

BKtel

2G6

HFC Transmission Platform



DWDM FTTH HFC Video Overlay



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2G6

HFC Transmission Platform

Overview

With 2G6, the Bktel team has developed a leading edge HFC platform with premium performance and outstanding reliability meeting cost efficiency.

The 2G6, is designed to meet all demands of future-safe optical broadband networks. Regardless of technology or requirements, the 2G6 platform is the right choice for small, medium and large scale operators. With its modular concept and high density, the 2G6 supports all kinds of applications, like e.g.:

- ▶ CATV distribution and high speed Internet/VoIP over HFC Network
- ▶ Fiber To The Home with overlay CATV distribution
- ▶ HFC network enhanced for interactive Services like Video on Demand
- ▶ SAT IF Transport Network

The robustness, form factor and modularity of the 2G6 platform reach a new dimension in optical transport for broadband networks.



Optical Platform

- ▶ Forward transmission 47...860/2605 MHz
- ▶ Reverse transmission 5...65 MHz
- ▶ HMS (hybrid management system) compliant, SNMP and Web browser based system management
- ▶ Optical connectors: SC/APC, E2000, etc
- ▶ RF connectors: F
- ▶ Operation environmental conditions according ETS 300 019-1-3, class 3.1 (temperature controlled locations)

Optical Transmitter Family

Directly modulated transmitters are available for 1310 nm or 1550 nm applications:

- ▶ Forward transmitter with various output powers (optional SAT IF input)
- ▶ DWDM narrowcast transmitter
- ▶ Reverse transmitters 1310 nm, 1550 nm or CWDM

Externally modulated 1550 nm transmitter

Optical Amplifier Family

Erbium doped fiber amplifiers with output variants such as 1 x 13 dBm, 8 x 13 dBm or 1 x 23 dBm for perfect flexibility in the optical transmission network section.

Optical Receiver Family

Low noise optical receivers for forward path signals as well as dual/quad port optical receiver modules for the reverse path.

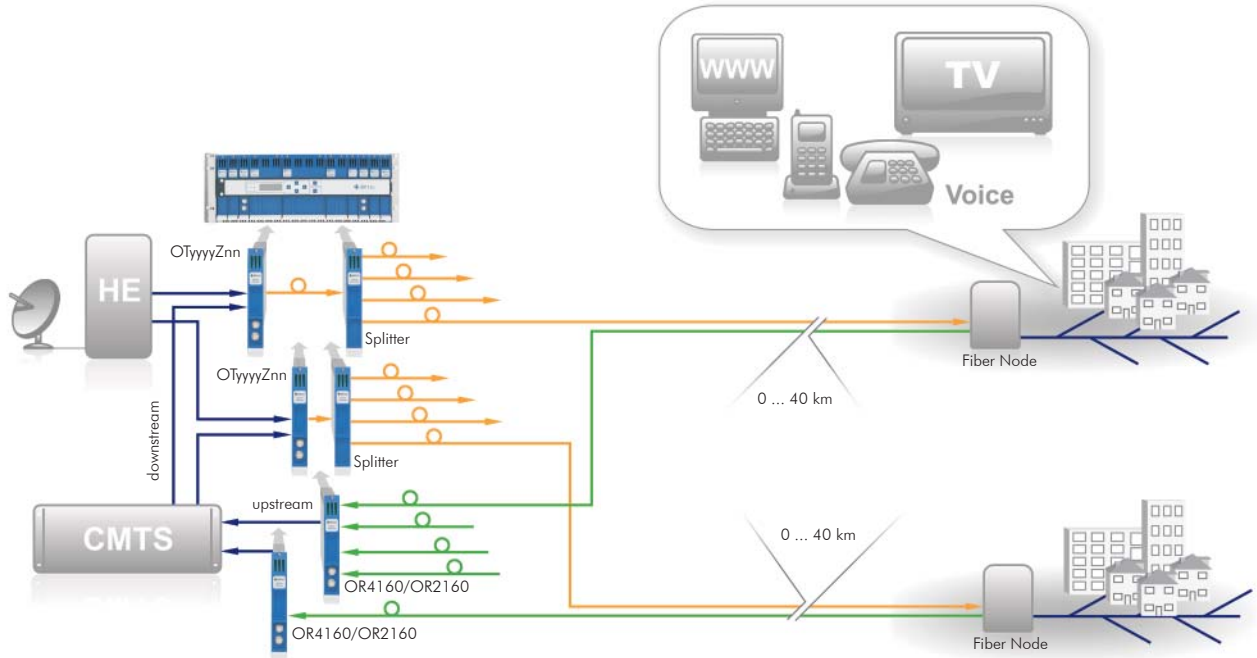
Element Controller

Element management controller with Ethernet interface, SNMP and Web Server manages up to three 2G6 chassis.

