

GigaWave

Digital Link Extender 40 (DLX40) Solution



DLX40
(front view)

The GigaWave DLX a next-generation digital optical gateway platform designed to provide cable operators with a powerful, futureproof and protocol-agnostic solution that enables them to expand the capacity of fiber access links between headends/hubs and outside plant facilities in a cost-effective and pay-as-you-grow manner. The aggregation platform integrates DWDM multiplexing, EDFA and optical switch functionality. When combined with the field-hardened and all-passive Digital Link Extender Receiver (DLR) unit, the pair form a platform that allows for the transmission of up to twenty 10 GigE optical links, redundantly across fiber distances of up to 60 km. The solution is ideal for use in areas where a legacy node serving area is converted into multiple Remote PHY (R-PHY)-based fiber deep nodes, which are fed via 10 GigE optical links. Support for PON transmission is also provided across the redundant links.

Features (DLX40)

- High level of integration maximizes rack space density and lowers power consumption
- Optimized OSNR maintained in DS and US
- High dynamic range and sensitivity
- Fast optical switching time if fiber cut
- SNMP/WEB GUI support
- US/DS monitor ports and PON express ports
- Two DLX40 modules per redundantly powered 1RU chassis
- 1625nm OTDR insertion port optional at each output

Key Benefits

- Supports Distributed Architecture - Enables reliable and fiber-efficient Remote PHY (R-PHY)-based fiber deep node deployments
- Optimized Fiber Utilization - Transmit up to 20 US/DS 10 GigE optical links redundantly across two fibers
- Advanced Resiliency - Redundancy across varying fiber distances is supported automatically
- Passive Architecture - No actives required in the field results in increased reliability and decreased Opex (truck rolls/powering)
- Plug & Play - Simply dial in primary and redundant path lengths on initial set-up. Maintains constant gain regardless of wavelength count from 1:20 (per direction)

Features (DLR)

- Integration of optical devices minimizes losses, improves uniformity and reliability
- Completely passive with wide temperature range
- Default packaging is three trays for a FOSC-C enclosure, but many options are available
- US/DS monitor ports and PON express ports

Specifications

DLX40

10 GigE REMOTE PHY OPTICS		GW-DLX40-V1REO / GW-DLX40-V2REO		
		MIN	MAX	
OPERATING WAVELENGTH, DS		ITU CH 37, 1547.72nm	ITU CH 18, 1563.05nm	
OPERATING WAVELENGTH, US		ITU CH 61, 1528.77nm	ITU CH 42, 1543.73nm	
UNIFORMITY ACROSS ALL PORTS			1 dB	
BER (without FEC)			10E-12	
DS EDFA OSNR		30 dB		
UP EDFA OSNR		25 dB ⁽¹⁾		
FIBER DISTANCE		5 km	40 km (v1) / 60 km (v2)	
GAIN PER WAVELENGTH ⁽²⁾	DS	-4 dB at 5 km	+3 dB at 40 km, +5 dB at 60 km (v2 only)	
	UP	-3 dB at 5 km	+4 dB at 40 km, +6 dB at 60 km (v2 only)	
MONITOR PORTS	DS ⁽³⁾	-21 dB	-19 dB	
	UP ⁽³⁾	-21 dB	-19 dB	
	U-MON ⁽⁴⁾	-21 dB	-19 dB	
OPTICAL POWER, DEVICE	10 GigE DS TX LEVEL AT DLX40 OUTPUTS 1, 2		21 dBm Comp.	
	10 GigE UP RX LEVEL AT DLX40 OUTPUTS 1, 2		2.7 dBm Comp.	
	10 GigE UP RX LEVEL AT DLX40 PAIR * PORTS		-22 dBm/λ	-7 dBm/λ
OPTICAL POWER, SYSTEM	ASSUMED SFP TRANSMIT RANGE		-1 dBm/λ	+3 dBm/λ
	ASSUMED SFP RECEIVE RANGE		-22 dBm/λ	-7 dBm/λ
PON				
GPON DS λ		1480nm	1500nm	
GPON US λ		1290nm	1330nm	
XGPON DS λ		1575nm	1580nm	
XGPON US λ		1260nm	1280nm	
GPON/XGPON DS AT GW-DLR PON PORT		3 dBm/λ	7 dBm/λ	
GPON/XGPON UP AT DLX PON PORT		0.5 dBm/λ	5 dBm/λ	
OPTICAL SWITCH				
DS OPTICAL POWER RANGE AT OUT		-30 dBm	+22 dBm	
UP OPTICAL POWER RANGE AT OUT		-40 dBm	+10 dBm	
OPTICAL CROSSTALK		50 dB		
ISOLATION		55 dB		
SWITCHING TIME			25ms	
TOTAL PROTECTION SWITCHING TIME			50ms	
OPTICAL RETURN LOSS, OUT 1/OUT 2		45 dB		
ENVIRONMENTAL				
OPERATING TEMPERATURE		0°C to +50°C (+32°F to +122°F)		
STORAGE TEMPERATURE		-40°C to +65°C (-40°F to +149°F)		
STORAGE RELATIVE HUMIDITY		5-85% Non-condensing		
PHYSICAL				
PACKAGING		1 Slot of DLX Chassis, 2 Slots per 1RU		
WEIGHT (DLX40-V1 / DLX40-V2)		4 lbs (1.8 kg) / 5 lbs (2.3 kg)		
FRONT FEATURES		20x 10 GigE DS Inputs, 20x 10 GigE US Outputs, 2x Outputs 2x WL MON DS, 2x WL MON UP, 2x OTDR Ports 1x US Monitor, 1x EXP/PON, 6x Status LEDs		
OUTPUT PORT CONNECTORS x2		SC/APC		
ALL OTHER PORTS		LC/UPC		
CERTIFICATIONS (Pending)		CE/FCC/CISPR-32 Class A, RoHS		

