O XFP SERIES AT A GLANCE

O XFP Chassis - optical Transmitter

OT XFP pluggable Modules
Broadcast

External modulated
transmitter 1550nm

OT XFP pluggable Modules
Narrowcast

External modulated
transmitter, tunable
wavelength DWDM

OA XFP pluggable Modules
optical amplifier

Optical amplifier module
+17 dBm,
all DWDM wavelengths

Type	Item No.	Description
O XFP Chassis	57002689	Chassis, XFP-RF Transmitter, 1RU, 10 XFP-HF ports
OT XFP PS-AC	57002691	Power supply, AC 105-264 V
OT XFP PS-DC	57002692	Power supply, DC 36-75 V
OT XFP 1550 04-H	57003053	XFP-RF pluggable TX-Module, Broadcast 1,56µm, 1,2GHz, +4dBm, SBS 17 dBm
OT XFP 1550 05-H	57002920	XFP-RF pluggable TX-Module, Broadcast 1,56µm, 1,2GHz, +5dBm, SBS 20 dBm
OT XFP 1550 07	57002687	XFP-RF pluggable TX-Module, Broadcast 1,56µm, 1,2GHz, +6dBm, SBS 14 dBm
OT XFP DWDM	57002688	XFP-RF pluggable TX-Module, tunable wavelength, QAM, +1,2GHz, +5 dBm, 43 DWDM
OT XFP DWDM-8	57002919	XFP-RF pluggable TX-Module, 8 tunable wavelengths, QAM, +1,2GHz, +6 dBm, 8 DWDM
OT XFP DWDM-F ITU 27	57003382	XFP-RF Pluggable TX-Module, fixed wavelength ITU 27, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 29	57003361	XFP-RF Pluggable TX-Module, fixed wavelength ITU 29, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 31	57003362	XFP-RF Pluggable TX-Module, fixed wavelength ITU 31, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 33	57003383	XFP-RF Pluggable TX-Module, fixed wavelength ITU 33, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 35	57003384	XFP-RF Pluggable TX-Module, fixed wavelength ITU 35, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 37	57003385	XFP-RF Pluggable TX-Module, fixed wavelength ITU 37, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 39	57003386	XFP-RF Pluggable TX-Module, fixed wavelength ITU 39, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 41	57003387	XFP-RF Pluggable TX-Module, fixed wavelength ITU 41, +1.2GHz, +5 dBm
OA XFP 17 OF XFPC	57004182	XFP-RF pluggable EDFA-Module, 17 dBm

XFP SYSTEM

0 XFP Chassis

PRODUCT FEATURES

- High-Density: 10 ports for 10 XFP-RF transmitters in 1 RU chassis
- Individual configuration of OMI, RF amplification, operating mode and SBS status for each of the 10 modules
- Energy Efficient: maximally 5W per module
- User-friendly web browser interface to set up and configure transmitters
- 10 x 75 Ω RF inputs on the rear of the chassis
- Two physically separated Ethernet SNMP ports on front and rear
- USB port for future interface applications
- Option for single or dual power supplies; AC and DC
- Field-Replaceable Cooling Fan
- Mounts into standard 19- inch racks
- Complies with the SCTE HMS HE Optics Management Information Base (MIB) Specifications
- Power supply unit not included in delivery, needs to be ordered separately

LESS SPACE - MORE VISION

APPLICATIONS

- 50 MHz to 1218 MHz RF- over fibre applications
- C- and L-Band Transport and Distribution
- All-Digital QAM networks
- Standard HFC- and RFoG networks
- DOCSIS 3.1 compatible
- Broadcast and Narrowcast services

KEY ADVANTAGES

- High Density: 10 transmitters per rack-unit
- Power consumption per transmitter less than 5W
- Redundant powering capability
- User-friendly web browser configuration tool

The DELTA XFP Chassis is specifically designed around the new XFP transmitter module. The reduction of rack-spacing and power consumption in the headend is more than half in comparison to today`s technologies.

Up to 10 XFP-Modules can be deployed in this 1 rack unit chassis and consume less than 60 W together.

An embedded web server in the chassis allows transmitter modules to be configured with a user-friendly graphical interface through one of the two Ethernet SNMP ports. An element management system can remotely monitor and control the transmitter modules by connecting the chassis to an IP network.

The chassis can be powered with either one AC power supply or one DC power supply in the rear of the chassis. For redundancy, a second power supply can be utilized. For complete powering redundancy in headends or hubs, one AC power supply combined with one DC power supply can be used.