Applications

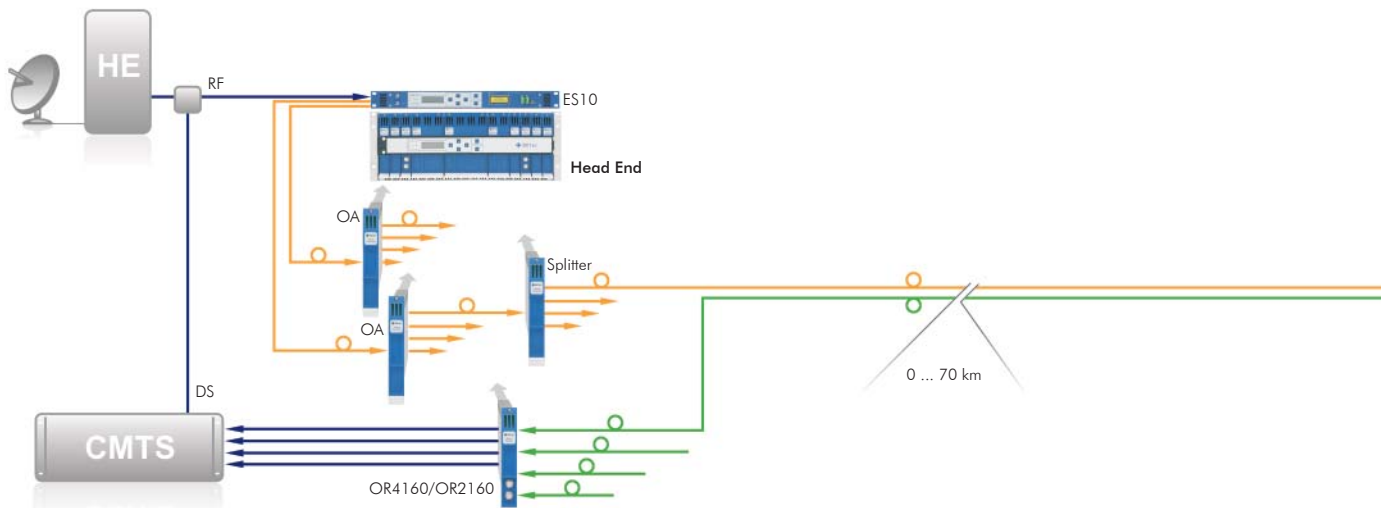
CATV distribution and high speed Internet/VoIP over HFC Network

1310 nm Distribution Network with Return Path



CATV distribution and high speed Internet/VoIP over long distance HFC Network

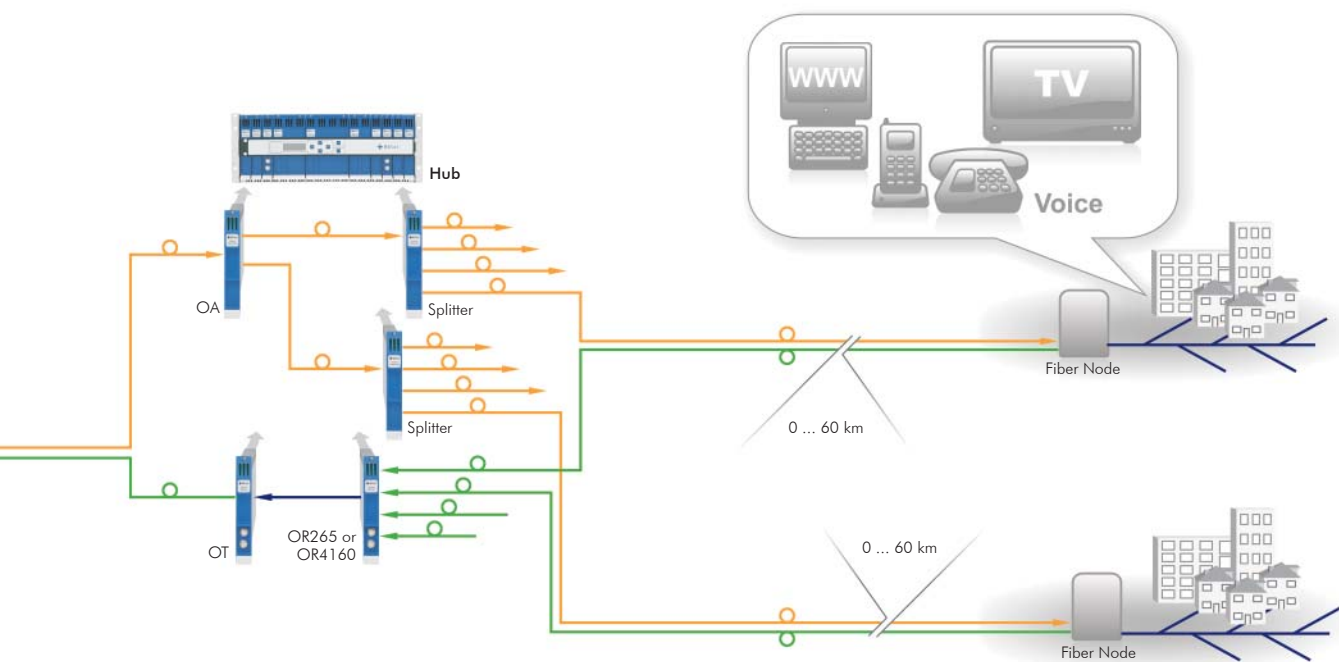
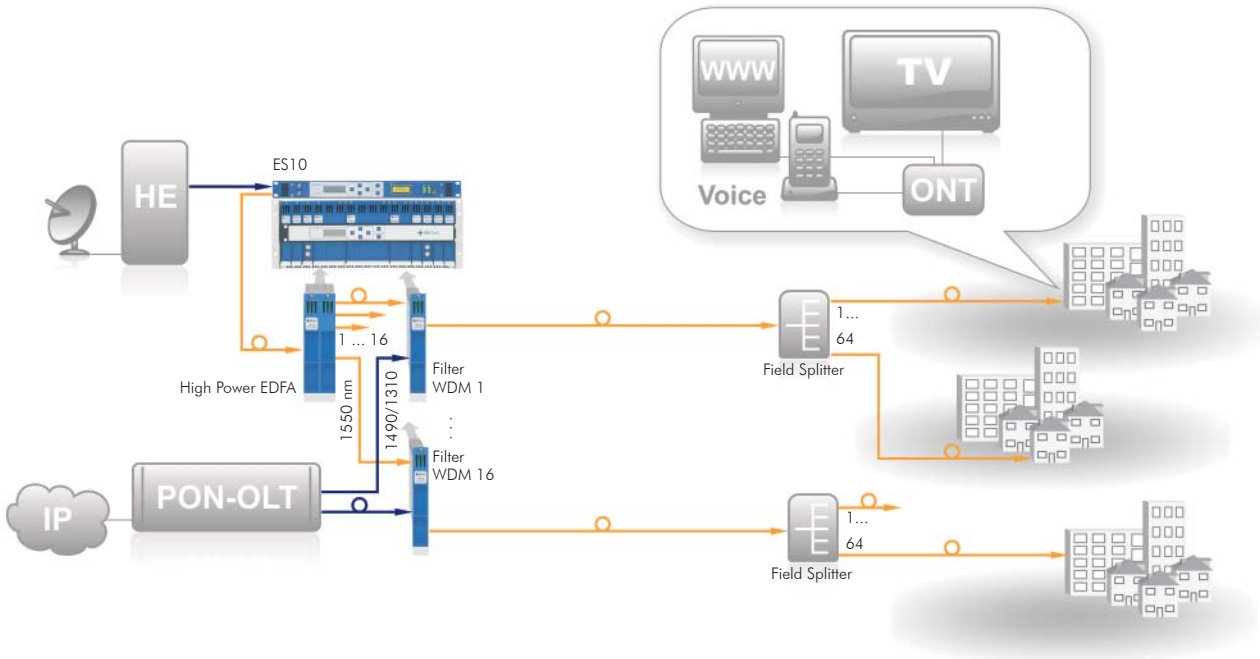
1550 nm Distribution Network with Return Path





