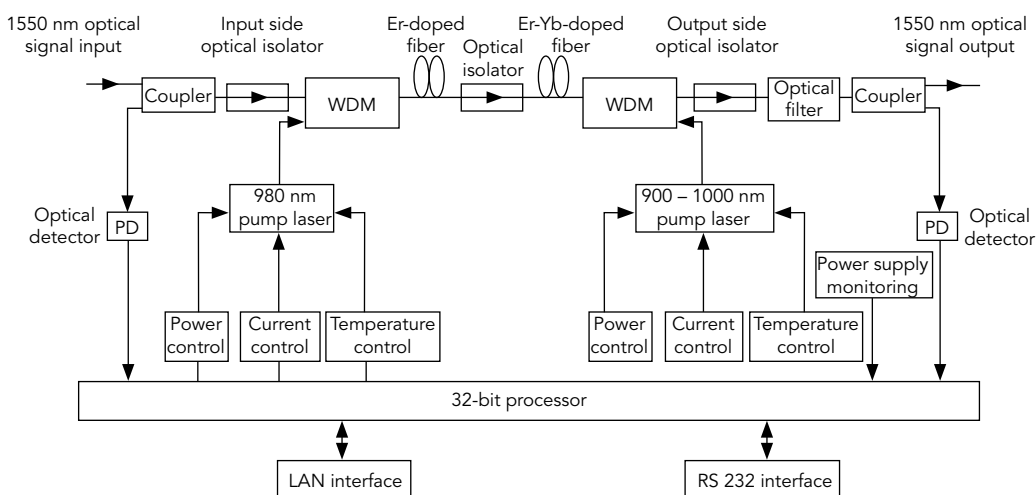
EDFA-1550-4x18-HP



- Adopts erbium ytterbium co-doped double-clad fiber technology
- 4 – 16 output ports
- Extremely high optical output power per port
- Adjustable loss at the output -3 – 0 dB
- Low noise figure
- Network management interface, in line with standard SNMP network management
- Intelligent temperature control system for lowering the power consumption
- RS 232 and RJ 45 control interface
- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- 2 power supplies with each 50 % load sharing, 160 ... 250 VAC or 48 VDC, not hot-pluggable
- Connector types: SC/APC (optical) – E2000/APC alternative available

Parameter	EDFA-1550-4x18-HP	EDFA-1550-4x20-HP	EDFA-1550-4x22-HP	EDFA-1550-4x24-HP	EDFA-1550-8x16-HP	EDFA-1550-8x18-HP	EDFA-1550-16x16-HP
Operating wavelength [nm]	1545 – 1565	1545 – 1565	1545 – 1565	1545 – 1565	1545 – 1565	1545 – 1565	1545 – 1565
Optical input power range [dBm]	-3 ... +10	-3 ... +10	-3 ... +10	-3 ... +10	-3 ... +10	-3 ... +10	-3 ... +10
Max internal output power [dBm]	26	28	30	31	27	29	31
Amount output ports	4	4	4	4	8	8	16
Output power per port [dBm]	18	20	22	24	16	18	16
Output power stability [dBm]	± 0,5	± 0,5	± 0,5	± 0,5	± 0,5	± 0,5	± 0,5
Return loss optical output [dB]	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45
Return loss optical input [dB]	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45
Noise figure [dBμV]	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
Optical connectors	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC
Power consumption [W]	30	30	30	30	30	30	30
Operating temperature range [°C]	-10 ... +45	-10 ... +45	-10 ... +45	-10 ... +45	-10 ... +45	-10 ... +45	-10 ... +45
Storage temperature range [°C]	-30 ... +70	-30 ... +70	-30 ... +70	-30 ... +70	-30 ... +70	-30 ... +70	-30 ... +70
Max. relative humidity (operation and storage)	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation	max. 95 %, no condensation
Dimensions (L x W x H) [mm]	483 x 475 x 44	483 x 475 x 44	483 x 475 x 44	483 x 475 x 44	483 x 475 x 44	483 x 475 x 44	483 x 475 x 44
Weight [kg]	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Rack unit	19"/1 RU	19"/1 RU	19"/1 RU	19"/1 RU	19"/1 RU	19"/1 RU	19"/1 RU
Order No.	10420718	10420720	10420722	10420724	10420736	10420738	10420746

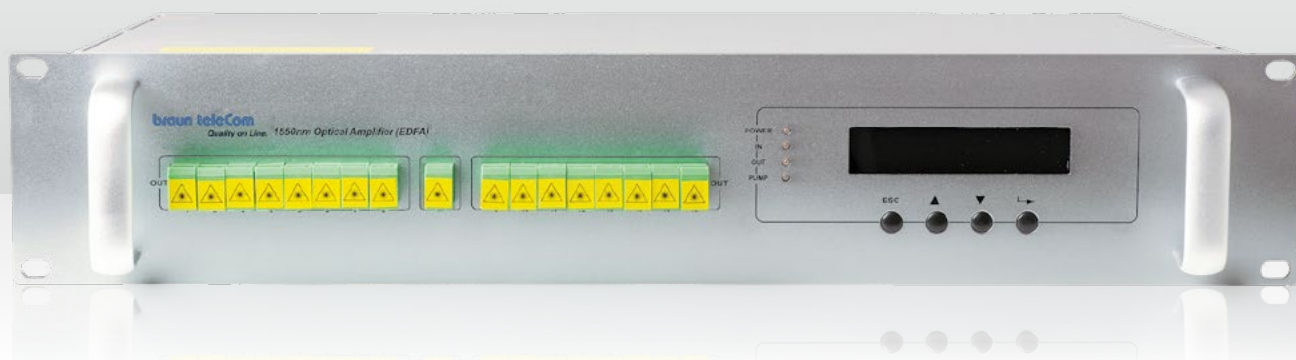
Further EDFA models are available on request!



EDFA-1550-XxX-HP-2U high power optical amplifier

10420816

EDFA-1550-16x16-HP-2U



- Adopts erbium ytterbium co-doped double-clad fiber technology
- 4 – 32 output ports
- Extreme high optical output power per port
- Adjustable loss at the output 0 – 3 dB
- Low noise figure
- Network management interface, in line with standard SNMP network management

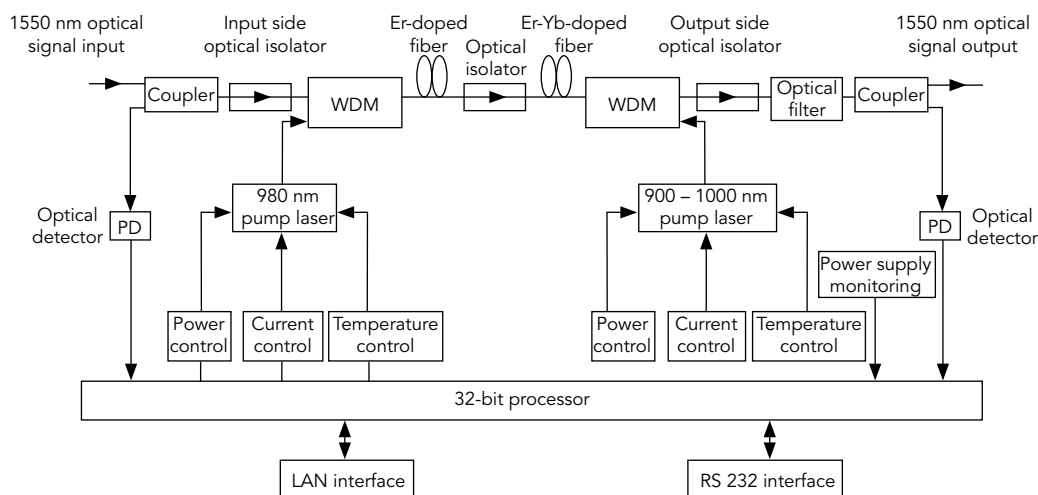
- Intelligent temperature control system for lowering the power consumption
- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- RS 232 and RJ 45 control interface
- 2 power supplies with each 50 % load sharing, 160 ... 250 VAC or 48 VDC, hot-pluggable
- Connector types: SC/APC (optical) – E2000/APC alternative available

Parameter	Applies to all EDFA models listed on the right
Operating wavelength [nm]	1545 – 1565
Optical input power range [dBm]	-3 ... +10
Output power stability [dBm]	± 0,5
Return loss optical output [dB]	≥ 45
Return loss optical input [dB]	≥ 45
Noise figure [dBμV]	≤ 5
Optical connectors	SC/APC
Power consumption [W]	30
Operating temperature range [°C]	-10 ... +45
Storage temperature range [°C]	-30 ... +70
Max. relative humidity (operation and storage) [%]	max. 95 %, no condensation
Dimensions (L x W x H) [mm]	434 x 456 x 87
Weight [kg]	6,8
Rack unit	19"/2 RU

* Version with 1 RU on request

Further EDFA models are available on request!

Model	Max internal output power [dBm]	Amount output ports	Output power per port [dBm]	Order No.
EDFA-1550-4x18-HP-2U*	25	4	18	10420838
EDFA-1550-4x20-HP-2U*	27	4	20	10420840
EDFA-1550-4x22-HP-2U*	29	4	22	10420842
EDFA-1550-4x24-HP-2U*	31	4	24	10420844
EDFA-1550-8x16-HP-2U*	27	8	16	10420856
EDFA-1550-8x18-HP-2U*	29	8	18	10420858
EDFA-1550-8x20-HP-2U	31	8	20	10420860
EDFA-1550-8x22-HP-2U	33	8	22	10420862
EDFA-1550-16x16-HP-2U*	31	16	16	10420816
EDFA-1550-16x19-HP-2U	34	16	19	10420819
EDFA-1550-16x21-HP-2U	36	16	21	10420821
EDFA-1550-32x16-HP-2U	34	32	16	10420826
EDFA-1550-32x18-HP-2U	33	32	18	10420828



EDFA-1550-XxX optical amplifiers

10420646
EDFA-1550-2x16



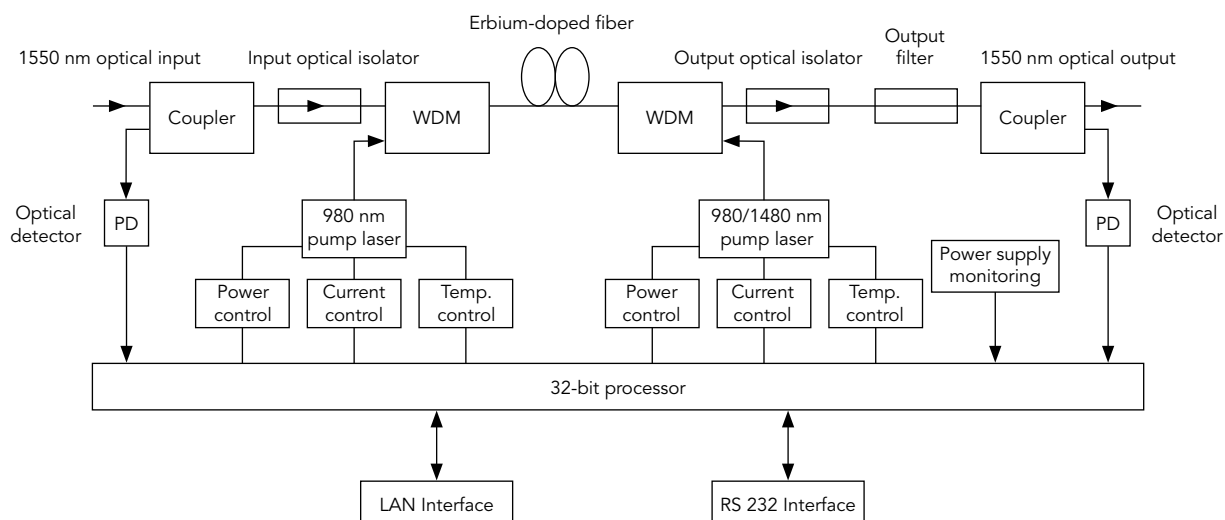
- High-performance erbium doped fiber and low noise pump laser
- 1 – 4 output ports
- Extremely high optical output power per port
- Adjustable loss at the output -3 – 0 dB
- Low noise figure
- Network management interface, in line with standard SNMP network management

- Intelligent temperature control system for lowering the power consumption
- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- RS 232 and RJ 45 control interface
- 2 power supplies with each 50 % load sharing, 160 ... 250 VAC or 48 VDC, hot-pluggable
- Connector types: SC/APC (optical) – E2000/APC alternative available

Parameter	Applies to all EDFA models listed on the right
Operating wavelength [nm]	1545 – 1565
Optical input power range [dBm]	-3 ... +10
Output power stability [dBm]	± 0,5
Return loss optical output [dB]	≥ 45
Return loss optical input [dB]	≥ 45
Noise figure [dBμV]	≤ 5
Optical connectors	SC/APC
Power consumption [W]	30
Operating temperature range [°C]	-5 ... +55
Storage temperature range [°C]	-30 ... +70
Max. relative humidity (operation and storage)	max. 95 %, no condensation
Dimensions (L x W x H) [mm]	483 x 420 x 44
Weight [kg]	3,7
Rack unit	19"/1 RU

Model	Max internal output power [dBm]	Amount output ports	Output power per port [dBm]	Order No.
EDFA-1550-1x16	16	1	16	10420606
EDFA-1550-1x17	17	1	17	10420607
EDFA-1550-1x18	18	1	18	10420608
EDFA-1550-1x20	20	1	20	10420610
EDFA-1550-1x22	22	1	22	10420612
EDFA-1550-1x25	25	1	25	10420615
EDFA-1550-2x16	20	2	16	10420646
EDFA-1550-2x18	22	2	18	10420648
EDFA-1550-2x21	25	2	21	10420651
EDFA-1550-4x16	23	4	16	10420716

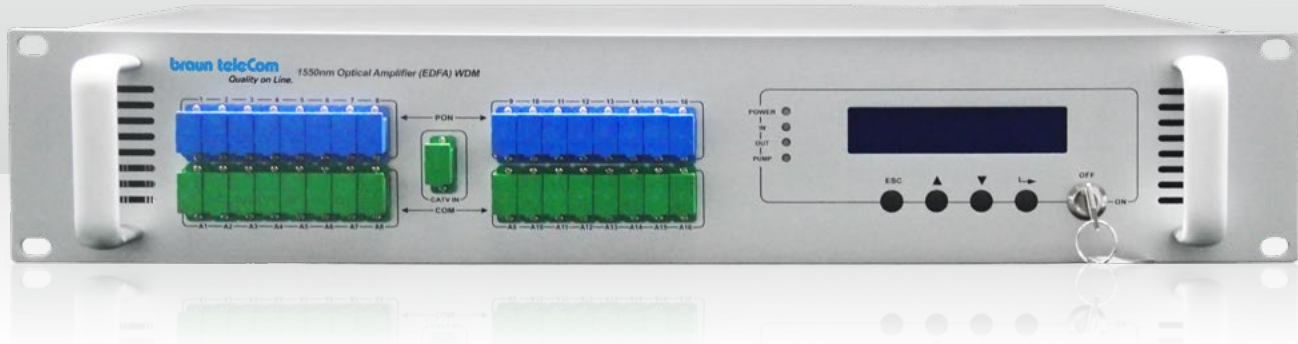
Further EDFA models are available on request!