Type		XFP Chassis
RF Bandwidth	MHz	50 - 1200
RF Input level	dBµV	80
RF Flatness	dB	+/- 1.5
Return loss	dB	> 18
CSO/ CTB	dB	> 60
Link noise figure	dB	< 20
RF Input connection		standard F-connector, 75 Ω
RF Test point		Available for each Tx-Module
Dimensions	mm	300 x 483 x 43.6
Operating Temperature Range	°C	0 - 50
Storage Temperature Range	°C	-40 - 85
Power Consumption	W	60, max. (with 10 XFP modules)
Communications interfaces		Ethernet SNMP, RJ-45 on front panel / Rear panel. USB port
Indicators		LED for each transmitter port(10) Summary LED`s for chassis and power supply status

1.2 GHZ O XFP TRANSMITTER

PRODUCT FEATURES

- DOCSIS 3.1 compatible with operating bandwidth up to 1218 MHz
- Mechanical dimensions compliant with 10 Gigabit Small Form Factor (XFP) host-system
- Externally modulated, no dispersion compensation required
- Transmission of up to 79 analogue plus 75 QAM channels
- Link distance of up to 35 km without optical amplification
- Transmitter version with +7 dBm and +4 dBm Optical Output Power
- LC/APC optical connection
- Power consumption < 3.5W
- Built- in digital diagnostic functions
- Compliant with SCTE 195 2013

APPLICATIONS

- Hybrid Fibre Coaxial (HFC) cable access networks
- Transmission of broadcast services
- RFoG technology

Delta`s XFP Transmitter is a pluggable optical module which can be fully loaded with 79 analogue AM-VSB channels plus 75 Digital QAM channels

The external modulated XFP transmitter is in a very small package. The small XFP module significantly increases the density and reduces power consumption for downstream transmitter which can be integrated into today`s Hybrid-Fibre Coaxial (HFC) optical platforms and tomorrow`s broadband infrastructure equipment.

The OT XFP 1550 07 transmitter modules can complement or replace today`s legacy 1310 nm and 1550 nm broadcast transmitters.

Since the wavelength is at 1550 nm, the optical signal can be multiplexed with a legacy 1310 nm optical signal to cost-effectively double the capacity of the fibre to the nodes.

Due to lower fibre loss at 1550 nm, the 7 dBm transmitter can transport signals to a node over fibre up to 35 km regardless of optical dispersion thanks to the modern integrated external modulation technology. Even further distances can be bridged with an additional standard optical amplifier EDFA.

Type	Item No.	Description
OT XFP 1550 04-H	57003053	XFP-RF Pluggable TX-Module, Broadcast 1550 nm, 1.2GHz, +4dBm, SBS 17 dBm
OT XFP 1550 05-H	57002920	XFP-RF Pluggable TX-Module, Broadcast 1550 nm, 1.2GHz, +5dBm, SBS 20 dBm
OT XFP 1550 07	57002687	XFP-RF Pluggable TX-Module, Broadcast 1550 nm, 1.2GHz, +6dBm, SBS 14 dBm

TECHNICAL SPECIFICATIONS

Type		Min.	Max.	Ref.
OT XFP 1550 07	dBm	6.75		
Optical Wavelength Range	nm	1555	7.75	
SBS Supression			1565	
through 20 km of fibre	dBm	+14		1
through 65 km of fibre	dBm	+13		2

Notes:
1. SBS suppression measured with the following link: transmitter through EDFA, launch power of +14 dBm, 20 km of fibre, 0 dBm input power into receiver
2. SBS suppression measured with the following link: transmitter through EDFA, launch power of +13 dBm, 65 km of fibre, 0 dBm input power into receiver. SBS suppression up to 20 dBm is possible

WAVELENGTH TUNABLE 1.2 GHZ OT XFP DWDM TRANSMITTER

0 XFP DWDM

PRODUCT FEATURES

- DOCSIS 3.1 compatible with operating bandwidth up to 1218 MHz
- XFP Form Factor
- All-Digital 256 QAM loading up to 154 carriers
- Externally modulated, no dispersion compensation required
- Wavelength-Tunability across entire C-band at 100 GHz spacing
- Link distances up to 60 km
- LC/APC optical connection
- Power consumption < 3.5 W
- Built-in digital diagnostic functions
- Compliant with SCTE 195 2013

APPLICATIONS

- Hybrid Fibre Coaxial (HFC) cable access networks
- 1550 nm Broadcast with DWDM Narrowcast overlay architectures
- All-Digital QAM networks

The DELTA XFP Transmitter is a pluggable optical module which can be fully loaded with 154 digital QAM channels. The external modulated XFP transmitter is in a very small package.

The small XFP module significantly increases the density and reduces power consumption for downstream transmitter which can be integrated into today`s Hybrid-Fibre Coaxial (HFC) optical platforms and tomorrow`s broadband infrastructure equipment.