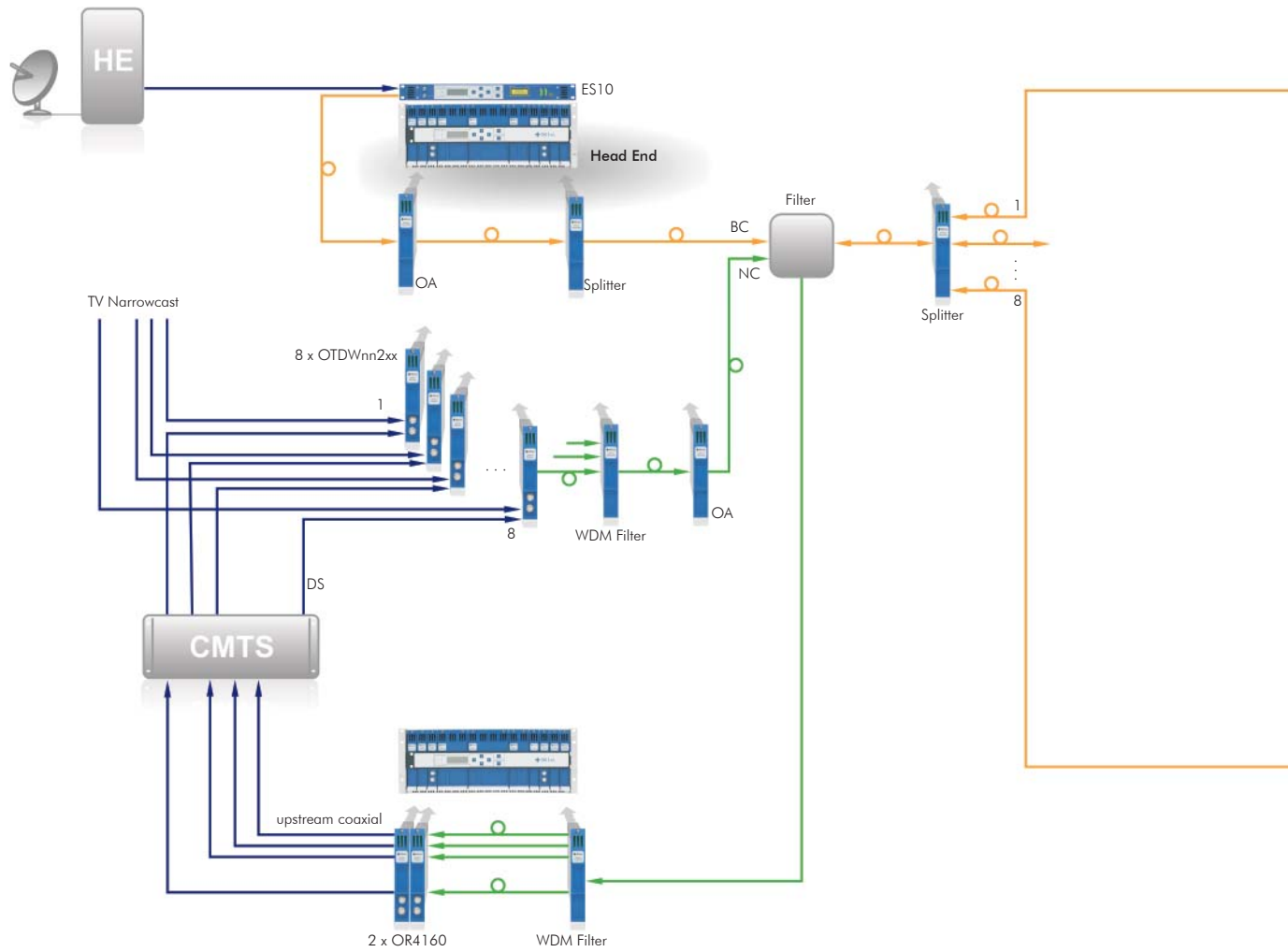
CATV distribution over Fiber To The Home Networks