PON-EDFA-1550-XxX-HP-2U high power optical amplifiers

10420817

PON-EDFA-1550-16x16-HP-2U



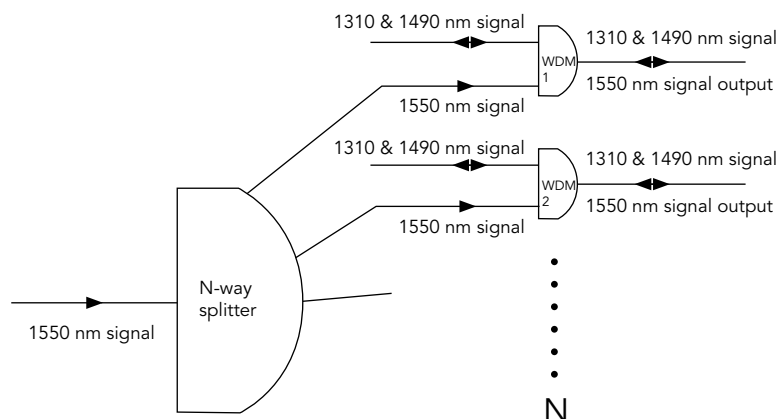
- Adopts erbium ytterbium co-doped double-clad fiber technology
- Extremely high optical output power per port
- Adjustable loss at the output 0 – 3 dB
- Low noise figure
- Network management interface, in line with standard SNMP network management
- Intelligent temperature control system for lowering the power consumption

- System parameter setting by front panel keypad, serial interface (RS 232) or user-friendly web interface
- RS 232 and RJ 45 control interface
- 2 power supplies with each 50 % load sharing, 160 ... 250 VAC or 48 VDC, hot-pluggable
- Connector types: CATV and COM SC/APC – xPON: SC/PC or CATV and COM:LC/APC; xPON: LC/PC

Parameter	Applies to all PON-EDFA models listed on the right
CATV wavelength [nm]	1545 – 1565
xPON wavelength [nm]	1260 – 1360 / 1480 – 1500
WDM through loss [dB]	< 1,0
Optical EDFA input power range [dBm]	-3 ... +10
Output power stability [dBm]	± 0,5
Return loss optical output [dB]	≥ 45
Return loss optical input [dB]	≥ 45
Noise figure [dBμV]	≤ 5
Optical connectors	SC/APC; xPON IN – SC/PC
Power consumption [W]	30
Operating temperature range [°C]	-10 ... +45
Storage temperature range [°C]	-30 ... +70
Max. relative humidity (operation and storage)	max. 95 %, no condensation
Dimensions (L x W x H) [mm]	434 x 456 x 87
Weight [kg]	6,8
Rack unit	19" / 2 RU

Further PON-EDFA models are available on request!

Model	Connectors	Amount output ports	Output power per port [dBm]	Order No.
PON-EDFA-1550-8x16-HP-2U	SC	8	16	10420857
PON-EDFA-1550-8x17-HP-2U	SC	8	17	10420859
PON-EDFA-1550-8x22-HP-2U	SC	8	22	10420863
PON-EDFA-1550-16x16-HP-2U	SC	16	16	10420817
PON-EDFA-1550-16x17-HP-2U	SC	16	17	10420820
PON-EDFA-1550-16x21-HP-2U	SC	16	21	10420822
PON-EDFA-1550-32x17-HP-2U	SC	32	17	10420823
PON-EDFA-1550-32x21-HP-2U	SC	32	21	10420824
PON-EDFA-1550-64x17-HP-2U-LC	LC	64	17	10420832
PON-EDFA-1550-64x18-HP-2U-LC	LC	64	18	10420833



Hardened EDFAs, optical amplifiers for outdoor cabinets

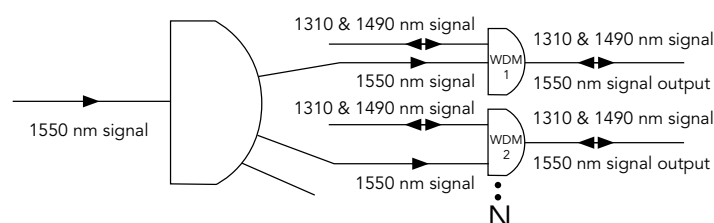
10420870
H-PON-EDFA-1550-16x17



- Due to enhanced operation temperature range (-30°C ... +65°C) optimized for installation in outdoor cabinets
- Innovative cooling concept guarantees reliable temperature control in harsh environments
- Space saving design due to 45° angled optical connectors at the front side, also ensuring a low bend radius of the applied patchcords
- Compact design with only 24 cm of installation depth for usage within street cabinets
- Adopts erbium ytterbium co-doped double-clad fiber technology
- Extremely high optical output power per port
- Output power is adjustable from -3 to 0 dB
- Low noise figure
- Network management interface, in line with standard SNMP 2.0 network management
- Intelligent temperature control system for lowering the power consumption and extending the product's lifespan
- System parameter setting via front panel keypad, serial interface (RS 232) or user-friendly web interface
- RS 232 and RJ 45 control interface
- 2 hot-swappable power supplies with each 50 % load sharing, 160 ... 250 VAC or 48 VDC
- Optional redundancy switch at the input of the EDFA
- Filter replaceable from the front

Parameter	H-PON-EDFA-1550-8x20	H-PON-EDFA-1550-16x17	H-PON-EDFA-1550-16x20	H-PON-EDFA-1550-32x17-LC
CATV wavelength [nm]	1545 – 1565	1545 – 1565	1545 – 1565	1545 – 1565
xPON wavelength [nm]	1260 – 1360 / 1480 – 1500	1260 – 1360 / 1480 – 1500	1260 – 1360 / 1480 – 1500	1260 – 1360 / 1480 – 1500
WDM through loss [dB]	< 1,0	< 1,0	< 1,0	< 1,0
Optical EDFA input power range [dBm]	-10 ... +10	-10 ... +10	-10 ... +10	-10 ... +10
Internal output power [dBm]	31	31	34	34
Amount of output ports	8	16	16	32
Output power per port [dBm]	20	17	20	17
Optical output power [dBm]	≥ 17	≥ 17	≥ 17	≥ 17
Input power [dBm]	-10 ... +10	-10 ... +10	-10 ... +10	-10 ... +10
Amount of input ports	1	1	1	1
Insertion loss [dB]	≤ 1,0	≤ 1,0	≤ 1,0	≤ 1,0
Output power stability [dBm]	≤ ± 0,3	≤ ± 0,3	≤ ± 0,3	≤ ± 0,3
Return loss optical output [dB]	≥ 50	≥ 50	≥ 50	≥ 50
Return loss optical input [dB]	≥ 50	≥ 50	≥ 50	≥ 50
RF test point [dB typ.]	≥ 78	≥ 78	≥ 78	≥ 78
Noise figure [dBμV]	≤ 5,5	≤ 5,5	≤ 5,5	≤ 5,5
Optical connectors	SC/APC; xPON IN – SC/PC	SC/APC; xPON IN – SC/PC	SC/APC; xPON IN – SC/PC	LC/APC; xPON IN – LC/PC
Power consumption [W]	50	50	50	50
Operating temperature range [°C]	-30 ... +65	-30 ... +65	-30 ... +65	-30 ... +65
Storage temperature range [°C]	-40 ... +80	-40 ... +80	-40 ... +80	-40 ... +80
Max. relative humidity [%]	95	95	95	95
Dimensions (L x W x H) [mm]	240 x 482 x 87	240 x 482 x 87	240 x 482 x 87	240 x 482 x 87
Weight [kg]	6	6	6	6
Rack Unit	19"/2 RU	19"/2 RU	19"/2 RU	19"/2 RU
Order-No.	10420869	10420870	10420871	10420872

Further H-PON-EDFA models are available on request!



Subject to technical changes!

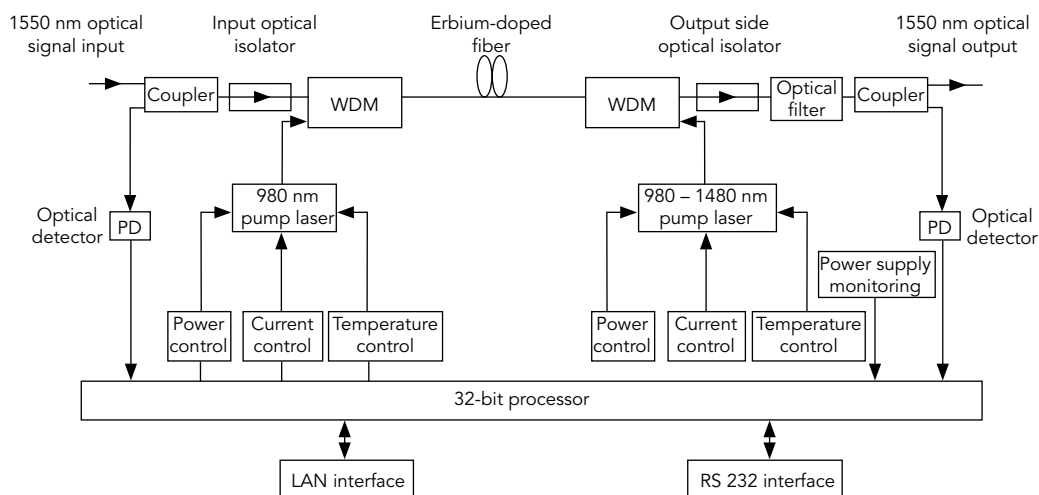
A-EDFA-1550-4-14 outdoor optical amplifier



10420900
A-EDFA-1550-4-14

- High-performance erbium doped fiber and low noise pump laser
- 4 output ports
- Low noise figure
- Large optical input power range
- Works under outdoor and bad environmental conditions, due to the aluminum waterproof housing
- Optical status indication with LEDs
- Network management via SNMP interface (optional)
- Highly reliable switching power supply with 110 – 265 VAC
- Connector types: SC/APC (optional)
- Dimensions: approx. 340 x 130 x 240 mm (W x H x D)
- Weight: approx. 3,9 kg

Parameter	A-EDFA-1550-4-14
Operating wavelength [nm]	1545 – 1565
Optical input power range [dBm]	-3 ... +10
Optical output power [dBm]	14
Output power stability [dBm]	± 0,5
Return loss optical output [dB]	≥ 45
Return loss optical input [dB]	≥ 45
Noise figure [dBμV]	≤ 5
Optical connectors	SC/APC
System parameters	42 channels CENELEC, 0 dBm optical input power, 100 dBμV output level, 3,3 % OMI
CSO [dBc]	≥ 64
CTB [dBc]	≥ 65
C/N [dBc]	≥ 52,5
Power consumption [W]	≤ 30
Operating temperature range [°C]	-15 ... +55
Storage temperature range [°C]	-30 ... +70
Dimensions (L x W x H) [mm]	340 x 130 x 240
Weight [kg]	3,9
Order No.	10420900



