PON Coexistence Specification Guide

Singlemode devices enabling multiple PON generations to coexist on a common optical distribution network

COMMSCOPE®

Solutions overview

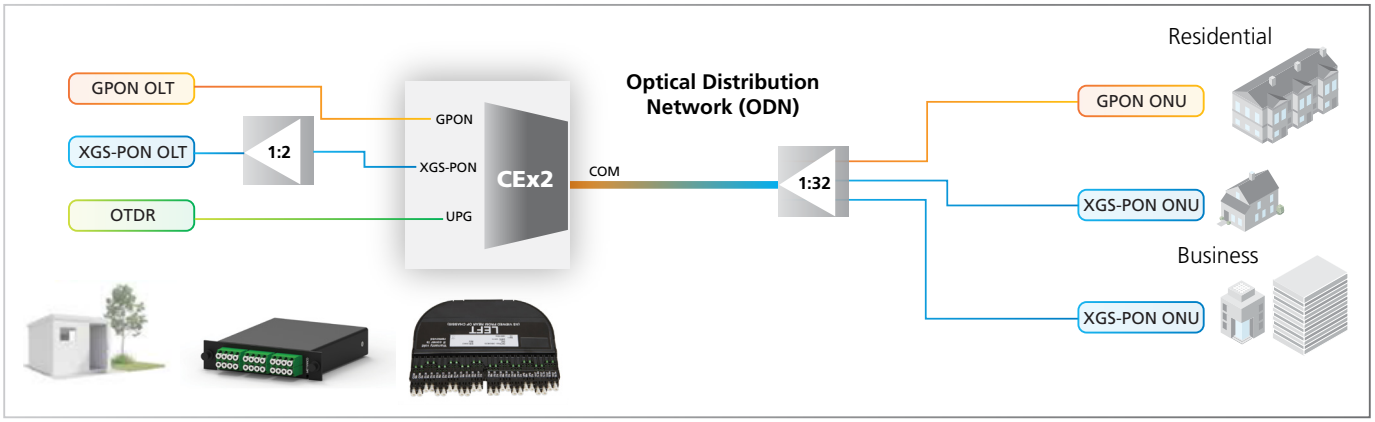
Passive Optical Network (PON) standards have been designed to enable two or more PON systems to co-exist over the same Optical Distribution Network (ODN) thanks to the use of separate wavelengths for both upstream and downstream communications. That allows increased data speed and the delivery of additional services without replacing any of the existing passive fiber network infrastructure, while keeping previous services active.

CommScope's coexistence elements support your migration to next-generation PON services while controlling costs.

Our portfolio of coexistence modules are designed to integrate into the network using fiber panels installed near the optical line terminal (OLT) or inside the optical distribution frame (ODF). They enable different generations of PON technologies such as GPON, XGS-PON, NG-PON2, 25GS MSA, 50GPON to coexist, potentially using different optical split ratio. In addition, some modules have separate ports to enable RF video, optical time domain reflectometry (OTDR), or WDM overlays. Many modules feature an upgrade port enabling the addition of future services over unused wavelengths.

CommScope's CEx elements are available in 2 housing styles, LGX and NG4, offering solutions for both inside plant (ISP) and outside plant (OSP) deployment.

Example application



		LGX	NG4
Connectors	LC/APC	24	24
	SC/APC	12	N/A
Operating Temperature		Outside Plant (OSP)-40°C to +70°C	Inside Plant (ISP)-10°C to +65°C
Test Standards		IEC 61300-2-1, -9, -21, -22, -26 and GR-1209/GR-1221 requirements.	GR-1209/GR-1221 and GR-63

Our LGX solutions meet Outside plant (OSP) requirements of -40°C to +70°C operating temperature environments, and are tested to IEC 61300-2-1, -9, -21, -22, -26 and GR-1209/GR-1221 requirements.

Our NG4 solutions are available with LC/APC connectors, meet inside plant (ISP) requirements of -10°C to +65°C operating temperature environments, and are tested to GR-1209/GR-1221 and GR-63 requirements.