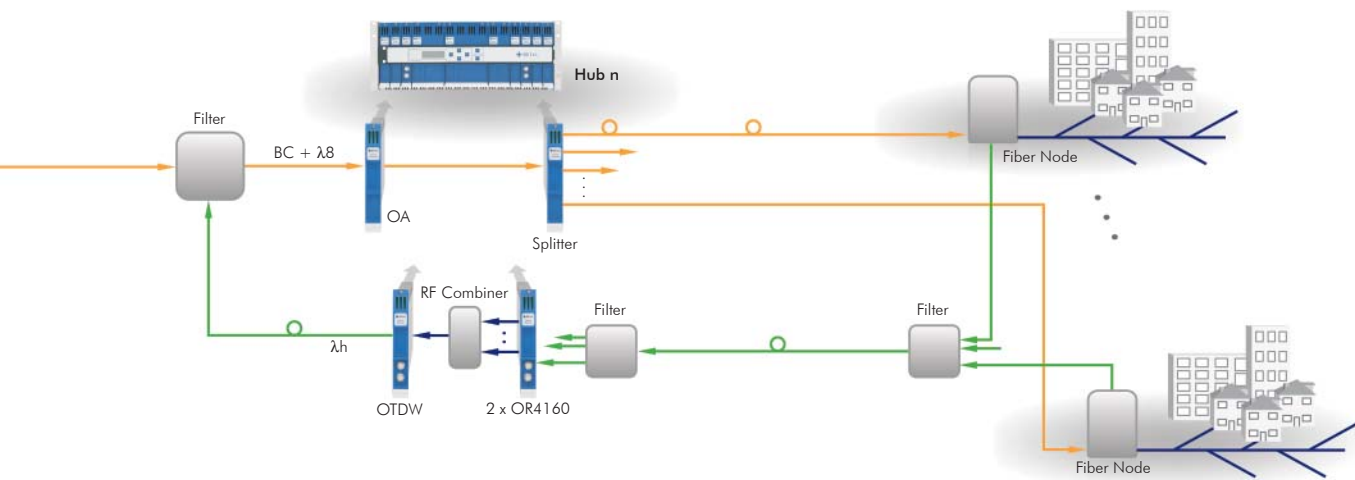
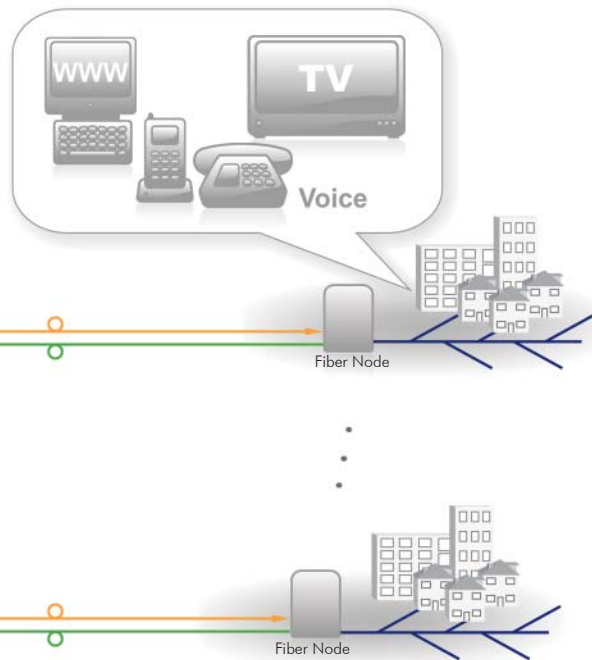
Passive Optical Network with RF Overlay



HFC network for interactive Services like Video on Demand

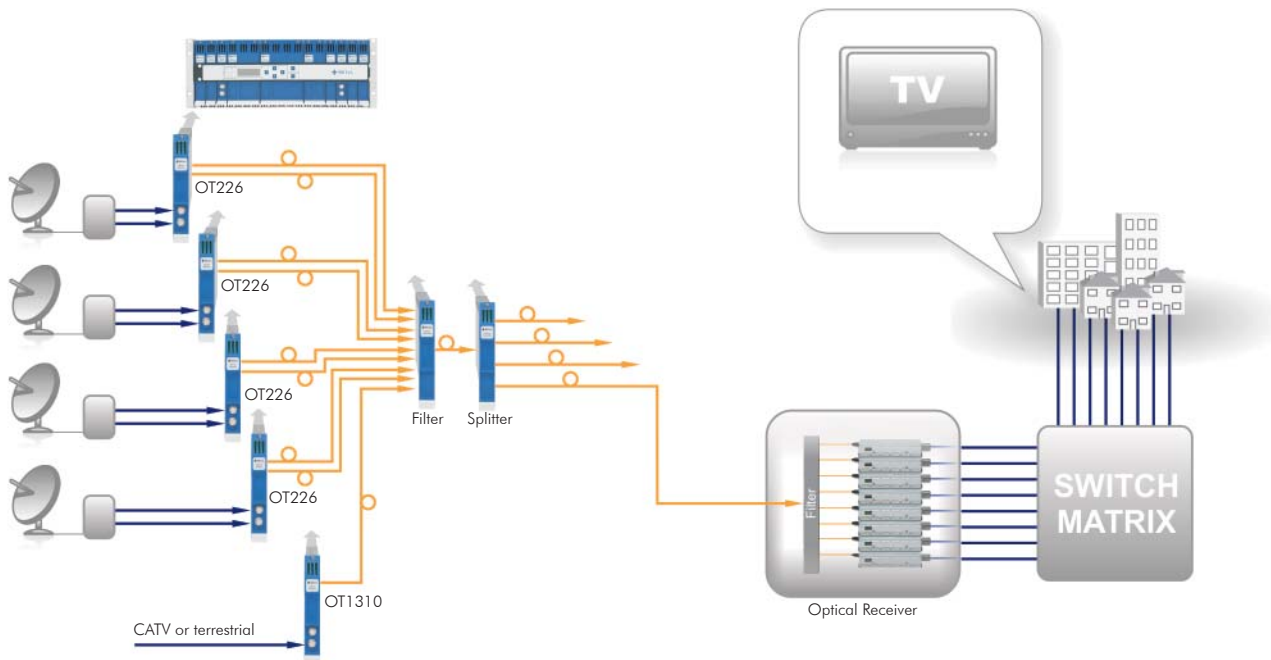
1550 nm Distribution Network and DWDM, Narrowcast and CWDM Return Path