RFoG optical return path receiver

ORX-4C-200 RFoG



- Designed for converting optical upstream signals into RF signals in head-ends and hubs, especially for usage in RFoG network topologies
- Supports Docsis 3.0 upstream channel bonding in PON architectures
- 4 separate optical return path receivers in one compact device
- Connection of up to 256 optical RFoG micro nodes (e.g. 4 clusters with each 64 RFoG micro nodes)
- Microprocessor-controlled adjustment of system parameters using frontal keypads or via a web interface (RJ 45 or RS 232)
- **The device is switchable from "RFoG" mode to "normal" mode (continuous light at the entrance)**
- Monitoring of the optical input power via web interface in "normal" mode
- Extremely high input sensitivity
- Very high RF output level for each receiver, depending on the relevant optical input level
- Fine tuning of the RF output level for each receiver by using internal attenuators
- Optical status indication with LEDs and built-in LCD monitor
- Separate test points for measuring the RF output levels (front side)
- Extremely wide operating temperature range, thereby suitable in almost all environmental conditions
- 2 power supplies with each 50 % load sharing, in case of a failure of one power supply 100 % load transfer to the 2nd power supply
- Connector types: SC/APC (optical) and F-females (RF and test points) – E2000/APC alternative available

Parameter	ORX-4C-200 RFoG
Operating wavelength [nm]	1200 ... 1620
Optical input power range [dBm]	-27 ... -13
Equivalent noise current input [pA/√Hz]	1
Optical return loss [dB]	> 50
Test point per RF output [dB]	-20 ± 0,5
Return loss output [dB]	> 16
Return loss optical input [dB]	≥ 45
RF frequency range [MHz]	5 – 200
RF output level per receiver [dBμV]	90 ... 120 (e.g.: 98 dBμV at 10 % OMI, -27 dBm , ATT. = 0 dB)
Frequency response [dB]	± 0,75
Attenuator range per receiver [dB]	-30 ... 0 (in 1 dB steps via front site, in 0,5 dB steps via web interface)
Power consumption [W]	≤ 12
Operating temperature range [°C]	-40 ... +65
Dimensions (L x W x H) [mm]	480 x 325 x 44
Weight [kg]	2,0
Order No.	10420092

Optical switch

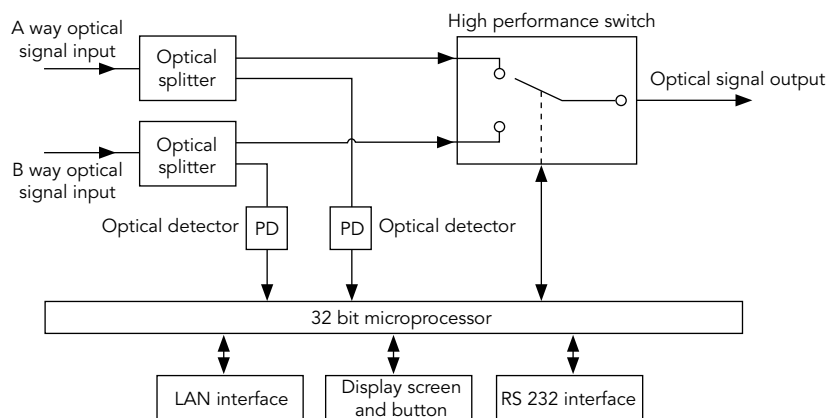
1 x 2 optical switch for redundant optical fiber transmissions

10420103
OSW-2



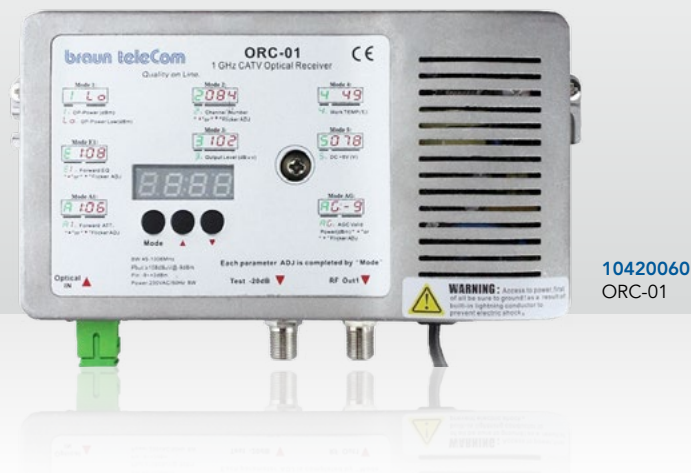
- Extremely short switching time
- Transmission of very high optical powers
- Advanced 32 bit processor for punctual and accurate monitoring of input power, reliable control of switch status and setup of automatic or manual switch mode
- Switches automatically when optical signal has a fault
- System parameters setting by front panel keypad or serial interface (RS 232)
- SNMP network management functionality via RJ 45 interface
- 2 power supplies with each 50 % load sharing, in case one power supply fails the second takes over 100 %
- Built-in blue screen 160 x 32 dot matrix LCD monitor
- SC/APC connectors at the front side
- Dimensions: 19"/1 RU (483 x 285 x 44 mm (W x D x H))
- Weight: approx. 2,0 kg

Parameter	OSW-2
Operating wavelength [nm]	1200 ... 1620
Max. optical input power [dBm]	27
Through loss [dB]	≤ 1,3 (tested at 1310, 1490, 1550 nm)
Return loss output [dB]	> 55
Optical return loss [dB]	> 55
Optical input power ranges [dBm]	-15 ... +24
Max. switching life (MTBF)	≥ 10.000.000
Optical connectors	SC/APC
Supply voltage [VAC]	2 x 160 – 250/50 Hz (each 50 % load sharing)
Power consumption [W]	≤ 2
Operating temperature range [°C]	-5 ... +55
Storage temperature range [°C]	30 ... +70
Order No.	10420103



Optical receivers

Optical broadband receivers 45 – 1.006 MHz
with high power output for CATV applications

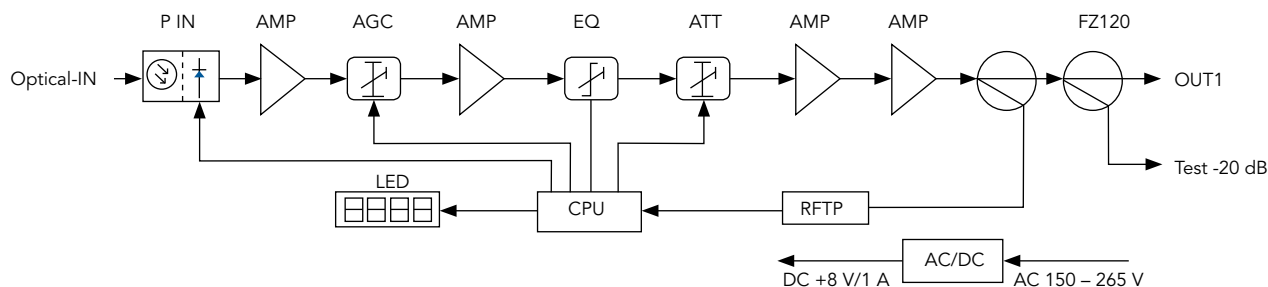


10420060
ORC-01

- Optical status indication by LEDs
- Integrated test point for the RF output
- Very high and constant RF output level within the whole optical input power range by an integrated automatic gain control (AGC)
- Connector types: SC (optical) and F-females
- Dimensions: approx. 190 x 110 x 52 mm (W x H x D)
- Weight: approx. 0,4 kg

Parameter	ORC-01	ORC-01-1550	ORC-01-PON
Max. optical input power [dBm]	-9 – +2	-9 – +2	-9 – +2
Responsivity [A/W]	0,85	0,85	0,85
Optical return loss [dB]	45	45	45
Optical connectors input	SC/APC	SC/APC	SC/APC
Operation bandwidth [MHz]	45 – 1.006	45 – 1.006	45 – 1.006
Output level [dBμV]	110 (-9 – +2 dBm i) 112 (-8 – +2 dBm i)	110 (-9 – +2 dBm i) 112 (-8 – +2 dBm i)	110 (-9 – +2 dBm i) 112 (-8 – +2 dBm i)
Flatness [dB]	-0,75 – +0,75	-0,75 – +0,75	-0,75 – +0,75
Return loss [dB]	14	14	14
Test point [dB typ.]	-20	-20	-20
Composite Second Order (CSO) [dB]	60*	60*	60*
Composite Triple Beat (CTB) [dB]	60*	60*	60*
Carry-to-Noise (C/N) [dB]	51*	51*	51*
Supply voltage [VAC]	150 ... 265	150 ... 265	150 ... 265
Operating temperature range [°C]	-20 – +55	-20 – +55	-20 – +55
Storage temperature range [°C]	-40 – +60	-40 – +60	-40 – +60
Power consumption [W]	8	8	8
Operating wavelength [nm]	1100 – 1600	1545 – 1563	1539 – 1565
PON pass through (SC/PC) [nm]	–	–	1260 – 1360 1480 – 1500
Order No.	10420060	10420062	10420064

* At P IN = -1 dBm, P OUT = 106 dBμV, 42 CH CENELEC, OMI = 3,5 %



EPON OLT

OLT-GEPON-8-2x10GE

10426101
OLT-GEPON-8-2x10GE



- The main components of a passive optical network (PON) are the following three elements: Optical line terminal (OLT), passive optical splitter and subscriber terminal (ONU)
- The braun teleCom OLT series supports the symmetric uplink/downlink 1,25 Gbps PON transmission rate, efficient bandwidth usage and Ethernet services, helping carriers to provide reliable services to their subscribers
- Overcurrent and overvoltage protection
- Effective expansion of the PON network: Connection of up to 1.024 subscribers
- Redundant power supply with two hot-swappable power supplies (AC/DC hybrid)
- Dimensions: 19"/1 RU (483 x 285 x 44 mm (W x D x H))
- Weight: approx. 2,0 kg

Parameter	OLT-GEPON-8-2x10GE
Maximum coupling ratio	1:64
Backplane bandwidth	128G
Volume of the MAC table	32.000
Ports	16 x EPON 8 x GE (4 x GE optical ports & 4 x GE TX/SFP)
Average emitting power of the PON port [dBm]	+2 – +7
Light reception sensitivity of the PON port [dBm]	> -30
Security	ONU authentication mechanism
Standard	IEEE802.3ah; IEEE 802.1D, Spanning Tree; IEEE802.1Q, VLAN; IEEE 802.1w RSTP; IEEE 802.3ad, LACP; Ethernet – II
QoS	Backpressure flow control (half duplex); IEEE 802.3x flow control (full duplex); IEEE 802.1p, COS; WR, SP and FIFO; ONU-based uplink/downlink rate limit; DBA and SLA
VLAN	Port-based VLAN, 4.000 active VLANs, QinQ and flexible QinQ
IP routing	Static route, RIPv1/v2, OSPF, etc.
Volume of the routing table	12.000
Multicast	IGMP v1/2/3
Reliability	Unidirectional Link Detection (UDLD), Optical path protection of EPON
Network security	MAC limit, port isolation, storm control, flow-based ACL, transmission data encryption on the PON interface
Management	CLI, SNMP and TELNET, TFTP and FTP, Web Interface
Operating temperature range [°C]	0 – +55
Storage temperature range [°C]	-40 – +80
Relative operating humidity	10 – 85 %, no condensation
Relative storage humidity	5 – 95 %, no condensation
Input Voltage [V]	AC 90 – 264 DC -36 – -72
Order No.	10426101

Further G(E)PON-OLT models are available on request!

PASSIVE OPTICAL COMPONENTS

Do you have questions concerning our products or want to place an order?

We look forward to your call!
+49 511 757086

Optical PLC Mini splitter modules

SFF-type with SC/APC or LC/APC-connectors



10439070
2 x 32 PLC Mini splitter

10439010
1 x 8 PLC Mini splitter

- Based on planar lightwave technology
- Designed as 1 x N splitter with 1 input as well as 2 x N splitter with 2 redundant inputs
- Low through loss, very low PDL
- Excellent port-to-port uniformity

- Very high return loss
- Wide wavelength range
- Highly reliable and stable
- Available in 2 grades: Standard (S) and Premium (P)
- Both grades are qualified with Telcordia standard

1 x N PLC Mini splitter (1 input)

Parameter	1 x 2	1 x 4	1 x 8	1 x 16	1 x 32	1 x 64
Operating wavelength [nm]	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650
Through loss* S/P [dB max.]	4,5/4,2	7,9/7,6	11,3/10,9	14,5/14,0	18,0/17,5	21,5/21,0
Uniformity loss S/P [dB max.]	0,6/0,6	0,8/0,6	1,0/1,0	1,3/1,1	1,5/1,5	1,8/1,8
PDL S/P [dB max.]	0,2/0,2	0,2/0,2	0,3/0,2	0,3/0,3	0,3/0,3	0,4/0,4
Directivity [dB min.]	55	55	55	55	55	55
Return loss [dB min.]	50	50	50	50	50	50
Maximum optical power [mW]	500	500	500	500	500	500
Operating temperature range [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Storage temperature range [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Pigtail length, fiber type [m]	1,5 (± 0,1), Corning SMF-28e XB acc. G657A, 900 µm loose tube					
Dimensions (H x W x L) [mm]	4 x 7 x 60	4 x 7 x 60	4 x 7 x 60	6 x 19 x 100	6 x 19 x 100	6 x 40 x 100
Order No.						
PLSC-(1xN)-S Standard SC/APC	10439001	10439005	10439010	10439015	10439020	10439025
PLSC-(1xN)-P Premium SC/APC	10439100	10439105	10439110	10439115	10439120	10439125
PLLC-(1xN)-S Standard LC/APC	10439200	-	-	-	10439220	10439225

2 x N PLC Mini splitter (2 inputs)

