

Fx-ES10XL

OPTICAL TRANSMITTER 1550 NM

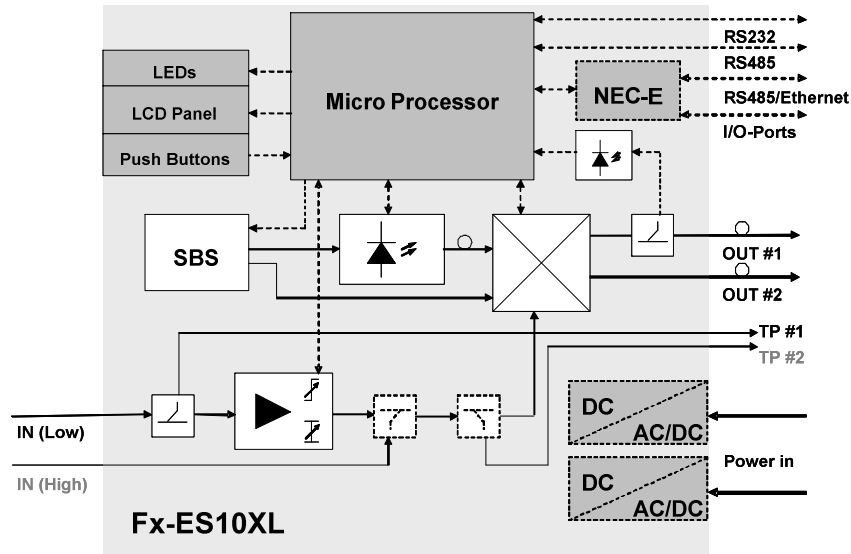
Application



- ▶ Externally modulated 1550 nm DFB laser transmitter for electrical to optical conversion of multichannel CATV signals like AM-VSB, FM and QAM signals
- ▶ Enables the usage of optical amplifiers (EDFAs) as boosters or repeaters in order to realize large scale HFC networks
- ▶ Excellent performance in order to realize links exceeding 100 km

Features

- ▶ Low noise, narrow linewidth CW-DFB laser
- ▶ ITU-Grid wavelength
- ▶ Wavelength adjustable +/- 100 GHz
- ▶ Electrooptical modulator with 2 optical outputs
- ▶ Automatic load control (ALC) for CATV signal input
- ▶ Adjustable RF slope
- ▶ > 2 x 10 dBm output power (Fx-ES10XL-100)
- ▶ Adjustable SBS threshold up to 19 dBm to increase transmission distance
- ▶ Front panel RF test point -20 dB
- ▶ Dual, hot-plug-in power supply modules for 100...240 VAC or ±36...±72 VDC
- ▶ Web and SNMP Interface (a-version)
- ▶ RS485/232 interface (b-version)
- ▶ LC display and LED status indication
- ▶ General purpose I/O interface for remote functions
- ▶ Very thin, only 1 U design for mounting into 19", ETSI or JIS racks

Block Diagram

General Technical Data

Optical connector	Any type of high return loss connectors front or rear side mounted	
Optical fiber	Standard single mode 9/125 μm	
RF connector	F female, front or rear side mounted	
Control interface	a-version: Ethernet 10/100 interface b-version: RS485/232 interface	
Power supply types (Dual redundant, hot pluggable)	100 ... 240 VAC, 50/60 Hz or ± 36 ... ± 72 VDC	
(Real) Power consumption	[W]	< 56 / 63 (1 / 2 power supply unit(s) equipped)
Enclosure	19" / 1 rack unit [U] (optionally compatible to ETSI or JIS standards)	
Weight	[kg]	≈ 9.0 (depend on power supply)
Safety	EN 60950, Laser class 1M according IEC 60 825-1 (eyesafe for normal viewing)	
EMC	EN50083-2	
Climatic specification		
Operation	ETS 300 019, class 3.1	
Storage	ETS 300 019, class 1.2	

Optical properties

		Fx-ES10XL-85	Fx-ES10XL-100
Wavelength	[nm]	1548...1560 or ITU grid ch 23...37	
Side mode suppression	[dB]	> 30	
Wavelength adjustment range	[GHz]	-100, -50, 0, 50, 100	
Optical power	[dBm]	2x 8.5 min.	2x 10.0 min.
Relative intensity noise for CATV (for optical fiber return loss > 40 dB)	[dBc/Hz]	< -158 (typ. < -160)	
SBS-Suppression	[dBm]	Threshold adjustable between +13 and +19 dBm	
Laser linewidth (typical)	[MHz]	0.3	