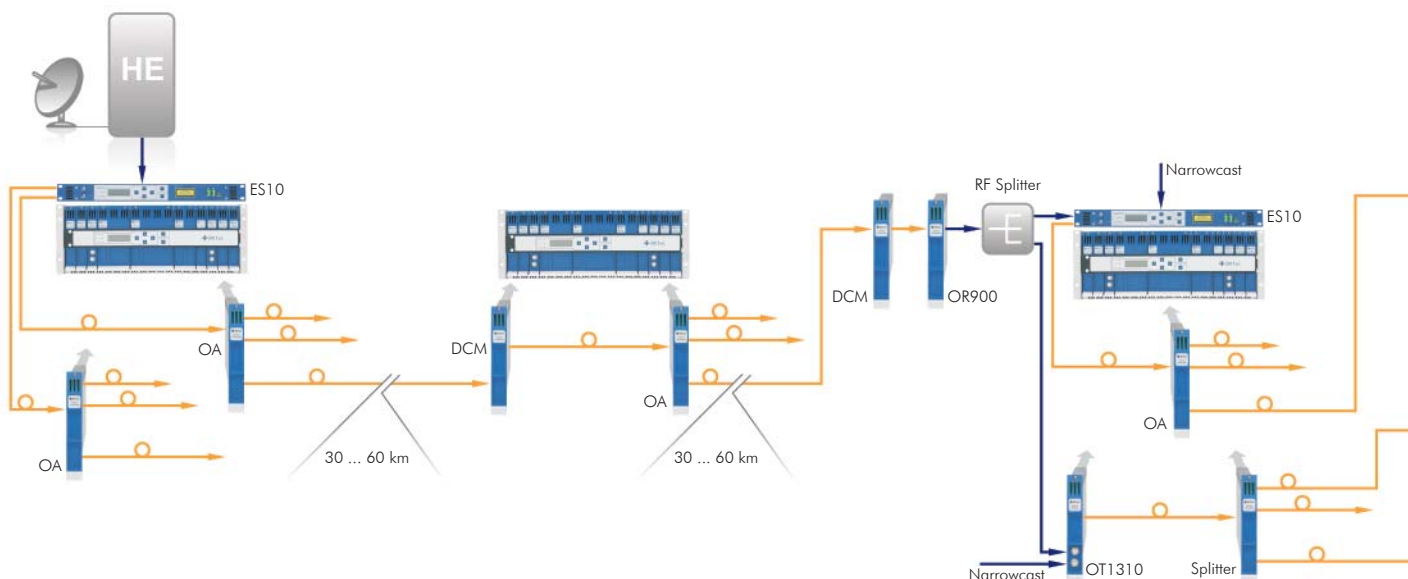
SAT IF Transport Network

CWDM Distribution Network for L-Band Frequencies



Ultra long haul CATV Distribution

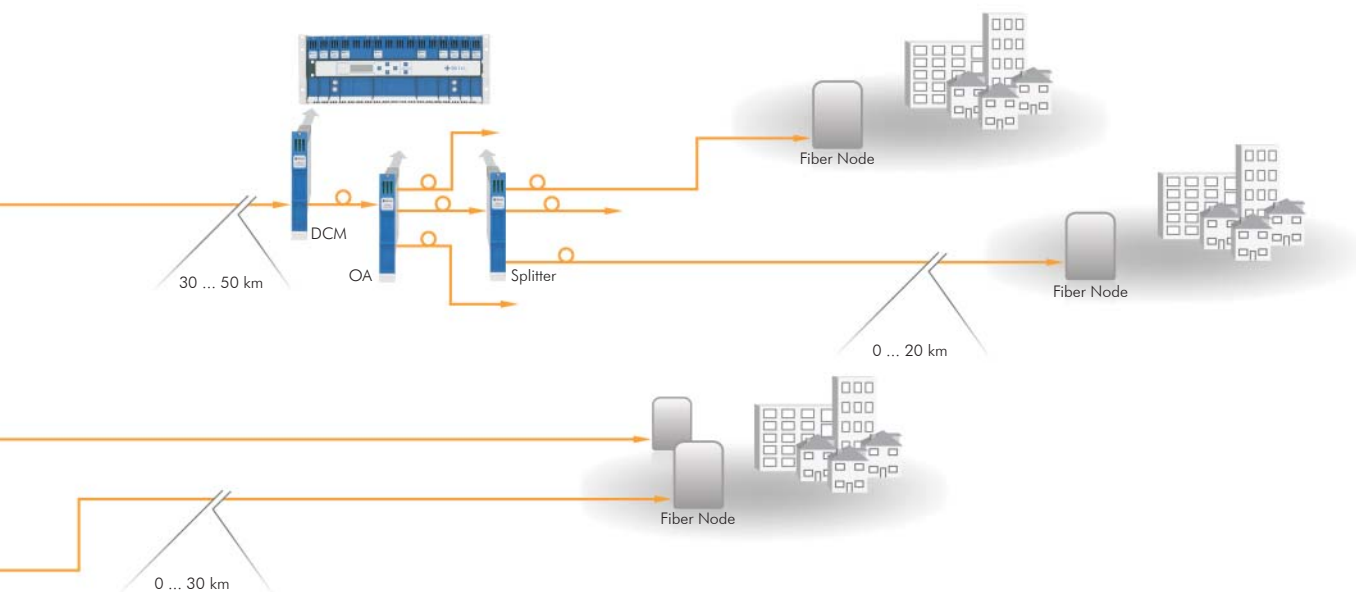
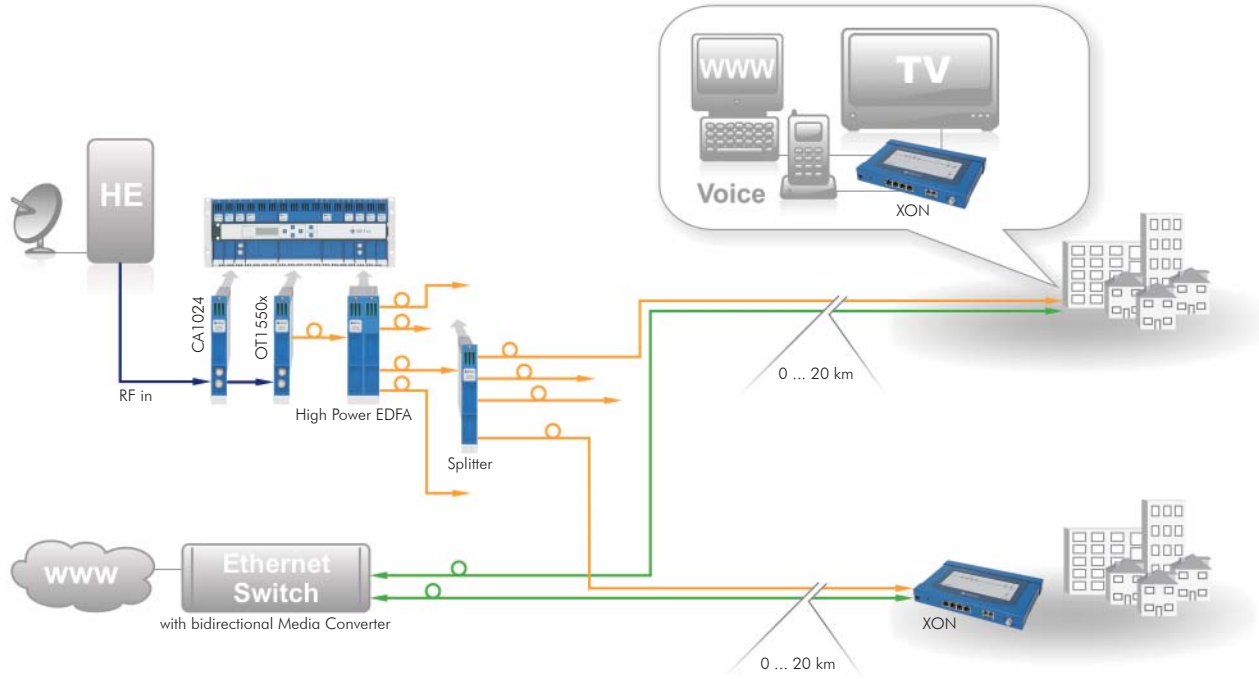
1550 nm with Dispersion Compensation/1310 nm Distribution