Parameter	2 x 2	2 x 4	2 x 8	2 x 16	2 x 32	2 x 64
Operating wavelength [nm]	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650
Through loss* S/P [dB max.]	5,0/4,7	8,4/8,0	11,9/11,5	15,2/14,8	18,4/18,0	22,5/22,0
Uniformity loss S/P [dB max.]	1,2/1,2	1,5/1,3	1,6/1,6	2,0/1,8	2,5/2,3	3,0/2,5
PDL S/P [dB max.]	0,3/0,3	0,3/0,3	0,3/0,3	0,4/0,4	0,4/0,4	0,5/0,5
Directivity [dB min.]	55	55	55	55	55	55
Return loss [dB min.]	50	50	50	50	50	50
Maximum optical power [mW]	500	500	500	500	500	500
Operating temperature range [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Storage temperature range [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Pigtail length, fiber type [m]	1,5 (± 0,1), Corning SMF-28e XB acc. G657A, 900 µm loose tube					
Dimensions (H x W x L) [mm]	4 x 7 x 70	4 x 7 x 70	4 x 7 x 70	6 x 19 x 100	6 x 19 x 100	6 x 40 x 100
Order No.						
PLSC-(2xN)-S Standard SC/APC	10439050	10439055	10439060	10439065	10439070	10439075
PLSC-(2xN)-P Premium SC/APC	10439150	10439155	10439160	10439165	10439170	10439175
PLLC-(2xN)-S Standard LC/APC	10439250	-	-	-	10439270	10439275

* Excluding connector loss, values with connectors + 2 x 0,25 dB (for both connectors)

Fiber couplers

Optical „All Band Window“ fiber couplers with SC/APC pigtails



Optical „All Band Window“ fiber coupler with SC/APC pigtails – box style

- Transmission of all wavelengths in a range of 1260 – 1620 nm
- Very low cross talk, very low PDL
- Very low excess loss
- Excellent port-to-port uniformity
- Very high directivity, very high return loss
- Highly reliable and stable
- Premium grade
- Qualified according Telcordia standard

Parameter	OFC-W-B-1:2/50:50 Allband-SC/APC	OFC-W-B-1:2/40:60 Allband-SC/APC	OFC-W-B-1:2/30:70 Allband-SC/APC	OFC-W-B-1:2/20:80 Allband-SC/APC	OFC-W-B-1:2/10:90 Allband-SC/APC	OFC-W-B-1:2/05:95 Allband-SC/APC
Operating wavelength [nm]	2 x 1260 – 1620	2 x 1260 – 1620	2 x 1260 – 1620	2 x 1260 – 1620	2 x 1260 – 1620	2 x 1260 – 1620
Excess loss [dB typ.]	0,1	0,1	0,1	0,1	0,1	0,1
PDL [dB]	≤ 0,15	≤ 0,15	≤ 0,15	≤ 0,15	≤ 0,15	≤ 0,15
Flatness [dB]	≤ 1,8	≤ 1,8	≤ 1,8	≤ 1,8	≤ 1,8	≤ 1,8
Temperature sensitivity [dB]	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3
Directivity [dB]	≥ 55	≥ 55	≥ 55	≥ 55	≥ 55	≥ 55
Return loss [dB]	≥ 50	≥ 50	≥ 50	≥ 50	≥ 50	≥ 50
Maximum optical power [mW]	≤ 500	≤ 500	≤ 500	≤ 500	≤ 500	≤ 500
Temperature range (oper. & storage) [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Pigtail length, fiber type [m]	1,5 (± 0,1), Corning SMF-28e, 2 mm fiber					
Dimensions [mm]	100 x 80 x 10	100 x 80 x 10	100 x 80 x 10	100 x 80 x 10	100 x 80 x 10	100 x 80 x 10
Coupling ratio	50 : 50	40 : 60	30 : 70	20 : 80	10 : 90	5 : 95
Through loss* [dB max.]	4,0 : 4,0	5,3 : 3,3	6,6 : 2,5	8,5 : 1,8	11,7 : 1,3	14,8 : 1,0
Order No.	10437510	10437515	10437520	10437525	10437530	10437535

* Including connector loss, determined at 1310 nm and 1550 nm and +23°C
The „Water-Peak“ through loss at 1380 nm is already included in the specifications above

Optical „Wideband Window“ fiber couplers with SC/APC pigtails – tube style

- Transmission of wavelengths in a range of 1270 – 1350 & 1464 – 1617 nm
- Very low cross talk, very low PDL
- Very low excess loss
- Excellent port-to-port uniformity
- Very high directivity, very high return loss
- Highly reliable and stable
- Premium grade
- Qualified according Telcordia-Standard

Parameter	OFC-W-R-1:2/ 50:50 Wideband-SC/APC	OFC-W-R-1:2/ 40:60 Wideband-SC/APC	OFC-W-R-1:2/ 30:70 Wideband-SC/APC	OFC-W-R-1:2/ 20:80 Wideband-SC/APC	OFC-W-R-1:2/ 10:90 Wideband-SC/APC	OFC-W-R-1:2/ 05:95 Wideband-SC/APC
Operating wavelength [nm]	2 x 1270 – 1350 and 1464 – 1617	2 x 1270 – 1350 and 1464 – 1617	2 x 1270 – 1350 and 1464 – 1617	2 x 1270 – 1350 and 1464 – 1617	2 x 1270 – 1350 and 1464 – 1617	2 x 1270 – 1350 and 1464 – 1617
Excess loss [dB typ.]	0,1	0,1	0,1	0,1	0,1	0,1
PDL [dB]	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2	≤ 0,2
Flatness [dB]	≤ 1,0	≤ 1,0	≤ 1,0	≤ 1,0	≤ 1,0	≤ 1,0
Temperature sensitivity [dB]	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3
Directivity [dB]	≥ 55	≥ 55	≥ 55	≥ 55	≥ 55	≥ 55
Return loss [dB]	≥ 50	≥ 50	≥ 50	≥ 50	≥ 50	≥ 50
Maximum optical power [mW]	≤ 1.000	≤ 1.000	≤ 1.000	≤ 1.000	≤ 1.000	≤ 1.000
Temperature range (oper. & storage) [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Pigtail length, fiber type [m]	1,0 (± 0,1), Corning SMF-28e or SMF-28e XB acc. G657A, 900 µm loose tube					
Dimensions [mm]	3,0 x 65	3,0 x 65	3,0 x 65	3,0 x 65	3,0 x 65	3,0 x 65
Coupling ratio	50 : 50	40 : 60	30 : 70	20 : 80	10 : 90	5 : 95
Through loss* [dB max.]	4,0 : 4,0	5,0 : 3,0	6,3 : 2,3	8,1 : 1,6	11,5 : 1,1	14,7 : 0,8
Order No.	10437550	10437555	10437560	10437565	10437570	10437575

* Including connector loss, determined at 1310 nm and 1550 nm and +23°C
Further coupling ratios are available on request!

CWDM multiplexers

for 8 ITU channels and 1 channel 1310 ± 40 nm, with SC/APC pigtails



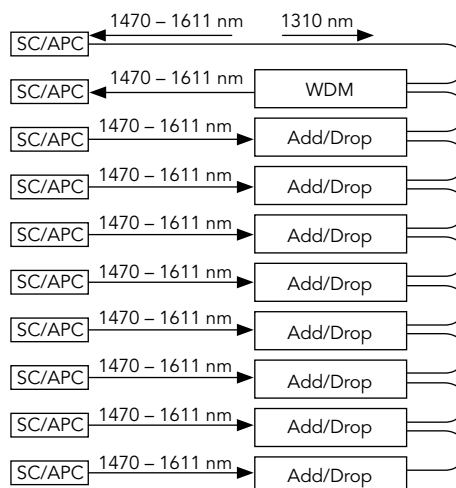
10450040

CWDM-B-MUX 1x9-SC/APC

- For combining the 8 ITU channels C11-C18 and retrieval of the channel 1310 nm
- 1 port for 1310, each 1 port for the 8 ITU channels C11 – C18 (1471/1491/1511/.../1611 nm), 1 COM-port
- Very low through loss, very low PDL
- Very high isolation, very high directivity
- Very high return loss
- Highly reliable and stable
- Qualified according Telcordia standard

Parameter	CWDM-B-MUX 1x9-SC/APC
Central wavelenghts [nm]	1310, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611
Operating wavelenghts [nm]	1310 ± 40 & 1460 – 1620
Channel space [nm]	20
Channel bandwidth [nm]	$\lambda_c \pm 6,5$
Through loss for 1460 – 1620 nm* [dB]	$\leq 3,1$
Through loss for 1310 nm* [dB]	$\leq 0,7$
Channel flatness [dB]	$\leq 0,4$
Channel uniformity [dB]	$\leq 1,0$
Isolation	
Demux-adjacent channels [dB]	≥ 30
Demux-non-adjacent channels [dB]	≥ 40
Mux or reflection channels [dB]	≥ 15
Polarization dependent loss (PDL) [dB]	$\leq 0,15$
Polarization mode dispersion (PDM) [ps]	$\leq 0,1$
Directivity [dB]	≥ 55
Return loss [dB]	≥ 50
Maximum optical power [mW]	≤ 500
Operating temperature range [°C]	0 ... +70
Storage temperature range [°C]	-40 ... +85
Pigtail length, fiber type [m]	1,5 ($\pm 0,1$), Corning SMF-28e, 2 mm fiber
Dimensions [mm]	100 x 80 x 10
Order No.	10450040

* Plus connector loss



Optical CWDM demultiplexer module for 8 ITU channels and 1 channel 1310 ± 40 nm, with SC/APC pigtails

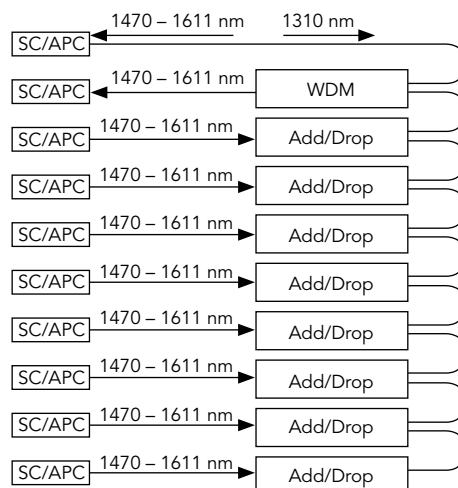


10450045
CWDM-B-DEMUX 1x9-SC/APC

- For separation of the 8 ITU channels C11-C18 and insertion of the channel 1310 nm
- 1 port for 1310, each 1 port for the 8 ITU channels C11 – C18 (1471/1491/1511/.../1611 nm), 1 COM-port
- Very low through loss, very low PDL
- Very high isolation, very high directivity
- Very high return loss
- Highly reliable and stable
- Qualified according Telcordia standard

Parameter	CWDM-B-DEMUX 1x9-SC/APC
Central wavelenghts [nm]	1310, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611
Operating wavelenghts [nm]	1310 ± 40 & 1460 – 1620
Channel space [nm]	20
Channel bandwidth [nm]	$\lambda_c \pm 6,5$
Through loss for 1460 – 1620 nm* [dB]	$\leq 3,5$
Through loss for 1310 nm* [dB]	$\leq 0,7$
Channel flatness [dB]	$\leq 0,4$
Channel uniformity [dB]	$\leq 1,0$
Isolation	
Demux-adjacent channels [dB]	≥ 30
Demux-non-adjacent channels [dB]	≥ 40
Mux or reflection channels [dB]	≥ 15
Polarization dependent loss (PDL) [dB]	$\leq 0,15$
Polarization mode dispersion (PDM) [ps]	$\leq 0,1$
Directivity [dB]	≥ 55
Return loss [dB]	≥ 50
Maximum optical power [mW]	≤ 500
Operating temperature range [°C]	0 ... +70
Storage temperature range [°C]	-40 ... +85
Pigtail length, fiber type [m]	1,5 (±0,1), Corning SMF-28e, 2 mm fiber
Dimensions [mm]	100 x 80 x 10
Order No.	10450045

* Plus connector loss

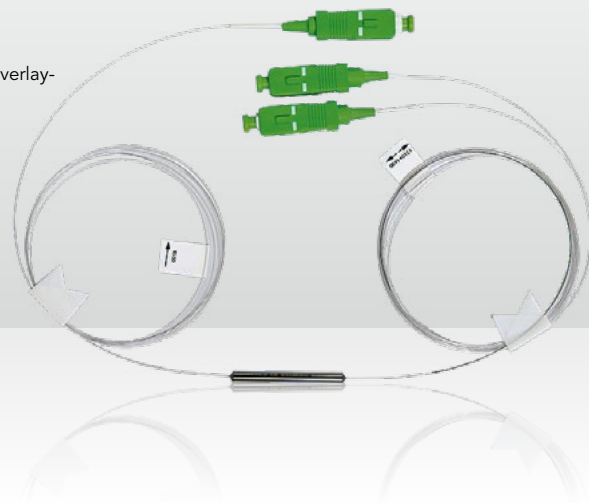


Optical CWDM multiplexer for GPON with RF Overlay, with SC/APC pigtails



10450030
CWDM-B-GPON w/ RF-Overlay-SC/APC, box style

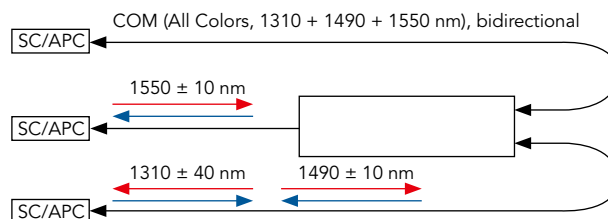
10450035
CWDM-B-GPON w/ RF-Overlay-SC/APC, tube style