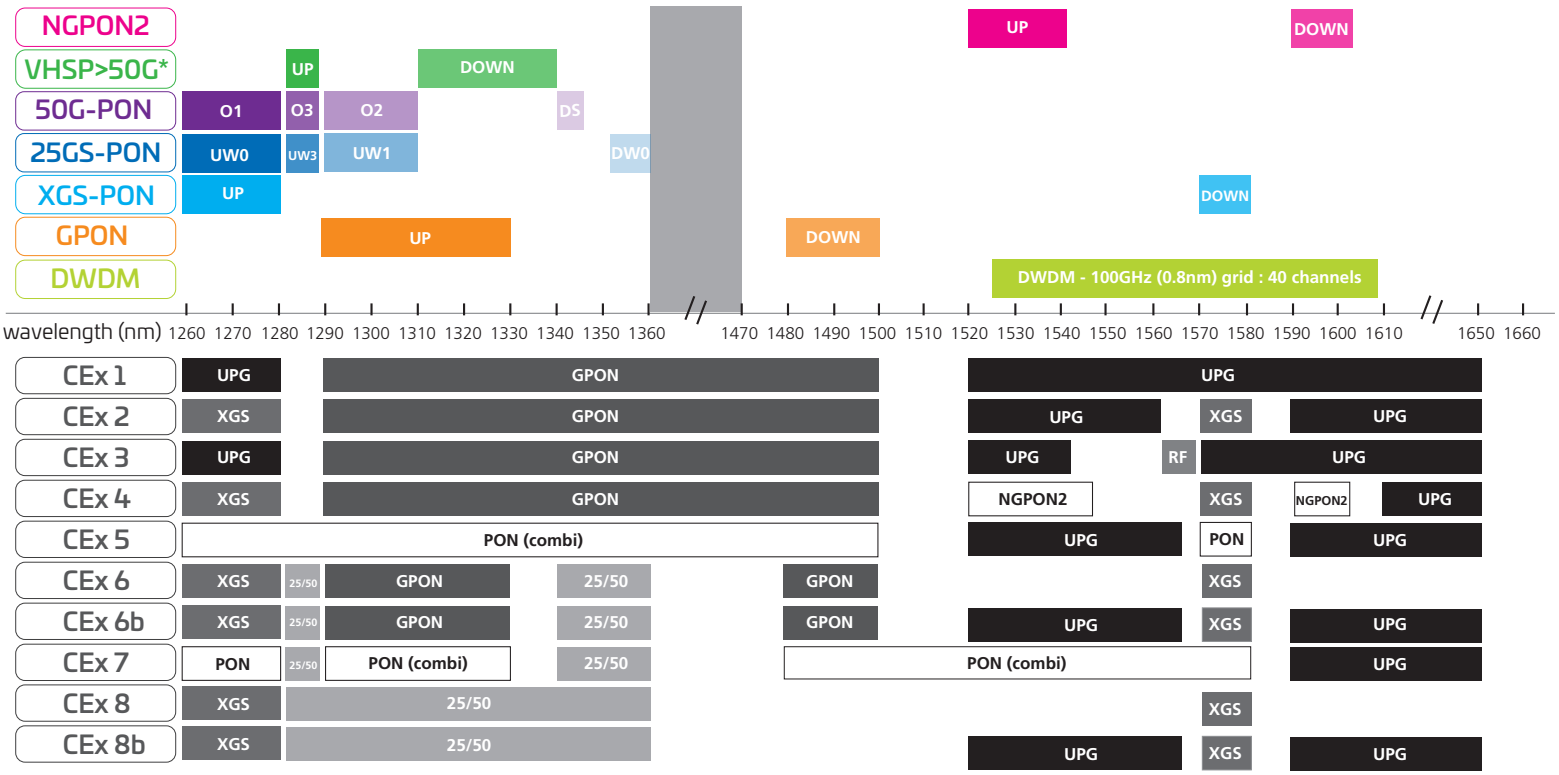
Example NG4™ VAM with LC connectors

Example LGX with LC connectors

PON standards - Overview

Standard		Wavelengths (nm)	
Application	Standard Reference	Upstream (US)	Downstream (DS)
GPON	ITU-TG.984.5	1290-1330	1480-1500
XGS-PON	ITU-TG.9807.1	1260-1280	1575-1581
25GS-PON	25GS-PON Specification 2.0 MSA	1260-1280 (UW0) 1290-1310 (UW1) 1284-1288 (UW3)	1356-1360 (DW0)
50G-PON	ITU-TG.9804.3	1260-1280 (option 1) 1290-1310 (option 2) 1284-1288 (option 3)	1340-1344
G.Sup.VHSP	ITU.TGsup. VHSP (draft)	Proposed 1284-1288 (option 3 from 50G)	Proposed in 1310-1340 range
NG-PON2 (TWDM PON)	ITU-TG.989.2	1524-1544	1596-1603