Fiber To The Home Point-to-Point

Point-to-Point Ethernet with RF-Overlay



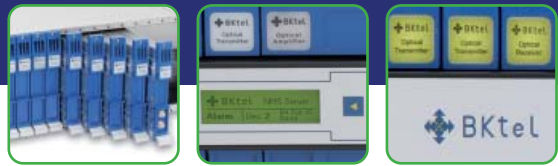
2G6 Platform

Chassis - SR19



Features

- ▶ 19" 4 HU modular design (ETSI available)
- ▶ Highest density: 16 slots for plug-in Modules
- ▶ High quality stainless steel housing
- ▶ Redundant powering on the rear (fan cooling, in-service maintenance)
- ▶ Dust-safe air flow
- ▶ Rear cabling of optical and coaxial lines, test ports on the front panel
- ▶ LCD display on the front side for local setup and monitoring
- ▶ Status indication per module (green: OK, orange: Warning, red: Alarm)



Power Supply and Fan Unit



Features

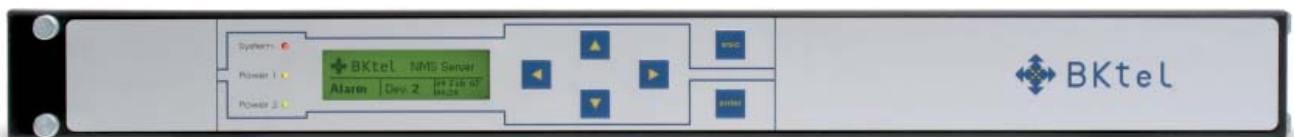
- ▶ 110...240 VAC or 48/60 VDC powering
- ▶ Redundancy option for power supply and fan unit (2 units hot pluggable)



Front Panel

Features

- ▶ Local configuration and status check through pluggable front panel with LC display and keys
- ▶ Additional status indication on front panel through LEDs



2G6 Modules

Direct Modulated Optical Transmitter – OTyyyyZnn



Applications & Options

- ▶ 1310nm forward path transmitter OT1310X with high linearity
- ▶ 1310nm forward path transmitter OT1310N with standard linearity
- ▶ 1550nm forward path transmitter OT1550X for EDFA applications
- ▶ DWDM narrowcast transmitter OTDWnnL with ITU grid wavelength
- ▶ CWDM reverse path transmitter OTCWnnS with ITU grid wavelength
- ▶ Automatic gain adjustment (0..24dB) and OMI control
- ▶ Dual inputs (Broadcast/Narrowcast)

Types

	OT1310Xnn / Nnn	OT1550Xnn
Wavelength	1310 nm	1550nm
Optical output power nn	3 ... 14 dBm	8 ±1 dBm
Frequency range	5 ... 1000 MHz	5 ... 1000 MHz

	OTDWmLnn	OTCWmSnn
Wavelength	ITU grid m	ITU grid m
Optical output power nn	8dBm, 11dBm	3dBm, 6dBm
Frequency range	5 ... 1000 MHz	5 ... 450 MHz

CATV & SAT IF Optical Transmitter – OTSyyyyXnn

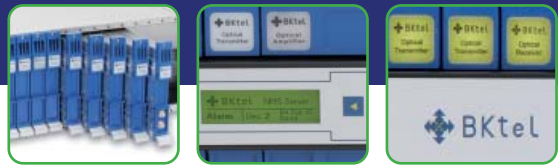


Applications & Options

- ▶ Combined CATV forward path and SAT-IF Optical Transmitter for ultra broadband applications
- ▶ Separate input ports for CATV (5 ... 860 MHz) and SAT-IF (950 ... 2150 MHz)

Types

	OTS1310Xnn	OTS1550Xnn
Wavelength	1310 nm	1550nm
Optical output power nn	5, 8, 11, 13 dBm	8 ±1 dBm



Dual SAT IF Optical Transmitter – OT226-x



Applications & Options

- ▶ L Band (SAT IF) optical transmitter
- ▶ Two independent optical transmitter blocks per module
- ▶ Optional CWDM multiplex
- ▶ LNB feed
- ▶ RF slope and gain control