- For combining or separating the 3 wavelengths which are required for a GPON network architecture with RF Overlay (only forward transmission) respectively Active-Ethernet (P2P) with RF Overlay
- Usable as MUX (red signal direction) or DEMUX (blue signal direction) due to the bidirectional design
- 1 Port for 1310 & 1490 nm (GPON),
1 port for 1550 nm (RFoG forward way),
1 COM port
- Very low through loss, very low PDL
- Very high directivity, very high return loss
- Highly reliable and stable
- Qualified according Telcordia standard

Parameter	CWDM-B-GPON w/ RF-Overlay-SC/APC, box style	CWDM-R-GPON w/ RF-Overlay-SC/APC, tube style
Transmitted operating wavelength bandwidth [nm]	1550 ± 10	1550 ± 10
Reflected operating wavelength bandwidth [nm]	1310 ± 40 & 1490 ± 10	1310 ± 40 & 1490 ± 10
Transmitted through loss* [dB]	≤ 0,6	≤ 0,7
Channel flatness [dB]	≤ 0,4	≤ 0,4
Reflected through loss* [dB]	≤ 0,6	≤ 0,4
Isolation		
Transmitted channel [dB]	≥ 30	≥ 25
Reflected channel [dB]	≥ 15	≥ 20
Polarization dependent loss (PDL) [dB]	≤ 0,10	≤ 0,10
Directivity [dB]	≥ 55	≥ 55
Return loss [dB]	≥ 50	≥ 50
Maximum optical power [mW]	≤ 500	≤ 500
Operating temperature range [°C]	0...+70	-5...+70
Storage temperature range [°C]	-40...+85	-40...+85
Pigtail length, fiber type [m]	1,5 (±0,1), Corning SMF-28e, 2 mm fiber	1,5 (±0,1), Corning SMF-28e XB
Dimensions [mm]	100 x 80 x 10	Diameter 3,8 x 36
Order No.	10450030	10450035

* Plus connector loss



Optical CWDM multiplexer module for GPON and RFOG (OLT), with SC/APC pigtails



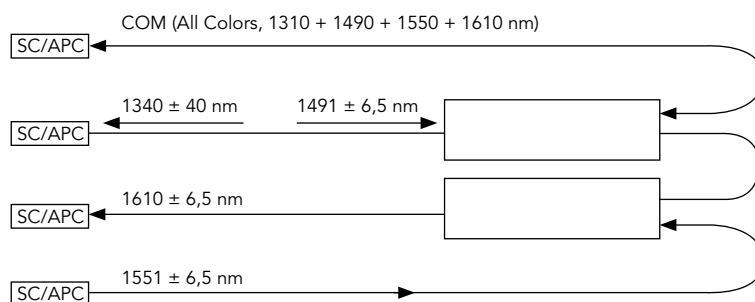
10450020

CWDM-B-GPON + RFOG-OLT-SC/APC, box style

- For combination or separation of the 4 wavelengths which are required for a combined GPON and RFOG architecture
- Usage in headends and Optical Line Terminals (OLT)
- 1 port for 1310 & 1490 nm (GPON Tx & Rx),
1 port for 1550 nm (RFOG Tx),
1 port for 1610 nm (RFOG Rx),
1 COM port
- Very low through loss, very low PDL
- Very high isolation, very high directivity
- Very high return loss
- Highly reliable and stable
- Qualified according Telcordia standard

Parameter	CWDM-B-GPON + RFOG-OLT-SC/APC, box style
Central wavelenghts [nm]	1310, 1491, 1551, 1611
Operating wavelenghts [nm]	1310 ± 40 & 1460 – 1620
Channel space [nm]	20
Channel bandwidth [nm]	$\Delta\lambda_c \pm 6,5$
Transmission through loss* [dB]	≤ 1,2
Channel flatness [dB]	≤ 0,4
Channel uniformity [dB]	≤ 1,0
Isolation	
Demux-adjacent channels [dB]	≥ 30
Demux-non-adjacent channels [dB]	≥ 40
Mux or reflection channels [dB]	≥ 15
Polarization dependent loss (PDL) [dB]	≤ 0,15
Polarization mode dispersion (PDM) [ps]	≤ 0,1
Directivity [dB]	≥ 55
Return loss [dB]	≥ 50
Maximum optical power [mW]	≤ 500
Operating temperature range [°C]	0 ... +70
Storage temperature range [°C]	-40 ... +85
Pigtail length, fiber type [m]	1,5 (± 0,1), Corning SMF-28e, 2 mm fiber
Dimensions [mm]	100 x 80 x 10
Order No.	10450020

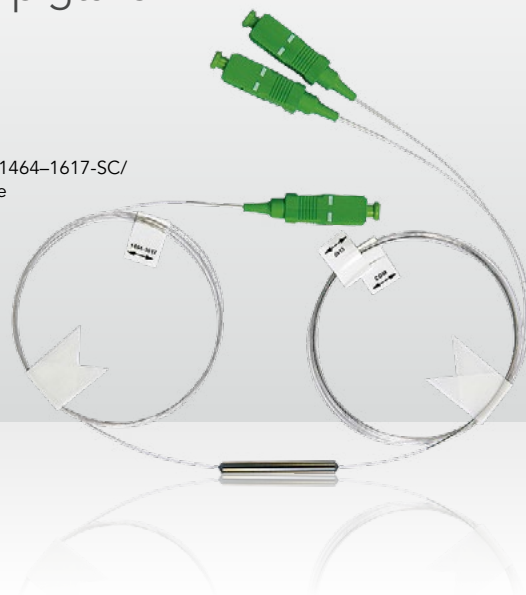
* Plus connector loss



Optical WDM multiplexers with SC/APC pigtails



10450010
WDM-B-1310/1464-1617-SC/
APC, box style



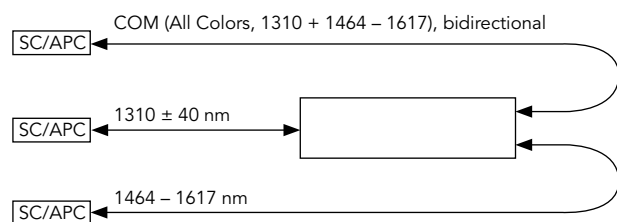
10450015
WDM-R-1310/1464-1617-SC/
APC, tube style

- To combine or separate wavelengths for forward and return path transmission
- Usage as MUX or DEMUX by bidirectional design
- 1 port for 1310 nm,
1 port for 1464 – 1617 nm,
1 COM port
- Very low through loss, very low PDL
- Very high directivity, very high return loss
- Highly reliable and stable
- Qualified according Telcordia standard

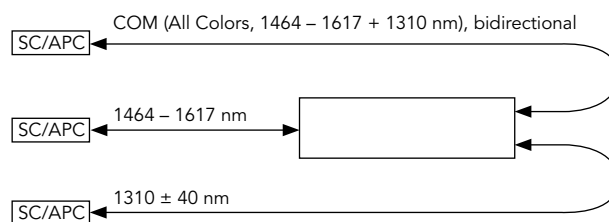
Parameter	WDM-B-1310/1464-1617-SC/APC, box style	WDM-R-1310/1464-1617-SC/APC, tube style
Transmitted operating wavelength bandwidth [nm]	1310 ± 40	1464 – 1617
Reflected operating wavelength bandwidth [nm]	1464 – 1617	1310 ± 40
Channel flatness [dB]	≤ 0,4	≤ 0,4
Transmitted through loss* [dB]	≤ 0,6	≤ 0,7
Reflected through loss* [dB]	≤ 0,6	≤ 0,4
Isolation		
Transmitted channel [dB]	≥ 30	≥ 25
Reflected channel [dB]	≥ 15	≥ 20
Polarization dependent loss (PDL) [dB]	≤ 0,10	≤ 0,10
Directivity [dB]	≥ 55	≥ 55
Return loss [dB]	≥ 50	≥ 50
Maximum optical power [mW]	≤ 500	≤ 500
Operating temperature range [°C]	0 ... +70	-5 ... +70
Storage temperature range [°C]	-40 ... +85	-40 ... +85
Pigtail length, fiber type [m]	1,5 (± 0,1), Corning SMF-28e, 2 mm fiber	1,5 (± 0,1), Corning SMF-28e XB acc. G657A, 900 µm loose tube
Dimensions [mm]	100 x 80 x 10	Durchmesser 3,8 x 36
Order No.	10450010	10450015

* Plus connector loss

Configuration box style



Configuration tube style



19" housings for splitter and coupler modules



10443501
OSF-19-SC-2/16*



10443505
OSF-19-SC-2/64*

19" housings for reception of the optical PLC splitter and coupler modules

- Designed for use in standard 19" racks
- Can be equipped with SC Simplex adapters or with LC/APC Duplex adapters

* Example figure, supplied without modules and adapters!

Parameter	OSF-19-SC-2/16	OSF-19-SC-2/32	OSF-19-SC-2/64
Maximum configuration with SC Simplex adapters	2 inputs/16 outputs	2 inputs/32 outputs	2 inputs/64 outputs
Maximum configuration with LC/APC Duplex adapters	4 inputs/32 outputs	4 inputs/64 outputs	4 inputs/128 outputs
Dimensions (L x W x H) [mm]	485 x 200 x 43,5	485 x 200 x 43,5	485 x 200 x 88,0
Material	1,5 mm SPCC steel plate with powder coating	1,5 mm SPCC steel plate with powder coating	1,5 mm SPCC steel plate with powder coating
Weight [kg]	approx. 1,8	approx. 1,8	approx. 3,0
Order No.	10443501	10443500	10443505

Our housings are available with adapters and splitters on request!

19" housings for reception of the CWDM multiplexers and demultiplexers

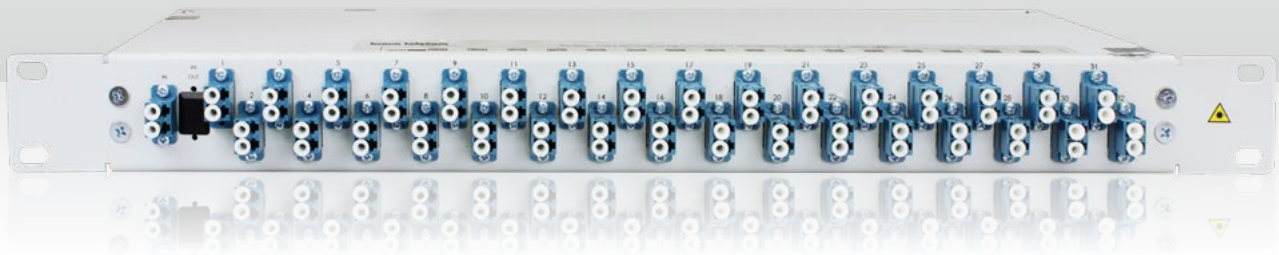
- Designed for use in standard 19" racks
- Pre-assembled with various multiplexers and demultiplexers, the technical data is to be taken from the previous pages of the concerned modules

Parameter	OSF-19-CWDM-8xGPON-SC	OSF-19-CWDM-16xGPON-SC	OSF-19-CWDM-24xGPON-LC	OSF-19-CWDM-32xGPON-LC	OSF-19-CWDM-8xGPON-RFoG-SC	OSF-19-CWDM-MUX-1x9-SC/APC	OSF-19-CWDM-DEMUX-1x9-SC/APC
Equipment	8 pcs CWDM multiplexer for GPON with RF Overlay	16 pcs CWDM multiplexer for GPON with RF Overlay	24 pcs CWDM multiplexer for GPON with RF Overlay	32 pcs CWDM multiplexer for GPON with RF Overlay	8 pcs with CWDM multiplexer for GPON and RFoG (OLT)	CWDM multiplexer for 9 channels	CWDM demultiplexer for 9 channels
Ports	1 port SC/PC for 1310 ± 40 nm & 1490 ± 10 nm, 1 port SC/APC for 1550 ± 10 nm, 1 COM port SC/APC		1 port LC/PC for 1310 ± 40 nm & 1490 ± 10 nm, 1 port LC/APC for 1550 ± 10 nm, 1 COM port LC/APC		1 port SC/PC for 1310 ± 40 nm & 1490 ± 10 nm, 1 port SC/APC for 1550 ± 10 nm, 1 Pprt SC/APC for 1610 ± 10 nm, 1 COM port SC/APC	1 port for each of the 8 ITU channels 11 – 18 (1471/1491/1511/.../1611 ± 6,5 nm), 1 COM port SC/APC	1 port for 1310 ± 40 nm, 1 port for each of the 8 ITU channels 11 – 18 (1471/1491/1511/.../1611 ± 6,5 nm), 1 COM port SC/APC
Order No.	10450070	10450072	10450074	10450076	10450078	10450080	10450082

19" housings for PLC Mini splitter modules

with or without pre-assembled modules

Sample configuration with LC/PC connectors



- Pre-assembled shelves as well as empty housings available
- Designed for use in standard 19" racks
- Configured with LC/APC or SC/APC splitters
- Further connector types are available on request
- Maximum configuration: 2 inputs, 64 outputs
- Very low installation depth and high operating temperature range, therefore suitable for outdoor cabinets
- Very low through loss
- Grade PREMIUM

Parameter	OSF-19-SC/APC-16x1/2	OSF-19-SC/APC-8x1/4	OSF-19-SC/APC-5x1/8	OSF-19-SC/APC-1x1/16	OSF-19-SC/APC-1x1/32	OSF-19-SC/APC-1x1/64	OSF-19-LC/APC-1x1/32	OSF-19-LC/APC-1x1/64	OSF-19-34 empty
Assembled with PLC Mini splitter module	16 x 2-way	8 x 4-way	5 x 8-way	1 x 16-way	1 x 32-way	1 x 64-way	1 x 32-way	1 x 64-way	leer
Connector type	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	LC/APC	LC/APC	–
Operating wavelength [nm]	1260 ... 1650								–
Through loss* [dB max.]	4,2	7,6	10,9	14,0	17,5	21,0	17,5	21,0	–
Uniformity S/P [dB max.]	0,6	0,6	1,0	1,1	1,5	1,8	1,5	1,8	–
PDL S/P [dB max.]	0,2	0,2	0,2	0,3	0,3	0,4	0,3	0,4	–
Directivity [dB min.]	55	55	55	55	55	55	55	55	–
Return loss [dB min.]	50	50	50	50	50	50	50	50	–
Maximum optical power [mW]	500	500	500	500	500	500	500	500	–
Operating temperature range [°C]	-40 ... +85								–
Storage temperature range [°C]	-40 ... +85								–
Length of the pigtails [m]	1,5 (± 0,1)								–
Fiber	Corning SMF-28e XB acc. G657A, 900 µm loose tube								–
Dimensions (L x W x H) [mm]	483 x 200 x 44								–
Order No.	10443530	10443532	10443534	10443536	10443538	10443540	10443542	10443544	10443610

* Plus connector loss

Further configurations are available on request!