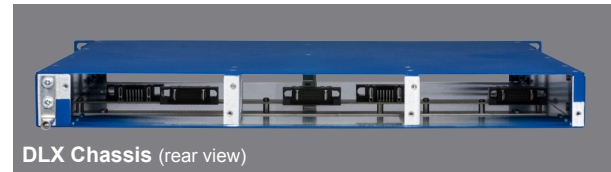
NOTES:

- (1) Derate US OSNR by 0.5 dB if optional OTDR ports present.
- (2) ±1 dB, km based on Fiber Length Setting in software, gain increases 1 dB per 5 km step.
- (3) With respect to levels at OUT1/2 ports.
- (4) With respect to internal UP EDFA output. Intended for OSNR measurements.

Specifications

DLX Chassis

	GW-DLX-CHAS
NUMBER OF DLX SLOTS	2
NUMBER OF POWER SUPPLY SLOTS	2
NUMBER OF COMMUNICATION MODULE SLOTS	1
PHYSICAL	
DIMENSIONS	1.75"H x 19.0"W x 23.0"D (4.45H x 48.26W x 58.4D cm)
WEIGHT	6.3 lbs (2.9 kg)
CERTIFICATIONS	CE/FCC/CISPR-32 Class A, RoHS



Specifications

DLX Power Supply

	AC SUPPLY (GW-DLX-PSAC) / DC SUPPLY (GW-DLX-PSDC)	
	MIN	MAX
OPERATING DC VOLTAGE	-72 VDC	-36 VDC
OPERATING AC VOLTAGE	85 VAC	264 VAC
POWER CONSUMPTION (No Load)		11W
TOTAL LOAD		65W
ENVIRONMENTAL		
OPERATING TEMPERATURE	0°C to +50°C (+32°F to +122°F)	
STORAGE TEMPERATURE	-40°C to +65°C (-40°F to +149°F)	
STORAGE RELATIVE HUMIDITY	5-95% Non-condensing	
PHYSICAL		
DIMENSIONS	1.7"H x 5.5"W x 5.6"D (4.3H x 14.0W x 14.2D cm)	
WEIGHT	1.3 lbs (0.6 kg)	
CERTIFICATIONS (Pending)	CE/FCC/CISPR-32 Class A, CB (UL60950-1), RoHS	