1310 nm Types

	OT226-1310-n
Wavelengths	1310 nm
Number of inputs	2
Optical output power range n	3 dBm, 6 dBm

CWDM Types

	OT226-C11-n-C12-n	...	OT226-C17-n-C18-n
Wavelengths	1470 nm, 1490 nm		1590 nm, 1610 nm
Optical output power range n	3 dBm, 6 dBm		3 dBm, 6 dBm

Optical Amplifier OAnxxx



Applications & Options

- ▶ Erbium doped optical fiber amplifier EDFA for 1550nm CATV networks
- ▶ DWDM narrowcast signal amplification

Types

	OAn130	OAn160	OAn200
Optical output power	13 dBm	16 dBm	20 dBm
Number n of ports	1, 2, 4, 8	1, 2, 4	1, 2

Optical Booster Amplifier OBAnnxxx-y



Applications & Options

- ▶ Cladding-pumped ErYb doped optical fiber amplifier (EYDFA) for FTTx/PON networks
- ▶ RF video overlay networks
- ▶ Less space consuming due to integrated optical preamplifier
- ▶ Optionally with integrated WDM filter (-a)

Types

	OBA16165	OBAAnn200
Optical output power	16,5 dBm	20dBm
Number (n) of ports	16	8, 16
Integrated WDM filter	-	-

	OBA16165-a	OBAAnn200-a
Optical output power	16,5 dBm	20dBm
Number (n) of ports	16	8, 16
Integrated WDM filter	Yes	Yes

Optical Forward Path Receiver OR900

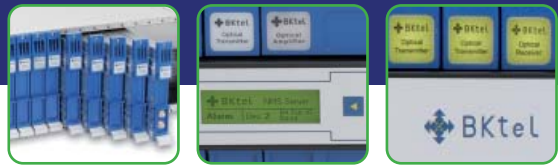


Applications & Options

- ▶ Advanced very low noise optical receiver for 1310nm/1550nm CATV networks
- ▶ Forward broadcast and narrowcast optical receiver
- ▶ Redundancy option
- ▶ Built-in AGC control keeps RF output level constant
- ▶ RF test port on front panel

Types

	OR900
Optical input level	-10 dBm ... +4 dBm
Optical wavelength	1280 nm ... 1610 nm
RF bandwidth	47 MHz ... 870 MHz



Broadband RF Amplifier CA1024



Applications & Options

- ▶ RF amplification of both, forward and reverse path CATV signals
- ▶ Redundancy option
- ▶ RF-gain/slope and AGC configurable via software
- ▶ RF power detection
- ▶ Second input for local insertion of RF-signals
- ▶ Test port on front panel

Types

	CA1024
Frequency range	5 ... 1000 MHz
Gain range	0 ... 24 dB
Slope range	0 ... 16 dB
Noise figure	typ. 6.5 dB

Dual/Quad Optical Reverse Path Receiver OR2160 / OR4160



Applications & Options

- ▶ Optical Reverse Receiver for CATV networks
- ▶ 2 or 4 independent optical receiver blocks per module
- ▶ Redundancy option
- ▶ Each of the 2/4 independent optical receivers can be switched to the Test Port on the front test port
- ▶ Full performance monitoring

Types

	OR2160	OR4160
Receivers per module	2	4
Optical input range	typ. -16 ... +2 dBm	typ. -16 ... +2 dBm

Passive Optics



Applications & Options

- ▶ Optical dual window splitting / combining
- ▶ Optical MUX / DEMUX filtering
- ▶ Optical Taps
- ▶ Dispersion Compensator Modules

Element Controller (Ethernet) ECE



Applications & Options

- ▶ Automatically detecting and polling of all 2G6 series modules connected to the serial RS485 bus for remote supervision and control
- ▶ Interface to front panel of 2G6 Chassis
- ▶ Webserver/Ethernet management for easy local and remote management
- ▶ SNMP/Ethernet management to connect to Network Management Systems
- ▶ Easy software updates via Ethernet interface