Selection of available front panels

Blown cables



66000041
A-D(ZN)2Y, 1x4



66000047
A-D(ZN)2Y, 1x12

Blown cables are non-metallic cables with optical fibers, that are mainly installed in confined spaces within the access network. Due to the two-layer cores and the friction-optimized PE sheath, MiniXtend cables are particularly well suited for blowing into mini- or microducts. The fibers within the ducts are colored for better distinctness. MiniXtend are available with Corning SMF 28 -e™ (ITU-G 652D) single-mode fibers or Corning ClearCurve® fibers (ITU-G657 A / B) with optimized bending.

- Reduced outer diameter
- Installation of customer connections in micro tube/speedpipe systems
- Compact design with reduced weight
- Low investment costs
- Non-metallic cable structure
- No grounding necessary
- Secure transmission properties and low loss
- SMF-28e+® according to ITU-T G.652.D

Parameter	A-D(ZN)2Y, 1x4	A-D(ZN)2Y, 1x12
Application	Micro tubes/speedpipes	
Cable type	Central core A-D(ZN)2Y	
Product type	Dielectric	
Longitudinal water tightness (0,1 bar/24 h) [m]	≤ 1	
Crush resistance	1.000 N/10 cm	
Operating temperature range [°C]	-20 – 60	
Fiber category	OS2	
Fulfilled standards and norms	TIA/EIA 492-CAAB IEC 60793-2-50 Typ B1.3, ITU-T G.652 D, ISO/IEC 11801 Ed.2.2	
Fiber amount	4	12
Outer diameter [mm]	2,5	
Packaging unit [m]	2.000	
Tensile strength (short-term) [N]	80	
Order No.	66000041	66000047

Fixed core installation cables



66000043
J-V(ZN)H, 1x4



66000049
J-V(ZN)H, 1x12

These fiber optic cables can be used indoors for riser cabling or as distribution cables. The fixed cores enable a simple and direct plug-in field mounting without the use of a distribution adapter. The cables can be routed in cable ducts and manholes inside buildings.

- Metal-free construction
- No potential equalization required
- Low cable diameter and bending radius
- Therefore easy installation in confined spaces
- Easy and consistent peelability due to the TB3 fixed core construction
- Silicon-free sheath
- Cable sheath and outer sheath of the basic components (but 900 µm fixed core cables) are free of lacquer-wetting substances
- Flame-retardant LSZH™ / FRNC
- Fiber count: 4 or 12 pcs.

Parameter	J-V(ZN)H, 1x4	J-V(ZN)H, 1x12
Application	Indoor	
Cable type	Fixed core	
Product type	Dielectric	
Longitudinal water tightness (0,1 bar/24 h) [m]	≤ 0,1	
Fier class	LSZH™/FRNC	
Fiber category	SMF-28® Ultra Faser 0,9 mm; ITU-T G.652.D and ITU-T G.657.A1	
Coding acc. to DIN VDE 0888-100-1 (EN 60794-1-1)	J-V(ZN)H	
Former coding acc. to DIN VDE 0888-3	J-VH	
Fire behaviour	Cca, s1a, d1, a1	
Outer diameter [mm]	4,2	
Fiber amount	4	12
Packaging unit [m]	2.000	
Tensile strength at installation [N]	600	
Order No.	66000043	66000049

MiniFlex cables



66000202
Miniflex-2F-2,2



66000302
Miniflex-2F-3,0

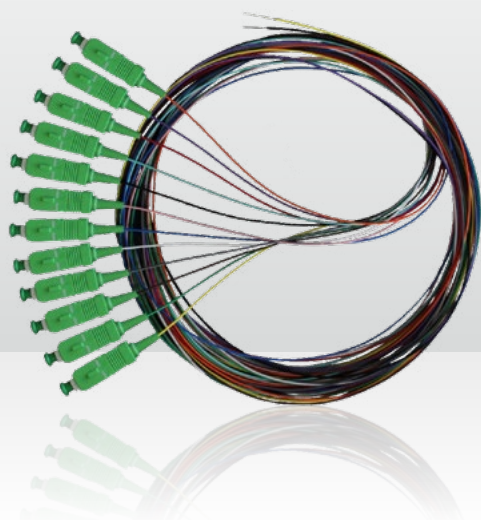
The MiniFlex Euroclass cable is a tough and lightweight optical fiber loose tube cable, available with up to 12 optical fibers. At just 2,2 or 3,0 mm outer diameter MiniFlex is a rugged, ultra-flexible drop cable solution for pushing and pulling inside raceways or for fixing directly to building surfaces. By virtue of the MiniFlex grooving technology this ruggedize lightweight fiber cable is ultra flexible whilst resisting the urge to kink like regular fiber cables. No specialist installation tools are required to push/pull MiniFlex through FTTx microducts. When combined with low-friction microducts, the cable can be pushed by hand in long routes.

- UV stabilized
- Ultra tough
- Very lightweight
- Small diameter (3 mm for up to 12 fibers)
- High crush resistance
- Best-is-class push/pull and blowability
- Ultra-flexible, small bend radius for compact slack fiber storage
- Small and unobtrusive enough for surface mount applications
- Tough enough for clipping, tacking and gluing

Parameter	MiniFlex-1F-2,2	MiniFlex-2F-2,2	MiniFlex-4F-2,2	MiniFlex-1F-3,0	MiniFlex-2F-3,0	MiniFlex-4F-3,0	MiniFlex-6F-3,0	MiniFlex-8F-3,0	MiniFlex-12F-3,0
Application	Indoor and outdoor								
Fiber category	ITU-T G.657 optical fiber								
Product type	Dielectric								
Fiber coating [µm]	250								
EN CPR Rating	Eca	Eca	Eca	Cca	Cca	Cca	Cca	Cca	Cca
Outer diameter [mm]	2,2	2,2	2,2	3,0	3,0	3,0	3,0	3,0	3,0
Fiber amount	1	2	4	1	2	4	6	8	12
Max. attenuation 1310 nm [dB/km]	≤ 0,40								
1550 nm [dB/km]	≤ 0,35								
Min. bending radius, attenuation 10 curves, 15 mm	0,20								
at 1550 nm [dB] 1 curve, 10 mm	0,50								
Tensile strength [N]	100								
Operating temperature range [°C]	-40 – +70								
Packaging unit [m]	2.000								
Order No.	66000201	66000202	66000204	66000301	66000302	66000304	66000306	66000308	66000312

Splicepanels and accessories

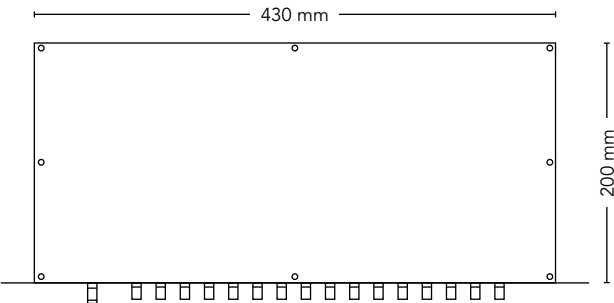
pre-assembled with splicecassettes and pigtails



10445960
OPT-2-SC/APC

Parameter	OSP-19-12-LC/APC	OSP-19-24-LC/APC
Application	Use in standard 19" racks	Use in standard 19" racks
Pre-assembling	Pre-assembled with 12 LC/APC Duplex adapters and 2 splicecassettes	Pre-assembled with 24 LC/APC Duplex adapters and 4 splicecassettes
Amount pigtails	Pre-assembled with 24 pigtails and ready for splicing	Pre-assembled with 48 pigtails and ready for splicing
Dimensions	1RU	1RU
Material	1,6 mm RAL 7035 light grey	1,6 mm RAL 7035 light grey
Weight [kg]	approx. 1,0	approx. 1,2
Order No.	10443910	10443911

Further splicepanel models are available on request (SC, FC and E2000)!



12 pcs. pigtail set, singlemode, 2 m, 900 µm G652D OS2, color coded

Item	Order No.
OPT-2-LC/APC	10445950
OPT-2-SC/APC	10445960
OPT-2-E2000/APC	10445970
OPT-2-FC/PC	10445992

Subject to technical changes!

Indoor speedpipes

with fitting accessories



42510104
Indoor speedpipe

42512317
Indoor sealing
element



42512302
Indoor connector



42512311
Indoor end cap

Indoor speedpipes

- For blowing in fibers, especially suitable for interior use
- Material: PD-HD acc. to DIN 16874
- Translucent base material for occupancy detection
- White color for restrained indoor hauling
- Optimized trapezoidal internal groove for optimal blowing results
- Low smoke acc. to DIN EN 61034-2, flame-retardant acc. to DIN EN 61386-1 and halogen-free acc. to DIN V VDE V 0604-2-100 (LSOH) for highest security in case of fire
- VDE-tested and certified acc. to DIN EN 61386-22(VDE0605) for defining the installation

Diameter [mm]	Packaging unit [m]	Order No.
7 x 1,5	1.250	42510102
10 x 2,0	2.500	42510104

Indoor end caps

- For permanent and pressure-tight closure of unoccupied indoor speedpipes with high tensile strength
- Pre-assembled locking clips prevent unwanted release
- Metal-free and transparent base body, clamping teeth made of stainless steel
- Suitable for blowing pressures up to 15 bar
- Flame retardant acc. to DIN EN 61386-22 and UL94-V2
- Not suited for direct burial

Diameter [mm]	Packaging unit [pcs]	Note	Order No.
5	250	e.g. Hydra cable	43022705
5	10	with GAS-Stop, e.g. Hydra cable	43022706
7	100		42512309
10	50		42512311

Indoor connectors

- For pressure-tight connection of indoor speedpipes with identical diameter, high tensile strength
- Pre-assembled locking clips prevent unwanted release
- Metal-free and transparent base body, clamping teeth made of stainless steel
- Suitable for blowing pressures up to 15 bar
- Flame retardant acc. to DIN EN 61386-22 and UL94-V2
- Not suited for direct burial

Diameter [mm]	Packaging unit [pcs]	Note	Order No.
5	10	e.g. Hydra cable	43022707
5	10	with GAS-Stop, e.g. Hydra cable	43022708
7	100		42512301
10	50		42512302

Indoor sealing elements

- Splittable and reusable elements for sealing unoccupied as well as occupied indoor speedpipes
- Water and gas tightness up to 0,5 bar
- Flame retardant acc. to DIN EN 61386-22
- Labeling field included (33 x 14 mm)
- White color for restrained indoor hauling

Diameter [mm]	Cable diameter [mm]	Packaging unit [pcs]	Order No.
7	0,8 – 2,5	25	42512315
7	2,0 – 4,0	25	42512316
10	1,8 – 3,5	25	42512317
10	3,0 – 5,0	25	42512318
10	4,5 – 6,0	25	42512319

Singlemode patchcords

Simplex singlemode patchcords and simplex coiled cable



10445025
OJS-20,0-SC/APC



10445004
OJS-2,0-SC/APC

- Very low through loss
- Very high return loss

- Highest reliability, stability and durability
- Meets the Telcordia GR-326 CORE specifications