Electrical Properties

RF frequency range	[MHz]	47 ... 1000
Flatness	[dB]	< ±0.75 (47 MHz...860 MHz) < ±1.5 (860 MHz...1 GHz)
Nom. Input level per TV channel	[dBμV]	80
Input level range (per carrier)	[dBμV]	78 ... 96 (for OMI= 5% per CATV carrier)
True RMS input level range	[dBm]	-16 ... +2 (for ALC correctly working)
Slope range	[dB]	-2 (cable equivalent) ... +8 (cable equalization)
RF impedance	[Ω]	75
Return loss	[dB]	> 20 (@ 47 MHz) – 1.5 dB/octave, minimum > 15
RF monitor output level	[dB]	-20 (+0.2 ... -0.8 dB @ 862 MHz, -1.3 dB @ 1 GHz)

Performance Characteristics

Transmitter version	C42	D84	N77	
Channel allocation plan for test	CENELEC 42	PAL-D 84	NTSC 77	
number of channels TV / FM (-4dB) / QAM64 (-10dB)	42 / 0 / 0	84 / 0 / 0	77 / 0 / 0	
Noise bandwidth	[MHz]	5	5	4
CNR Tx/Rx	[dB]	55.5	52.5	53.5
CNR Link 1	[dB]	55.0	52.0	53.0
CNR Link 2	[dB]	53.0	50.5	52.0
CNR Link 3	[dB]	50.5	49.0	50.0
CSO Tx/Rx and Link 1	[dBc]	65	65	65
CSO Link 2	[dBc]	63	65	65
CSO Link 3 at output #1	[dB]	62	63	65
CTB	[dBc]	65	65	65

Test Conditions

	Booster EDFA	1 st Fibre Length	In-Line EDFA	2 nd Fibre Length	RX
Tx/Rx	no	no	no	no	0 dBm
Link 1	no	35 km	no	no	0 dBm
Link 2	16 dBm	65 km	no	no	0 dBm
Link 3	13 dBm	52 km	13 dBm	52 km	0 dBm

RX with 7 pA/√Hz input noise current density
 EDFAs with 5dB noise figure
 RF input level at 80 dBuV / TV channel



Ordering Information

For more information on this product please contact BKtel communications. Properties for ordering optical transmitter Fx-ES10XL:

Optical output power	85	+8.5 dBm
	100	+10.0 dBm
Frequency plan *)	C42	Cenelec 42
	N77	NTSC 77
	PAL84	PAL 84
NMS-Interface	A	HTTP/SNMP Ethernet
	B	RS485
Wavelength	X	1548...1560 nm
	15xx.xx	15xx.xx ITU wavelength
Optical connector	1	E2000
	2	SC/APC
	3	FC/APC-NTT
	4	FC/APC-JDS
	5	SC/APC with shutter
RF input / optical output	F	on front side
	R	on rear side
Version	0	BKtel
	OEM	OEM
Power supply	230/230	2 x (100...240 VAC)
	48/48	2 x (36...72 VDC)
	230	1 x (100...240 VAC)
	48	1 x (36...72 VDC)
	230/48	mixed 230 VAC / 48 VDC
Power plug	0	No power cable included
	Eu	Europe (Germany, Spain,...)
	US	USA
	Sw	Switzerland
	UK	UK, Ireland
	Jp	Japan
	Ch	China

*) Other frequency plan on request!

Available ITU grid wavelengths

ITU Grid Ch. No.	DWDM Wavelength	ITU Grid Ch. No.	DWDM Wavelength
23	1558.98 nm	31	1552.52 nm
24	1558.17 nm	32	1551.72 nm
25	1557.36 nm	33	1550.92 nm
26	1556.55 nm	34	1550.12 nm
27	1555.75 nm	35	1549.32 nm
28	1554.94 nm	36	1548.51 nm
29	1554.13 nm	37	1547.72 nm
30	1553.33 nm		

Other wavelengths on request!