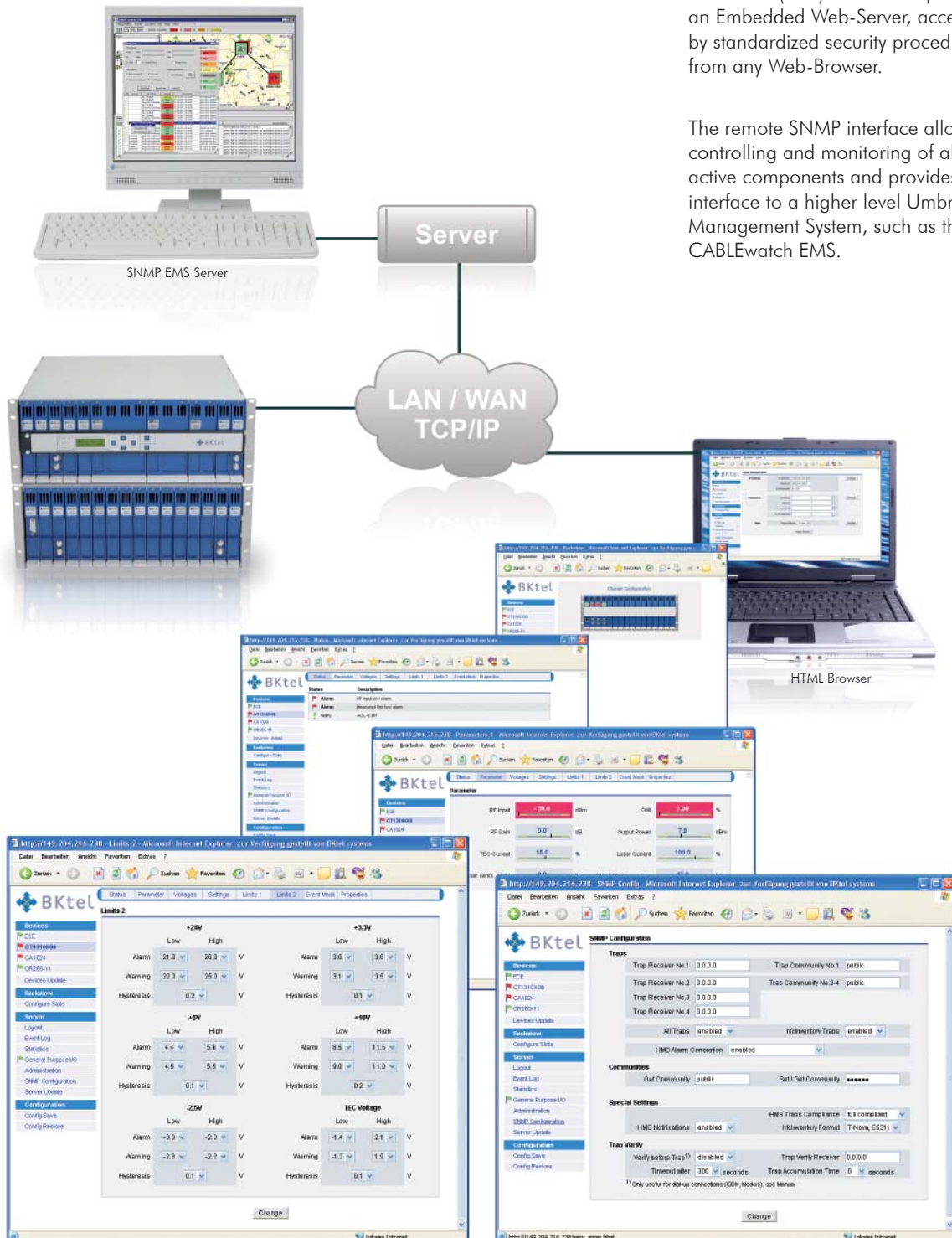


Network Management

Overview

For simplicity of monitoring, control and configuration, the 2G6 Element Controller (ECE) comes complete with an Embedded Web-Server, accessible by standardized security procedures from any Web-Browser.

The remote SNMP interface allows controlling and monitoring of all active components and provides the interface to a higher level Umbrella Management System, such as the Bktel CABLEwatch EMS.





Shaping the future with experience

Our aim is the manufacture of technically leading products to the advantage of our customers. The term „engineering based“ defines exactly BKtel’s orientation: Our organisation serves solely to optimally support the creativity and flexibility of product and system development.

BKtel has enforced this philosophy consequently throughout the formation of the company and in day-to-day work. All tasks that do not directly serve research and development or the implementation of the products are carried out by third parties as services. As a result the organisation has a lean and efficient structure.

This organisation, with a strict „production to order“ philosophy, is able to manufacture products, which not only offer our customers technically forward-looking solutions but also economical communication solutions

Our Aim

Innovative services such as fast internet, “Voice over IP” and modern cable TV revolutionise everyday life, inspire the telecommunication industry and determine the future of the telecommunication market. BKtel supplies today its worldwide customer base with system solutions which they require in order to create and operate interactive networks successfully. The core of our business is the development, in accordance with market requirements, of technically leading components and systems, high standard manufacturing and reliable delivery.

Outlook

Innovative broadband networks will offer worldwide a sole platform for the fast and economical data, voice and cable TV services. BKtel in close cooperation with its customers will deliver systems and relevant network management, which will play a key

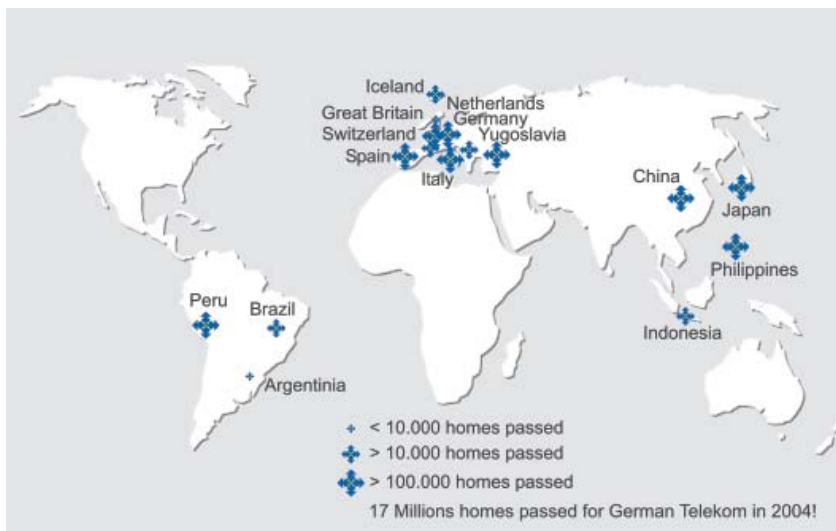
role in the formation of these broadband networks. As a reliable partner our company will help design these networks.

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References



As a result of a management buy-out from Alcatel and Thomson Multimedia, BKtel has references worldwide. To date over 20 million homes passed have been realised with the use of systems from BKtel. Involved are many different networks from small coax networks to large multimedia networks which include network management. Among our customers are network operators of every size as well as system integrators and OEM distributors.



Experts in Optical Networks



BKtel Group

Development, manufacturing, integration and marketing of systems and components for optical networks

System Solutions

- ▶ Broadband communication
- ▶ Manageable HFC networks
- ▶ German "BK" HFC networks
- ▶ DWDM solutions
- ▶ Fiber-To-The-Home networks



Products

- ▶ External modulated 1550 nm transmitters
- ▶ Direct modulated 1310/1550 nm transmitters
- ▶ Optical amplifiers
- ▶ Optical return channel systems
- ▶ Optical receivers
- ▶ Passive optical components
- ▶ DWDM technology for down- and upstream
- ▶ Ethernet media converters
- ▶ FTTH optical network units



Services

- ▶ Training
- ▶ Planning
- ▶ Installation and operation
- ▶ Approval and certification



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