Simplex patch cords with SC/APC connectors

Parameter	OJS-1,5-SC/APC	OJS-3,0-SC/APC	OJS-5,0-SC/APC	OJS-10,0-SC/APC	OJS-15,0-SC/APC	OJS-20,0-SC/APC	OJS-30,0-SC/APC
Through loss [dB]	< 0,15	< 0,15	< 0,15	< 0,15	< 0,15	< 0,15	< 0,15
Return loss [dB]	≥ 75	≥ 75	≥ 75	≥ 75	≥ 75	≥ 75	≥ 75
Radius of curvature [mm]	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12
Apex offset [μm]	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Fiber spherical height [μm]	± 50	± 50	± 50	± 50	± 50	± 50	± 50
Repeatability of IL [dB]	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Durability [dB]	≤ 0,2 typ. change, 1.000 matings						
Operating temperature range [°C]	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60
Storage temperature range [°C]	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70
Tensile strength [kg]	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)
Fiber type, cable diameter	Corning SMF-28e XB LSZH acc. G657A, 2,4 mm fiber						
Cable length [m]	1,5 ± 0,1	3,0 ± 0,1	5,0 ± 0,1	10,0 ± 0,2	15,0 ± 0,2	20,0 ± 0,2	30,0 ± 0,3
Order No.	10445001	10445006	10445011	10445016	10445020	10445025	10445030

Simplex patch cords with SC/APC to LC/APC connectors

Parameter	OJS-1,5-SC/APC-LC/APC	OJS-3,0-SC/APC-LC/APC	OJS-5,0-SC/APC-LC/APC	OJS-10,0-SC/APC-LC/APC
Through loss [dB]	< 0,2	< 0,2	< 0,2	< 0,2
Return loss [dB]	≥ 63	≥ 63	≥ 63	≥ 63
Radius of curvature [mm]	5 – 12	5 – 12	5 – 12	5 – 12
Apex offset [μm]	< 50	< 50	< 50	< 50
Fiber spherical height [μm]	± 50	± 50	± 50	± 50
Repeatability of IL [dB]	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Durability [dB]	≤ 0,2 typ. change, 1.000 matings			
Operating temperature range [°C]	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60
Storage temperature range [°C]	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70
Tensile strength [kg]	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)
Fiber type, cable diameter	Corning SMF-28e XB LSZH acc. G657A, 2,4 mm fiber			
Cable length [m]	1,5 ± 0,1	3,0 ± 0,1	5,0 ± 0,1	10,0 ± 0,2
Order No.	10445815	10445830	10445850	10445910

Simplex coiled cable

OJS-2,0-SC/APC Simplex coiled cable, yellow, 2 m

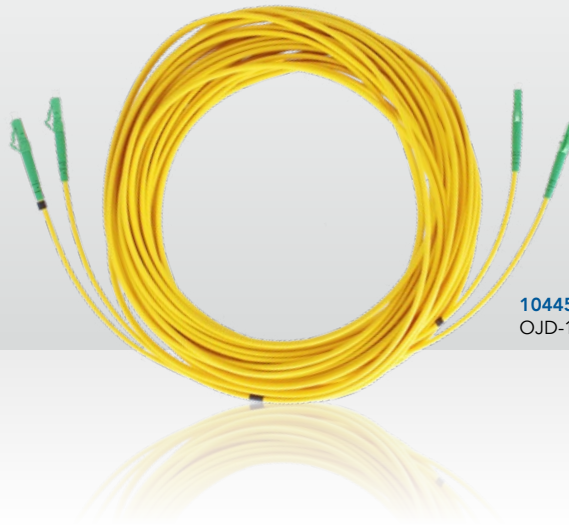
The benefit of a coiled cable is obvious: It is the bend-insensitive property of the G657 fiber, but with the through loss of a regular patchcord. This spiral cable is perfectly suitable for FTTH applications. Due to unlikely loop formations the propability of kinked fibers is significantly lower compared to standard patchcords.

Order No. 10445004

Simplex and duplex singlemode patchcords



10445710
OJS-10,0-E2000/APC



10445070
OJD-15,0-LC/APC

Simplex patch cords with SC/APC to E2000/APC connectors

Parameter	OJS-1,5-SC/APC-E2000/APC	OJS-3,0-SC/APC-E2000/APC	OJS-5,0-SC/APC-E2000/APC	OJS-10,0-SC/APC-E2000/APC
Through loss [dB]	< 0,2	< 0,2	< 0,2	< 0,2
Return loss [dB]	≥ 63	≥ 63	≥ 63	≥ 63
Radius of curvature [mm]	5 – 12	5 – 12	5 – 12	5 – 12
Apex offset [μm]	< 50	< 50	< 50	< 50
Fiber spherical height [μm]	± 50	± 50	± 50	± 50
Repeatability of IL [dB]	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Durability [dB]	≤ 0,2 typ. change, 1.000 matings			
Operating temperature range [°C]	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60
Storage temperature range [°C]	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70
Tensile strength [kg]	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)
Fiber type, cable diameter	Corning SMF-28e XB LSZH acc. G657A, 2,4 mm fiber			
Cable length [m]	1,5 ± 0,1	3,0 ± 0,1	5,0 ± 0,1	10,0 ± 0,2
Order No.	10445315	10445330	10445350	10445410

Simplex patch cords with E2000/APC connectors

Parameter	OJS-1,5-E2000/APC	OJS-3,0-E2000/APC	OJS-5,0-E2000/APC	OJS-10,0-E2000/APC
Through loss [dB]	< 0,2	< 0,2	< 0,2	< 0,2
Return loss [dB]	≥ 63	≥ 63	≥ 63	≥ 63
Radius of curvature [mm]	5 – 12	5 – 12	5 – 12	5 – 12
Apex offset [μm]	< 50	< 50	< 50	< 50
Fiber spherical height [μm]	± 50	± 50	± 50	± 50
Repeatability of IL [dB]	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Durability [dB]	≤ 0,2 typ. change, 1.000 matings			
Operating temperature range [°C]	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60
Storage temperature range [°C]	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70
Tensile strength [kg]	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)
Fiber type, cable diameter	Corning SMF-28e XB LSZH acc. G657A, 3 mm fiber			
Cable length [m]	1,5 ± 0,1	3,0 ± 0,1	5,0 ± 0,1	10,0 ± 0,2
Order No.	10445615	10445630	10445650	10445710

Duplex patch cords with LC/APC connectors

Parameter	OJD-1,5-LC/APC	OJD-3,0-LC/APC	OJD-5,0-LC/APC	OJD-10,0-LC/APC	OJD-15,0-LC/APC	OJD-20,0-LC/APC	OJD-30,0-LC/APC
Through loss [dB]	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2
Return loss [dB]	≥ 63	≥ 63	≥ 63	≥ 63	≥ 63	≥ 63	≥ 63
Radius of curvature [mm]	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12	5 – 12
Apex offset [μm]	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Fiber spherical height [μm]	± 50	± 50	± 50	± 50	± 50	± 50	± 50
Repeatability of IL [dB]	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,1
Durability [dB]	≤ 0,2 typ. change, 1.000 matings						
Operating temperature range [°C]	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60	-20 ... +60
Storage temperature range [°C]	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70	-40 ... +70
Tensile strength [kg]	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)	6,8 (GR-326-CORE)
Fiber type, cable diameter	Corning SMF-28e XB LSZH acc. G657A, 2 mm fiber						
Cable length [m]	1,5 ± 0,1	3,0 ± 0,1	5,0 ± 0,1	10,0 ± 0,2	15,0 ± 0,2	20,0 ± 0,2	30,0 ± 0,3
Order No.	10445050	10445055	10445060	10445065	10445070	10445075	10445080

Adapters

Optical SC simplex and LC/APC duplex adapters



10444000
OAD-SSA-P



10444100
OAD-SSA-M



10444500
OAD-LCA-P

Optical SC simplex adapters

- Suitable for insertion into the optical shelves OSF-xx-SC
- Very low through loss
- High-precision alignment and stability
- Qualified according Telcordia standard
- 2 screws for fixing are enclosed

Parameter	OAD-SSA-P (SC/APC-plastic)	OAD-SSA-M (SC/APC-metal)	OAD-SSP-P (SC/PC-plastic)	OAD-SSP-M (SC/PC-metal)
Type	Singlemode APC	Singlemode APC	Singlemode PC	Singlemode PC
Hook color code	Green	Green	Blue	Blue
Through loss [dB max.]	0,2	0,2	0,2	0,2
Sleeve material	ZrO ₂ (Zirkonia)	ZrO ₂ (Zirkonia)	ZrO ₂ (Zirkonia)	ZrO ₂ (Zirkonia)
Body material	Plastic (PBT GF 30)	Metal (Zn-Ni)	Plastic (PBT GF 30)	Metal (Zn-Ni)
Style	3 mm flange	3 mm flange	3 mm flange	3 mm flange
Temperature range (operating & storage) [°C]	-40 ... +85	-40 ... +85	-40 ... +85	-40 ... +85
Push-pull force [g]	200 ... 600	200 ... 600	200 ... 600	200 ... 600
Order No.	10444000	10444100	10444200	10444300

The adapters are also available as FC or E2000 versions in PC or APC-style on request.

Optical LC/APC duplex adapter

- Suitable for insertion into the optical shelves OSF-xx-SC
- By using in place of the SC simplex adapters, doubling of the input and output connections is possible
- High-precision alignment and stability
- Qualified according Telcordia standard
- 2 M2x8 screws for fixing are enclosed

Parameter	OAD-LCA-P (LC/APC-plastic)
Type	Singlemode APC
Hook color code	Green
Through loss [dB max.]	0,2
Sleeve material	ZrO ₂ (Zirkonia)
Body material	Plastic (PET)
Style	3 mm flange
Temperature range (operating & storage) [°C]	-40 ... +85
Push-pull force [g]	200 ... 600
Order No.	10444500

Attenuators

Optical attenuators SC/APC (adapter and male-female-types)



10441200
OATA-10 Dual-SC/APC



10442110
OATC-10 All-Band-Window-SC/APC

Optical attenuators (adapter type) SC/APC

- Precise attenuation values
- Excellent uniformity
- Very high return loss
- Highly reliable and stable
- 2 M2x8 Allen-head screws for fixing are enclosed
- Dual window

Parameter	OATA-05 Dual-SC/APC Dual Window	OATA-10 Dual-SC/APC Dual Window	OATA-15 Dual-SC/APC Dual Window	OATA-20 Dual-SC/APC Dual Window
Central wavelength [nm]	1310 & 1550	1310 & 1550	1310 & 1550	1310 & 1550
Bandwidth [nm]	± 40	± 40	± 40	± 40
Attenuation tolerance [%]	± 10	± 10	± 10	± 10
Return loss [dB min.]	50	50	50	50
Operating temperature range [°C]	- 40 ... +75	- 40 ... +75	- 40 ... +75	- 40 ... +75
Storage temperature range [°C]	- 40 ... +85	- 40 ... +85	- 40 ... +85	- 40 ... +85
Attenuation values [dB]	5	10	15	20
Order No.	10441100	10441200	10441300	10441400

Adapters with other attenuation values (1 ... 20 dB) are available on request.

Optical attenuators (male-female-type)

- Precise attenuation values
- Excellent uniformity
- Very high return loss
- Highly reliable and stable
- All-band window

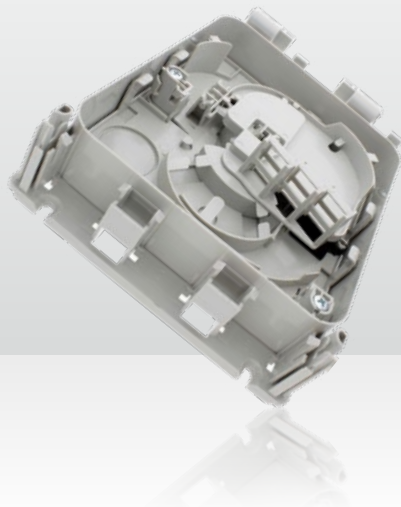
Parameter	OATC-10-All-Band-Window-SC/APC	OATC-20-All-Band-Window-SC/APC	OATC-10-All-Band-Window-E2000/APC	OATC-20-All-Band-Window-E2000/APC	OATC-10-All-Band-Window-LC/APC	OATC-20-All-Band-Window-LC/APC
Central wavelength [nm]	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650	1260 ... 1650
Attenuation tolerance [%]	± 10	± 10	± 10	± 10	± 10	± 10
Operating temperature range [°C]	- 40 ... +75	- 40 ... +75	- 40 ... +75	- 40 ... +75	- 40 ... +75	- 40 ... +75
Attenuation values [dB]	10	20	10	20	10	20
Connector	SC/APC	SC/APC	E2000/APC	E2000	LC/APC	LC/APC
Order No.	10442110	10442120	10442210	10442220	10442310	10442320

If you wish to order adapters with other attenuation values (1 ... 20 dB):

Please replace the last two digits of the Order No. as well as the specification within the item name with the desired attenuation value!

Termination boxes for buildings

GF-HUP 4F, compact and max



10419001
GF-HUP compact



10419008
GF-HUP max

GF-HUP 4F

The GF-HUP 4F is versatile for FTTx use for indoor and outdoor wall mounting. It combines small dimensions and weight with easy installation and handling.

- Suitable for max. capacity of 2 SC adapters or duplex LC installation (not included)
- Max. capacity is 2 or 4 fibers of fusion splice or crimp splice
- Preinstalled PLC splitter 1 x 4 micro type
- 2 cable ports
- Suitable for indoor cable or drop cable
- IP grade: IP65
- Dimensions (WxLxH): 153 x 208 x 52 mm
- Lock included

The following accessory is included:

- 4 dowels
- 4 screws
- 10 cable ties
- 2 keys

Order No. 10418999

GF-HUP compact

In addition to the innovative fiber management and sealing concept, this termination box for buildings offers a maximum of possible applications. The installation effort is significantly reduced. This solution offers longevity and maximum investment protection.