Specifications

DLX Communication Module

	GW-DLX-COMM
POWER CONSUMPTION	1.25W
ENVIRONMENTAL	
OPERATING TEMPERATURE	0°C to +50°C (+32°F to +122°F)
STORAGE TEMPERATURE	-40°C to +65°C (-40°F to +149°F)
STORAGE RELATIVE HUMIDITY	5-95% Non-condensing
PHYSICAL	
DIMENSIONS	1.7"H x 6.2"W x 6.0"D (4.3H x 15.8W x 15.2D cm)
WEIGHT	1.0 lbs (0.5 kg)
CERTIFICATIONS (Pending)	CE/FCC/CISPR-32 Class A, RoHS



Specifications

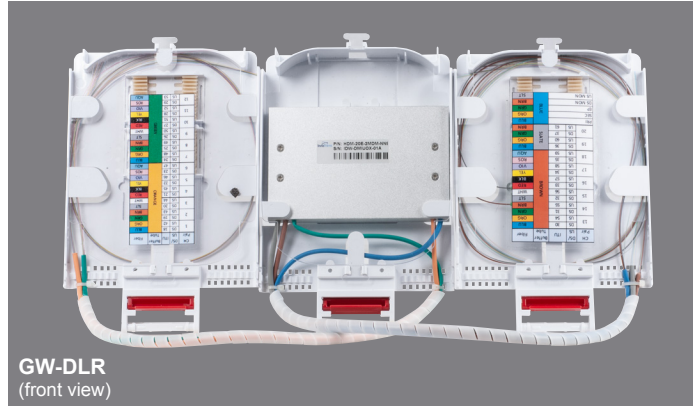
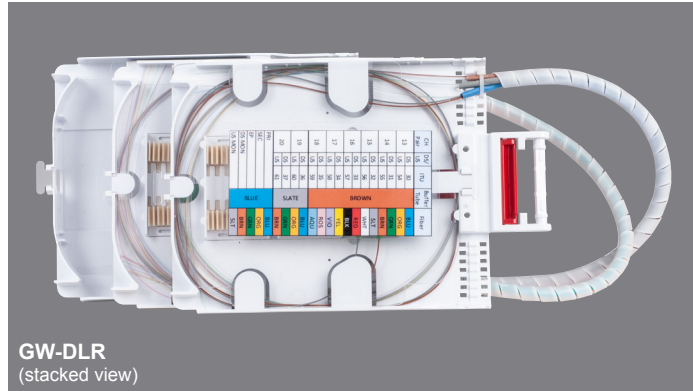
Optical Multiplexer/Demultiplexer

		GW-DLR40-RENF / GW-DLR40-RELF	
OPTICAL		MIN	MAX
10 GigE REMOTE PHY PORTS	OPERATING WAVELENGTH (ITU 18-37 & 42-61)	1528nm	1568nm
	PASSBAND AT -0.5 dB		$\lambda_n \pm 0.12\text{nm}$
	INSERTION LOSS - IN TO INTENDED PAIR PORT		6.5 dB (Typ), 7.2 dB (Max)
	INSERTION LOSS - IN TO DS MON	20 dB	22 dB
	INSERTION LOSS - PAIR TO US MON	20 dB	22 dB
	RIPPLE (With Each DWDM Passband)		0.5 dB
	ADJACENT CHANNEL ISOLATION	25 dB	
	NON-ADJACENT CHANNEL ISOLATION	40 dB	
	UNIFORMITY ACROSS ALL PORTS		1 dB
EXPRESS PORT	OPERATING WAVELENGTH - BAND 1	1260nm	1520nm
	OPERATING WAVELENGTH - BAND 2	1570nm	1660nm
	INSERTION LOSS - IN* TO EXPRESS PORT		5.5 dB
	ISOLATION - C-BAND SIGNAL TO EXPRESS	25 dB	
ALL PORTS	OPTICAL RETURN LOSS	45 dB	
	DIRECTIVITY	45 dB	
ENVIRONMENTAL			
OPERATING TEMPERATURE		-40°C to +85°C (-40°F to +185°F)	
STORAGE TEMPERATURE		-40°C to +85°C (-40°F to +185°F)	
STORAGE RELATIVE HUMIDITY		5-95% Non-condensing	
OPTICAL POWER HANDLING		300mW	
MECHANICAL			
PACKAGING		Three FOSC C-size single-width fiber splice trays. One tray has optics module cassette while the other two have 24 fiber splice inserts	
FIBER TYPE		G.657.A1 Bend Insensitive 250um Fibers	
FIBER LENGTH		2 ± 0.1m (This results in ~30mm between trays ~1.97m in each splice tray loop)	
US & DS MON PORT CONNECTORS		SC/APC	
ALL OTHER PORTS		Bare Fiber Pigtails (See Color Code Below)	
RELIABILITY		GR-1221-CORE	