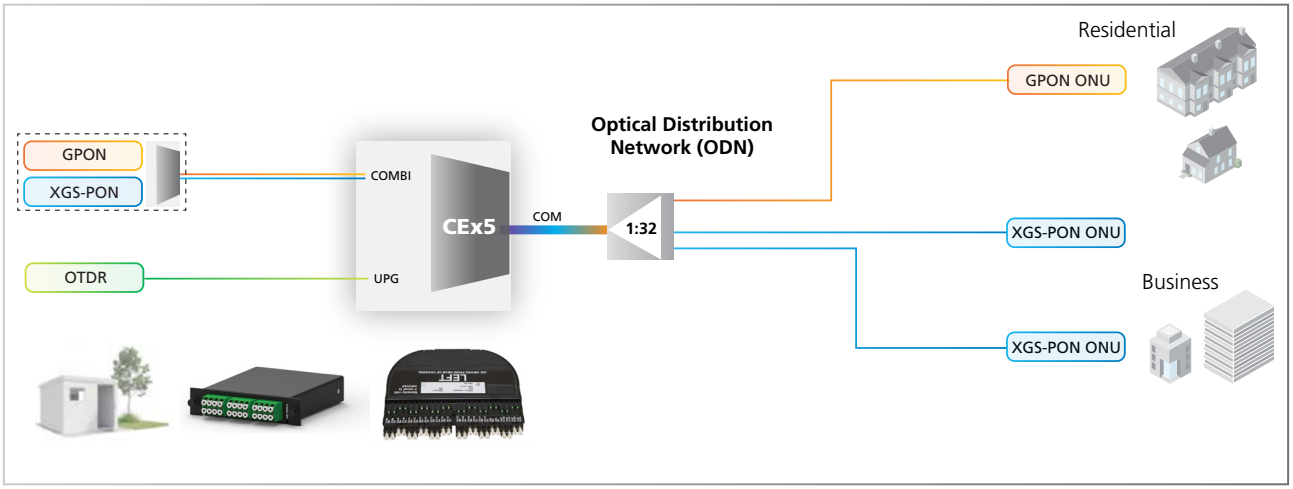
Coexistence application overview



Coexistence optical performance

CEx Configuration		CEx 1	CEx 2	CEx 3	CEx 4	CEx 5
Density (number of circuits in chosen housing and connector type)	NG4-LC/APC	8	6	6	4	8
	LGX-LC/APC	8	6	6	4	8
	LGX-SC/APC	4	3	3	2	4
Application		GPON with upgrade option	GPON, XGS-PON and upgrade option	GPON with RF video overlay and upgrade option	GPON, XGS-PON and NGPON2	GPON and XGS-PON combi port and upgrade option
Passbands Wavelengths	1	GPON: 1290-1500nm	GPON: 1290-1500nm	GPON: 1290-1500nm	GPON: 1290-1500nm	PON (combi): 1260-1500nm & 1575-1581nm
	2	UPG: 1260-1280nm & 1525-1650nm	XGS-PON: 1260-1280nm & 1575-1581nm	RF: 1550-1560nm	XGS-PON: 1260-1280nm & 1575-1581nm	UPG: 1525-1565nm & 1596-1650nm
	3	NA	UPG: 1525-1560nm & 1596-1650nm	UPG: 1260-1280nm, 1525-1540nm & 1575-1650nm	NG-PON2: 1524-1544nm & 1596-1603nm	NA
	4	NA	NA	NA	UPG: 1550-1560 & 1613-1650nm	NA
Insertion Loss	COM to 1	≤0.8dB	≤0.8dB	≤0.8dB	≤0.8dB	≤0.8dB
	COM to 2	≤0.6dB	≤1.2dB	≤1.2dB	≤1.2dB	≤0.6dB
	COM to 3	NA	≤1.2dB	≤1.2dB	≤1.4dB	NA
	COM to 4	NA	NA	NA	≤1.4dB	NA
Maximum Optical Input Power		+23dBm	+23dBm	+23dBm	+23dBm	+23dBm
Isolation	COM to 1	≥30dB	≥30dB	≥30dB	≥30dB	≥30dB
	COM to 2	≥15dB	≥30dB	≥30dB	≥30dB	≥15dB
	COM to 3	NA	≥15dB	≥15dB	≥30dB	NA
	COM to 4	NA	NA	NA	≥15dB	NA
Return Loss		≥50dB	≥50dB	≥50dB	≥50dB	≥50dB
Polarization Dependent Loss (PDL)		≤0.3dB	≤0.3dB	≤0.3dB	≤ 0.3dB	≤0.3dB
Polarization Mode Dispersion (PMD)		≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$
Directivity		≥50dB	≥50dB	≥50dB	≥50dB	≥50dB