- 12 x splice tray
- 1 x PLC splitter
- 6 x couplers inside the folding tray
- 3 x flexible, splittable seal kit for diameter 3 – 10 mm
- Optional gabocom speedpipe insertion
- Strain relief
- Lockable and removable cover
- Protection class IP54
- Dimensions: 150 mm x 212 mm x 53 mm
- Approved acc. to federal funding (Germany)

The following sealing set is included:

- 1 x diameter 10 mm
- 2 x diameter 7 mm
- 1 x 2 x diameter 7 mm
- 1 x 12 x diameter 5 mm
- 1 x 24 x up to diameter 3 mm

Order No. 10419001

GF-HUP max

The perfect connection box for a large amount of residential units

This termination box for buildings offers despite the compact design the possibility to connect up to 144 fibers. Of these, 24 fibers are spliced within the base, the other ones in cassettes. The innovative fiber management and sealing concept is identical to the GF-HUP compact. The wall mounting as well as the protection against unauthorized access are of course included.

- 144 x splice tray
- 4 x PLC splitter
- 12 x couplers inside the folding tray
- 4 x flexible, splittable seal kit for diameter 3 – 10 mm
- Optional gabocom speedpipe insertion
- Strain relief
- Lockable and removable cover
- Protection class IP54
- Dimensions: 150 mm x 212 mm x 53 mm
- Approved acc. to federal funding (Germany)

The following sealing set is included:

- 1 x diameter 10 mm
- 2 x diameter 7 mm
- 3 x 12 x diameter 5 mm
- 2 x 24 x up to diameter 3 mm

Order No. 10419008

Fiber boxes for up to 64 residential units



FTTH-Box NANO, termination of 4 fibers

- Optimal for detached houses
- 12 x splice tray
- Optimized for pre-configured fibers
- 3 x self-closing couplers, flat and hidden applicable (6 x LC)
- Patchcords are safe from being pulled unauthorized
- Entry for tubes up to a diameter of 10 mm
- Strain relief

- Inclusion of micro gas stop
- Metal mounting plate, surface- or flush-mounted outlet
- Torx screws for access security
- IP 44, UV, UL
- Dimensions: 120 x 105 x 22,8 mm (W x H x D)

Order No. 10419005

GF Box size S for 3 residential units

Scope of supply

- 2 LC/APC duplex couplers pre-installed
- 6 LC/APC pigtails G652 Grade B
- 1 splice cassette for terminating the main cable
- 1 splice cassette for terminating the house network

Input incl. strain relief

- 1 micro duct (outer diameter 7 mm) without gas stop or
- 1 metal-free trunk cable (outer diameter 7 mm)

Output incl. strain relief

- 3 cables 2,4 – 8 mm (riser resp. connection cable)
- Sealable with grooves screw
- Plastic color: Tele grey 4 RAL 7047
- Protection class: IP55

Order No. 80100210

GF Box for up to 64 residential units

1 fiber per residential unit

Scope of supply

- LC/APC duplex couplers
- LC/APC pigtails G652
- 1 splice cassette for terminating the main cable
- 1 splice cassette for terminating the house network

Input incl. strain relief

- 1 micro duct (outer diameter 7 mm) without gas stop or
- 1 metal-free trunk cable (outer diameter 7 mm)

Output incl. strain relief

- 2,4 – 8 mm (riser resp. connection cable)
- Sealable with EMKA lock
- Plastic color: Tele grey 4 RAL 7047
- Protection class: IP55

Item	Amount residential units	Order No.
GF-BOX (M) (4)	4	80100211
GF-BOX (M) (5-8)	5 – 8	80100212
GF-BOX (M) (9-12)	9 – 12	80100213
GF-BOX (L) (13-16)	13 – 16	80100214
GF-BOX (XL) (17-64)	17 – 20	80100215
GF-BOX (XL) (17-64)	21 – 24	80100216
GF-BOX (XL) (17-64)	25 – 28	80100217
GF-BOX (XL) (17-64)	29 – 32	80100218
GF-BOX (XL) (17-64)	33 – 36	80100219
GF-BOX (XL) (17-64)	37 – 40	80100220
GF-BOX (XL) (17-64)	41 – 64	80100221

We do not have the perfect fiber box in our product portfolio yet?

We are happy to provide further configurations, e.g. with multiple fibers per residential unit, on request!

Termination boxes for apartments

Open Access Point and matching Basic Kit



10419060
OAP basic element



10419061
OAP CATV

OAP (Open Access Point)

The most compact fiber optic network termination

The OAP is a neutral network termination. It can be integrated into any FTTH network, regardless of whether "Active Ethernet" or GPON access solutions are used. The OAP is the perfect solution for connecting a fiber optic CPE. The modular structure offers the efficient development of each residential unit. Pre-assembled fiber optic cables make splicing work in the home obsolete. A CATV receiver can be used (Plug & Play) with a plug-in module.

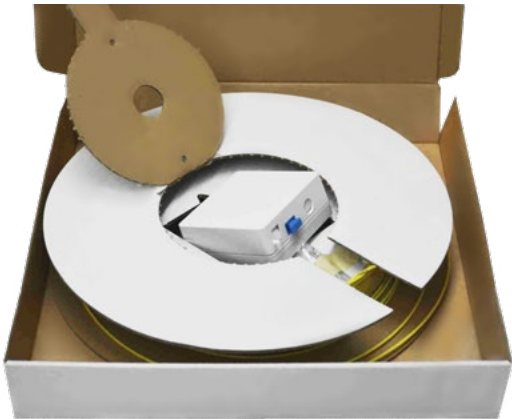
- 1 x splice tray
- 1 x SC coupler output
- Wall- or flush-mounted socket installation
- Optical TV module Plug & Play
- Optical IN -8 dB ... 0 dB, F-OUT ... 80 dBμV/1 GHz, AGC
- PSU 9 V DC
- Dimensions: 80 x 80 x 45 mm

Item	Description	Order No.
OAP basic element	OAP basic element for installation on standardized flush-mounted socket, incl. matching Snap-On module SC/PC	10419060
OAP CATV	Active Snap-On module with TV receiver 1 GHz, 1 x SC/PC, 230 V power supply	10419061

OAP Basic kit

The OAP Easy-Fiber install kit offers a practical self-install possibility for the end user or a enormous saving of time for the technician. Splicing within the apartment is obsolete, from now on we are able to take on high-quality installing for you! Besides regular cable lengths like 20 m, 30 m or 50 m, we can also provide individual lengths. This way the fiber can be directly connected to the termination box, which is the access to your optical network.

- 4 x FO G657A2 (color-coded acc. to DIN) optical cable with 4 fibers
- 1 x splice tray
- 1 x SC coupler output
- Wall- or flush-mounted socket installation
- Optical TV module Plug & Play
- Optical IN -8 dB ... 0 dB, F-OUT ... 80 dBμV/1 GHz, AGC
- Cable lengths of 20 m, 30 m, 50 m or individual length
- IP Ethernet module 1 Gbit
- PSU 9 VDC
- Dimensions: 80 x 80 x 45 mm



Item	Cable length [m]	Order No.
OAP Basis-Kit 20	20	10419072
OAP Basis-Kit 30	30	10419073
OAP Basis-Kit 50	50	10419075
OAP Basis-Kit ind	individual	on request

Fiber Termination

Gateways and fiber termination units



1 Gbps
Gateway



10 Gbps
Gateway

Passive FTUs with small form factor

The most flexible FTU in the industry

The FTUs consist of a neutral base/FTU in which fiber can be mounted, connected and terminated. The active gateway is designed as a click-on interface with the possibility for end-user activation. This solution is built to allow the customer to perform the service activation. The combined solution for FTU and gateway services are formed in an extremely compact form factor, 88 x 88 x 65 mm, making it viewed by the customer as just another outlet.

The FTU is ideal as a 2-box solution in combination with the gateways named below and 3rd party routers. It is available with or without pigtailed and various combinations of adapters, e.g. SC/PC and SC/APC.

Order No. on request

1 Gbps Gateways

Parameter	79734-1Gbps	79740-1Gbps	79741-1Gbps	79742-1Gbps	79753-1Gbps	79755-1Gbps
1 Gbps WAN	Yes	(1)	Yes	Yes	–	–
GPON WAN	–	–	–	–	Yes	Yes
1 Gbps LAN	1	–	4	4	1	4
CATV	–	Yes	–	Yes	Optional	Optional
Switch engine ⁽²⁾	Yes	–	Yes	Yes	Yes	Yes
CATV RF filter option	–	–	–	–	Optional	Optional
SFP WAN	Fixed	–	Fixed	Fixed	Fixed	Fixed
Fiber connector	SC/UPC	SC/APC	SC/UPC	SC/UPC & SC/APC	SC/APC	–
WDM filter	–	–	Optional	Optional	–	–
Clickable FTU	Yes	Yes	Yes	Yes	Yes	Yes
TR-069	Yes	–	Yes	Yes	–	–
Dimensions with/without cover (H x D x W) [mm]	23/15 x 88 x 88					
Operating temperature range [°C]	0 ... 40					
Order No.	on request					

The 1 Gbps gateway series is a unique and innovative product line that distinguishes itself by its small form factor and unique click-on interface. The small form factor, combined with ease of installation due to its click-on interface, makes the gateways an extremely flexible solution, with optimized handling and efficiency.

⁽¹⁾ Data port loop through, adapter SC/APC

⁽²⁾ Support for VLANs, Q-in-Q, QoS, IGMP, Jumbo Frames and traffic shaping and manipulation

10 Gbps Gateways

Parameter	79751-10Gbps	79752-10Gbps	79757-10Gbps	79759-10Gbps
10 Gbps WAN	Yes	Yes	–	–
XGSPON WAN	–	–	Yes	Yes
1 Gbps LAN	2	2	2	2
10 Gbps LAN	1	1	1	1
CATV	–	Yes	–	Yes
Switch engine ⁽¹⁾	Yes	Yes	Yes	Yes
CATV RF filter option	–	Yes	–	Yes
SFP WAN	Yes	Yes	Yes	Yes
Fiber connector	SC/UPC	SC/UPC & SC/APC	SC/APC	SC/APC
WDM filter	–	Optional	–	Yes
Clickable FTU	Yes	Yes	Yes	Yes
TR-069	Yes	Yes	–	–
Dimensions (H x D x W) [mm]	151 x 40 x 88			
Operating temperature range [°C]	0 ... 40			
Order No.	on request			

The 10 Gbps gateway series is built to fit the well proven FTU named above. The newly developed active part is based upon a sophisticated wire-speed Layer 2 switching-based "System-on-Chip" (SoC) solution.

This solution implies that fiber termination and service activation occur as part of the operator's "demarcation point" at the end customer in a FTTH 10 Gbps environment.

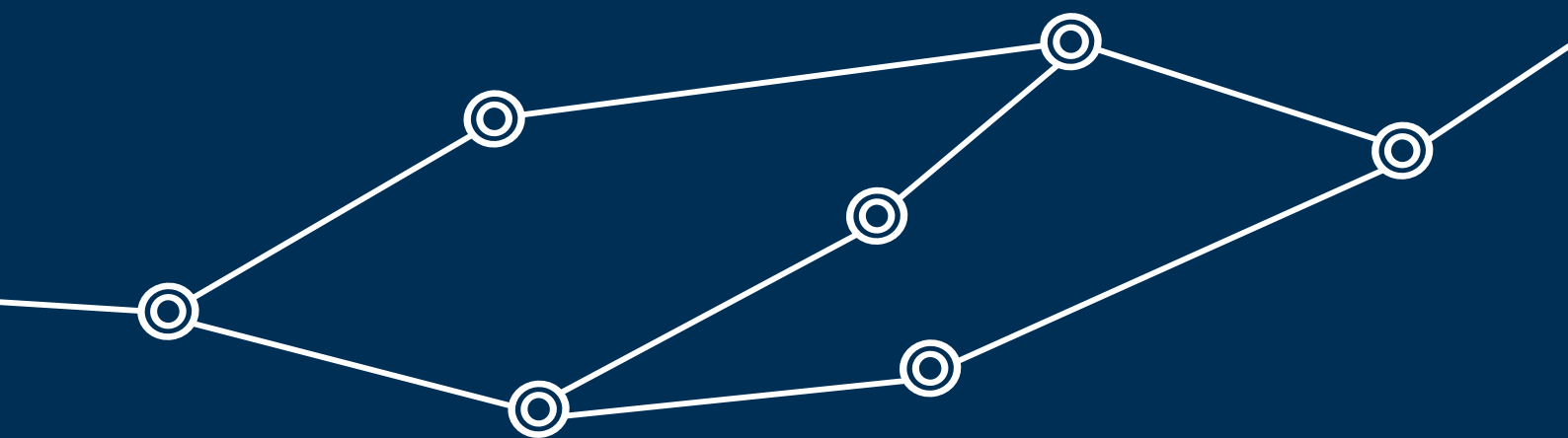
⁽¹⁾ Support for VLANs, Q-in-Q, QoS, IGMP, Jumbo Frames and traffic shaping and manipulation

Do you have questions concerning our products or want to place an order?

We look forward to your call!

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