Fiber Color Coding (Standard TIA/EIA-598-A Color Code)

Port Name	Fiber Color	Buffer Transfer Tube Color	
DS ITU18	BLU	Orange	
US ITU42	ORG		
DS ITU19	GRN		
US ITU43	BRN		
DS ITU20	SLT		
US ITU44	WHT		
DS ITU21	RED		
US ITU45	BLK		
DS ITU22	YEL		
US ITU46	VIO		
DS ITU23	ROS		
US ITU47	AQU		
DS ITU24	BLU		Green
US ITU48	ORG		
DS ITU25	GRN		
US ITU49	BRN		
DS ITU26	SLT		
US ITU50	WHT		
DS ITU27	RED		
US ITU51	BLK		
DS ITU28	YEL		
US ITU52	VIO		
DS ITU29	ROS		
US ITU53	AQU		

Port Name	Fiber Color	Buffer Transfer Tube Color	
DS ITU30	BLU	Brown	
US ITU54	ORG		
DS ITU31	GRN		
US ITU55	BRN		
DS ITU32	SLT		
US ITU56	WHT		
DS ITU33	RED		
US ITU57	BLK		
DS ITU34	YEL		
US ITU58	VIO		
DS ITU35	ROS		
US ITU59	AQU		
DS ITU36	BLU		Grey
US ITU60	ORG		
DS ITU37	GRN		
US ITU61	BRN		
Primary	BLU	Blue	
Secondary	ORG		
Express Port	GRN		
Downstream Test	BRN		
Upstream Test	SLT		



Ordering Information

Part Number	Description
GW-DLX40-V2REO	DLX40 v2 module (up to 2 per chassis). 40x 100G spaced C-Band ITU, PON Express Port, 60 km Redundant Path and 1625nm OTDR port
GW-DLX40-V1REO	DLX40 v1 module (up to 2 per chassis). 40x 100G spaced C-Band ITU, PON Express Port, 40 km Redundant Path and 1625nm OTDR port
GW-DLX-PSDC	-48 VDC Power Supply (up to 2 per chassis)
GW-DLX-PSAC	AC Power Supply (up to 2 per chassis)
GW-DLX-CHAS	1RU Chassis with 2 DLX module slots
GW-DLX-COMM	Communication Module (always use 1 per chassis)
GW-DLX-FM1	Optional Fiber Management Kit, includes management bar and dual rear chassis support brackets
GW-DLR40-RENF	Digital Link Extender Remote Field-hardened Passive Module, 40x 100G spaced C-Band ITU, PON Express Port, 250um pigtails, 3x FOSC-450C size splicing trays
GW-DLR40-RELF	Digital Link Extender Remote Field-hardened Passive Module, 40x 100G spaced C-Band ITU, PON Express Port, 250um to LC/APC, 3x FOSC-450C size splicing trays
GW-DLR40-RELR	Digital Link Extender Rack Mount Field-hardened Passive Module, 40x 100G spaced C-Band ITU, Redundant Launch Ports, PON Express Port, LC/UPC, 2x SC/APC Launch Ports, 2 per GW-DLX-CHAS
GW-DLX-FAN	Replacement 4-wire Fan Assembly for DLX Platform
GW-DLX-BLANK10	10-pc Blank Panel Kit for Unused Slots in DLX-CHAS
GW-DLX-KTCHDC	Digital Link Extender Base Kit, includes 2x DC Power Supplies, 1x Chassis, 1x Communication Module. No DLX or DLR included

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ATX Networks

1-501 Clements Road West, Ajax, ON L1S 7H4 Canada
Tel: 905.428.6068 | Toll Free: 800.565.7488 | support@atxnetworks.com