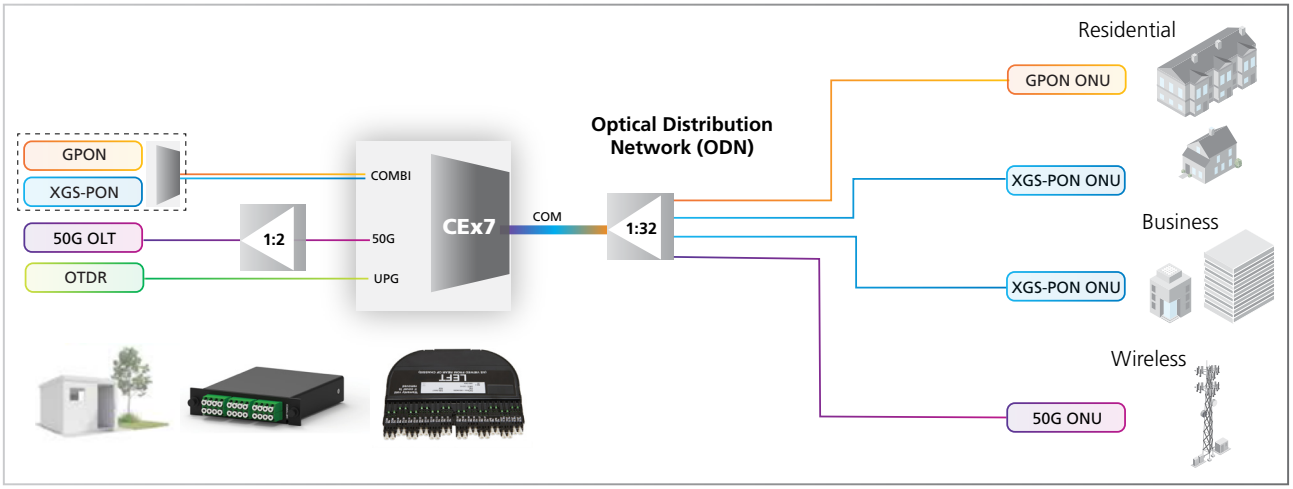
Example application



Coexistence optical performance (continued)

CEx Configuration		CEx6	CEx6b	CEx7	CEx8	CEx8b
Density (number of circuits in chosen housing and connector type)	NG4-LC/APC	4	4	3	8	6
	LGX-LC/APC	4	4	3	8	6
	LGX-SC/APC	3	2	3	4	3
Application		GPON, XGS-PON port, 25G or 50G (no upgrade)	GPON, XGS-PON port, 25G or 50G and upgrade	GPON and XGS-PON combi port, 25G or 50G and upgrade	XGS and 25G/50G	XGS and 25G/50G and upgrade port
Passbands Wavelengths	1	GPON: 1290-1330nm & 1480-1500nm	GPON: 1290-1330nm & 1480-1500nm	PON (combi): 1260-1280nm, 1290-1330nm, 1480-1581nm	XGS-PON: 1260-1280nm & 1575-1581nm	XGS-PON: 1260-1280nm & 1575-1581nm
	2	XGS-PON: 1260-1280nm & 1575-1581nm	XGS-PON: 1260-1280nm & 1575-1581nm	25G/50G: 1284-1288nm & 1340-1360nm	25G/50G: 1284-1360nm	25G/50G: 1284-1360nm
	3	25G/50G: 1284-1288nm & 1340-1360nm	25G/50G: 1284-1288 & 1340-1360nm	UPG: 1596-1650nm	NA	UPG: 1525-1560nm & 1596-1650nm
	4	NA	UPG: 1525-1560nm & 1596-1650nm	NA	NA	NA
Insertion Loss	COM to 1	≤1.4 dB	≤1.4 dB	≤1.8 dB	≤0.8 dB	≤0.8 dB
	COM to 2	≤1.8 dB	≤1.8 dB	≤2.3 dB	≤1.0 dB	≤1.0 dB
	COM to 3	≤2.1 dB	≤2.1 dB	≤1.7 dB	NA	≤1.0 dB
	COM to 4	NA	≤2.1 dB	NA	NA	NA
Maximum Optical Input Power		+23 dBm	+23 dBm	+23 dBm	+23 dBm	+23 dBm
Isolation	COM to 1	≥35 dB	≥35 dB	≥30 dB	≥30 dB	≥30 dB
	COM to 2	≥35 dB	≥35 dB	≥30 dB	≥30 dB	≥30 dB
	COM to 3	≥35 dB	≥35 dB	≥15 dB	NA	≥15 dB
	COM to 4	NA	≥15 dB	NA	NA	NA
Return Loss		≥50 dB	≥50 dB	≥45 dB	≥50 dB	≥50 dB
Polarization Dependent Loss (PDL)		≤0.2 dB	≤0.2 dB	≤0.2 dB	≤0.2 dB	≤0.2 dB
Polarization Mode Dispersion (PMD)		≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$	≤0.5ps/km$^{0.5}$
Directivity		≥50 dB	≥50 dB	≥50 dB	≥50 dB	≥50 dB