The wavelength of the transmitter can be tuned by the user within 500 ms. Each DWDM wavelength within the C-band can be selected.

This increases operational efficiencies in deploying DWDM networks and reduces inventory of transmitters at different fixed wavelengths.

Wavelength-Tunability also opens the possibility of novel HFC architectures that can dynamically route services and increases bandwidth capacity in the cable operator`s access network.

Type	Item No.	Description
OT XFP DWDM	57002688	XFP-RF Pluggable TX-Module, Wavelength-Tunable, QAM, +1.2GHz, +5 dBm, 43 DWDM
OT XFP DWDM-8	57002919	XFP-RF Pluggable TX-Module, Wavelength-Tunable, QAM, +1.2GHz, +5 dBm, 8 DWDM
OT XFP DWDM-F ITU 27	57003382	XFP-RF Pluggable TX-Module, fixed wavelength ITU 27, +1.2GHz, +5 dBm
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OT XFP DWDM-F ITU 39	57003386	XFP-RF Pluggable TX-Module, fixed wavelength ITU 39, +1.2GHz, +5 dBm
OT XFP DWDM-F ITU 41	57003387	XFP-RF Pluggable TX-Module, fixed wavelength ITU 41, +1.2GHz, +5 dBm

TECHNICAL SPECIFICATIONS

Type		Min.	Typ.	Max.	Ref.
Optical Output Power 9/125 SMF	dBm	4.75		5.75	
Optical Wavelength Range	nm	1529.55		1563.05	
Optical Wavelength Spacing	GHz		100		1
Transmitter Center Wavelength – Beginning of Life	pm	X-25	X	X+25	2
Transmitter Center Wavelength – End of Life	pm	X-100	X	X+100	2
Wavelength Tuning Time	seconds		0.5	3.0	
SBS Suppression	dBm		+13		3

Notes:

1. Corresponds to approximately 0.8 nm
2. X= Specified ITU Grid Wavelength. Wavelength stability is achieved within 10 seconds of power up
3. SBS suppression measured with the following link: Transmitter through EDFA, launch power of +13 dBm, 20 km of fibre, 0 dBm input power into receiver. Transmitter loaded with 153 channels of QAM.

OPTICAL FIBRE AMPLIFIER
OA XFP DWDM

PRODUCT FEATURES

- DOCSIS 3.1 compatible
- XFP Form Factor
- 980nm pump laser module
- High output power up to 17 dBm
- APC (automatic power control) and FLS (forced laser shutdown)
- LVTTL alarm
- Low power consumption
- Compatible with SCTE 195 2013

APPLICATIONS

- Compatible with DELTAs XFP Chassis
- Optimized for using in connection with OT XFP DWDM
- Broadcast and narrowcast application
- Narrowband amplification in C-band
- Amplification of DWDM-wavelengths in DWDM-networks due to integrated gain equalizer

The small, pluggable OA XFP DWDM is a full-functioning EDFA module with control circuitry packaged inside. It is totally compatible with the O XFP Chassis in respect of size and pin-map. Due to the small size and easy installation, the OA XFP DWDM is designed for single wavelength applications in fibre optic communication systems in core networks, access networks or CATV networks.

The OA XFP DWDM provides very stable output power of up to 17dBm and a noise figure of 6dB in C-band over a wide operating temperature range.
Over I²C all of the alarm-parameters such as output alarm, bias current, temperature and power supply can be analysed.

Type	Item No.	Description
OA XFP 17 OF XFPC	57004182	XFP EDFA module, 17dBm optical ouput power, amplification of all DWDM wavelengths XFP EDFA

TECHNICAL SPECIFICATIONS

Type		Min.	Typ.	Max.	Ref.
OA XFP 17 Optical Output Power	dBm	16.5		17.4	1,3
	dBm	13.6		17.4	2,3
Optical Output Power Adjustment Range	dB	-3		0	4
Multi Wavelength Gain Flatness	dB			1.0	5
Noise Figure	dB		6.0		6
Optical Isolation	dB	30			
Return loss	dB	40			
Optical interface		LC/APC			

Notes:
1. Minimum optical input of 0 dBm at wavelength of 1555 nm. Operating at maximum output power.
2. Minimum optical input of -5 dBm at wavelength from 1528.77 nm to 1563.45 nm.
3. Optical amplifier is controlled using Constant Output Power mode which maintains fixed output power regardless of optical input power.
4. Optical output power is adjustable.
5. Peak-to-peak for multiple wavelength signals from 1554.5 nm to 1561.0 nm. For OA XFP 17, optical input at + 9.0 dBm and optical output at + 17.0 dBm.
6. Optical input power of + 6.0 dBm. Optical wavelength = 1555 nm. Room temperature.