Example application



Ordering Information

NG4 CEx Ordering Information

MID	Description	Module Type
NG4-VXLFA08AAN	NG4 Module, CEx 1, 8 circuits, LC/APC connectors	CEx 1
NG4-VXLFB06AAN	NG4 Module, CEx 2, 6 circuits, LC/APC connectors	CEx 2
NG4-VXLFC06AAN	NG4 Module, CEx 3, 6 circuits, LC/APC connectors	CEx 3
NG4-VXLFE04AAN	NG4 Module, CEx 4, 4 circuits, LC/APC connectors	CEx 4
NG4-VXLFG08AAN	NG4 Module, CEx 5, 8 circuits, LC/APC connectors	CEx 5
NG4-VXLFJ04AAN	NG4 Module, CEx 6, 4 circuits, LC/APC connectors	CEx 6
NG4-VXLFL04AAN	NG4 Module, CEx 6b, 4 circuits, LC/APC connectors	CEx 6b
NG4-VXLFM03AAN	NG4 Module, CEx 7, 3 circuits, LC/APC connectors	CEx 7
NG4-VXLFN08AAN	NG4 Module, CEx 8, 8 circuits, LC/APC connectors	CEx 8
NG4-VXLFP06AAN	NG4 Module, CEx 8b, 6 circuits, LC/APC connectors	CEx 8b

LGX CEx Ordering Information

MID	Description	Module Type
LX1SXA08AAN	Single Width LGX Module, CEx 1, 8 circuits, LC/APC connectors	CEx 1
LX1SXA04CCN	Single Width LGX Module, CEx 1, 4 circuits, SC/APC connectors	CEx 1
LX1SXB06AAN	Single Width LGX Module, CEx 2, 6 circuits, LC/APC connectors	CEx 2
LX1SXB03CCN	Single Width LGX Module, CEx 2, 3 circuits, SC/APC connectors	CEx 2
LX1SXC06AAN	Single Width LGX Module, CEx 3, 6 circuits, LC/APC connectors	CEx 3
LX1SXC03CCN	Single Width LGX Module, CEx 3, 3 circuits, SC/APC connectors	CEx 3
LX1SXD04AAN	Single Width LGX Module, CEx 4, 4 circuits, LC/APC connectors	CEx 4
LX1SXD02CCN	Single Width LGX Module, CEx 4, 2 circuits, SC/APC connectors	CEx 4
LX1SXG08AAN	Single Width LGX Module, CEx 5, 8 circuits, LC/APC connectors	CEx 5
LX1SXG04CCN	Single Width LGX Module, CEx 5, 4 circuits, SC/APC connectors	CEx 5
LX1SXJ04AAN	Single Width LGX Module, CEx 6, 4 circuits, LC/APC connectors	CEx 6
LX1SXJ03CCN	Single Width LGX Module, CEx 6, 3 circuits, SC/APC connectors	CEx 6
LX1SXL04AAN	Single Width LGX Module, CEx 6b, 4 circuits, LC/APC connectors	CEx 6b
LX1SXL02CCN	Single Width LGX Module, CEx 6b, 2 circuits, SC/APC connectors	CEx 6b
LX1SXM03AAN	Single Width LGX Module, CEx 7, 3 circuits, LC/APC connectors	CEx 7
LX1SXM03CCN	Single Width LGX Module, CEx 7, 3 circuits, SC/APC connectors	CEx 7
LX1SXN08AAN	Single Width LGX Module, CEx 8, 8 circuits, LC/APC connectors	CEx 8
LX1SXN04CCN	Single Width LGX Module, CEx 8, 4 circuits, SC/APC connectors	CEx 8
LX1SXP06AAN	Single Width LGX Module, CEx 8b, 6 circuits, LC/APC connectors	CEx 8b
LX1SXP03CCN	Single Width LGX Module, CEx 8b, 3 circuits, SC/APC connectors	CEx 8b

LGX chassis solutions

LGX 4RU back-to-back chassis

Features

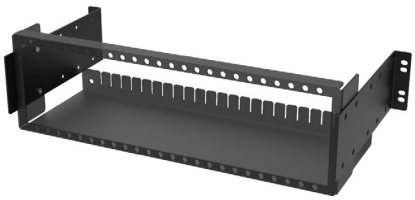
- The LGX 4RU back-to-back chassis holds 14 single-width LGX modules per side or seven dual-width LGX modules per side
- Maximum density of 28 single-width LGX modules or 14 dual-width LGX modules
- 19-in. or 23-in. rack mount
- 2.5-in., 5-in., or 8-in. recess mounting options
- Dimensions (H x W x D): 6.9 x 17 x 15 inches

MID	Description	Color
FBPS-LGX-4RU-BLK	LGX 4RU back-to-back chassis Ships equipped with two pass-through modules (LGX-PASSTHUR-3BK)	Black

3RU chassis

Features:

- Maximum density of 14 single-width LGX modules or 7 dual-width LGX modules
- 19-in. rack mount
- Dimensions (H x W x D): 132.5 x 482 x 235 mm



MID	Description	Color
760252747	FPS-OCM-I-F-BLK	Black

LGX 1RU chassis

Features

- Holds three single-width LGX modules
- 19-inch rack mount
- Dimensions (H x W x D): 1.7 x 18.9 x 8.9 inches / 44 x 481 x 225 mm

MID	Description	Color
760250917	LGX 1 RU chassis—FPS-OCM-K-F-BLK	Black

NG4 chassis solutions

NG4access® universal chassis

Features

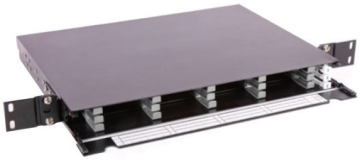
- Single 4 RU and 2 RU chassis for all applications
- One single-high VAM per access tray loaded from rear side of chassis/frame
- Up to 24 single-high VAMs per 4 RU universal chassis. Up to 12 single-high VAMs per 2 RU universal chassis.
- Can be deployed as a standalone 19”/23” chassis in standard racks

MID	Description	Color
NG4-CH100000	NG4-CH100000: 4RU NG4 CHASSIS W/O ADPTRS	Black
760242618	NG4-CH100000-2B: 2RU NG4 CHS W/O ADPTRS	Black

NG4 1RU Chassis – All Front Access

Features

- 3 trays per chassis
- Chassis accepts single high standard NG4 modules (front connectors only)
- 6 modules per 1RU chassis

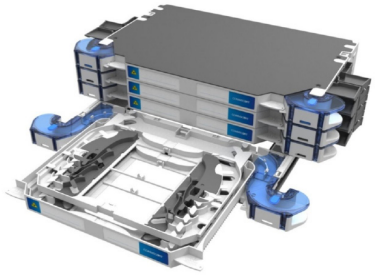


MID	Description	Color
760240294	EHD-1U-NG4VAM	Black

FACT NG4 Chassis

Features

- The FACT NG4 element includes two trays
- Each element can accommodate two single-height NG4 VAM modules

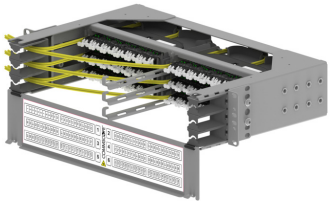


MID	Description
760239975	FACT-1ENG4

EQUIPMENT PANEL FOR NG4/FACT MODULES

Features

- 19 inch/ETSI - 2 HU Panel – full front access
- Can accomodate up to 6 modules



MID	Description
760252389	EQP-2U-6X-MOD-NG4

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