PANDUIT®

Deploying Fiber Cabling in the Data Center

Your network supports the critical data, voice, video, and security applications required to drive your business. Panduit Fiber Cabling System simplify the delivery of network services by providing reliable infrastructure components assembled and tested in a factory-controlled environment.

An end-to-end cabling system is an ideal solution for data centers especially when time for traditional cable installation and termination is limited.

The Panduit Fiber Cabling System components are terminated, tested and configured to fit the application, offering quick, plug-in deployment for trouble free network performance.

With the benefits of quick network deployment, assured performance, quality, and easy redeployment, the Panduit has multiple options for the perfect infrastructure solution for today's data centers.

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www.panduit.com

Panduit Fiber Cabling Systems

Panduit offers a variety of Fiber Cabling Systems and configurations and meet the unique needs of a data center project of any scale.

This guide covers common considerations for using these products, as well as selection guides to assist in choosing the right solution for your deployment. These solutions include QuickNet™, Opticom®, as well as HD Flex™, for a variety of applications such as:

- Applications for the data center
- Fiber termination options and common configurations
- Specifying options, measuring for lengths, and selection of part numbers

These applications will be valid for any of the options selected, and any differences will be highlighted throughout the guide.

QuickNet™ Fiber Applications in the Data Center
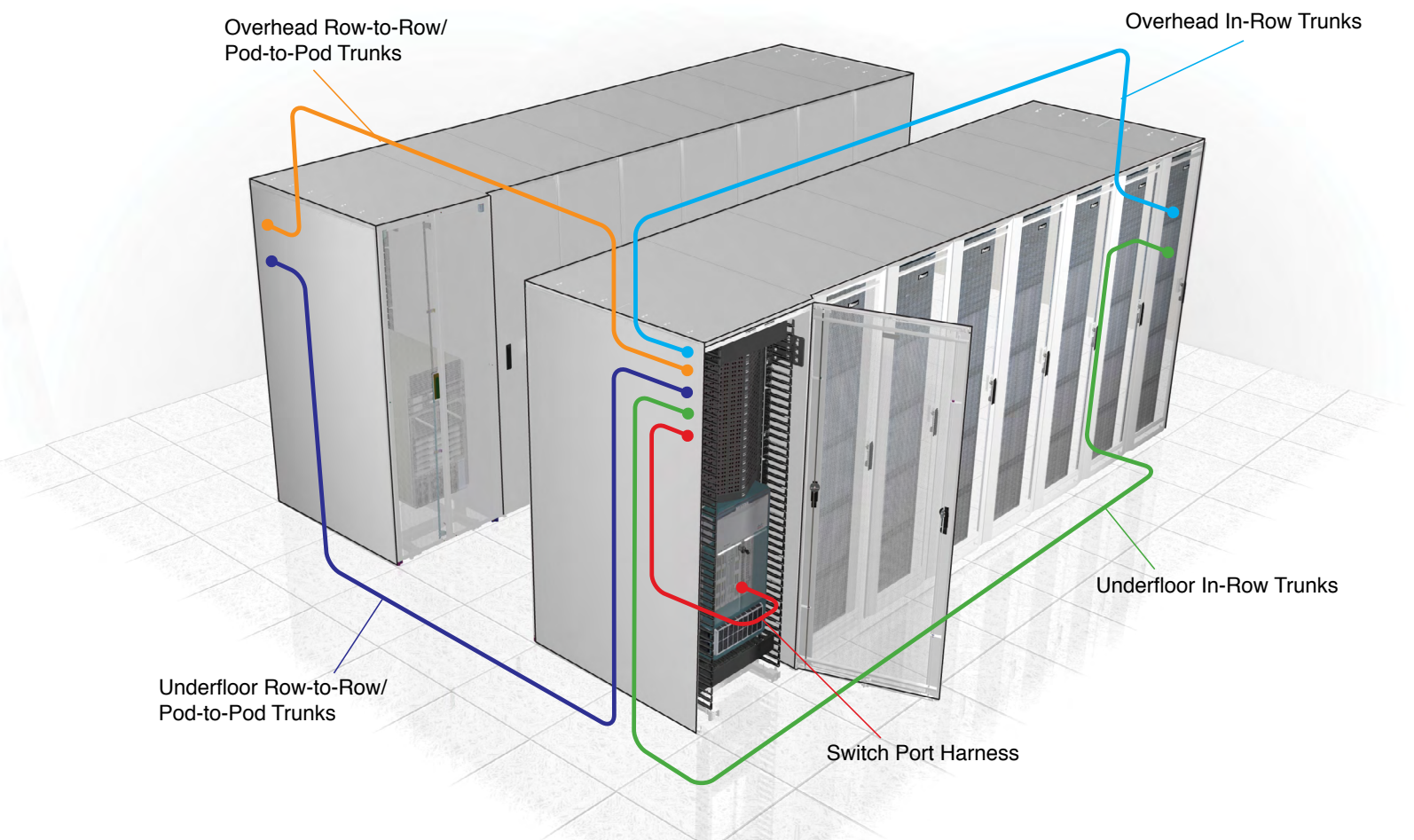
Figure 1: Data Center Applications

How to Use QuickNet™ Fiber Cable Assemblies

The following sections illustrate and describe in greater detail how QuickNet™ Fiber Trunks, Interconnects, Harnesses, Patch Cords, Cassettes, and Patch Panels are used in common data center cabling configurations.

Two-Connector Interconnect

In this configuration, a permanent link is installed between QuickNet™ Patch Panels in the switch/network cabinet and the server or storage cabinets. The most common, flexible, and upgradeable QuickNet™ Fiber Solution is shown in Figure 2, below:

QuickNet™ PanMPO™ to PanMPO™ Cable Assembly (trunk/interconnect)

QuickNet™ Patch Panel

MPO FAP **OR** 6-port LC to MPO Cassette

QuickNet™ MPO to LC Harness **OR** LC to LC Patch Cord

Switch/Network Cabinet

QuickNet™ Patch Panel

6-port LC to MPO Cassette

LC to LC Patch Cord

Server or Storage Cabinet
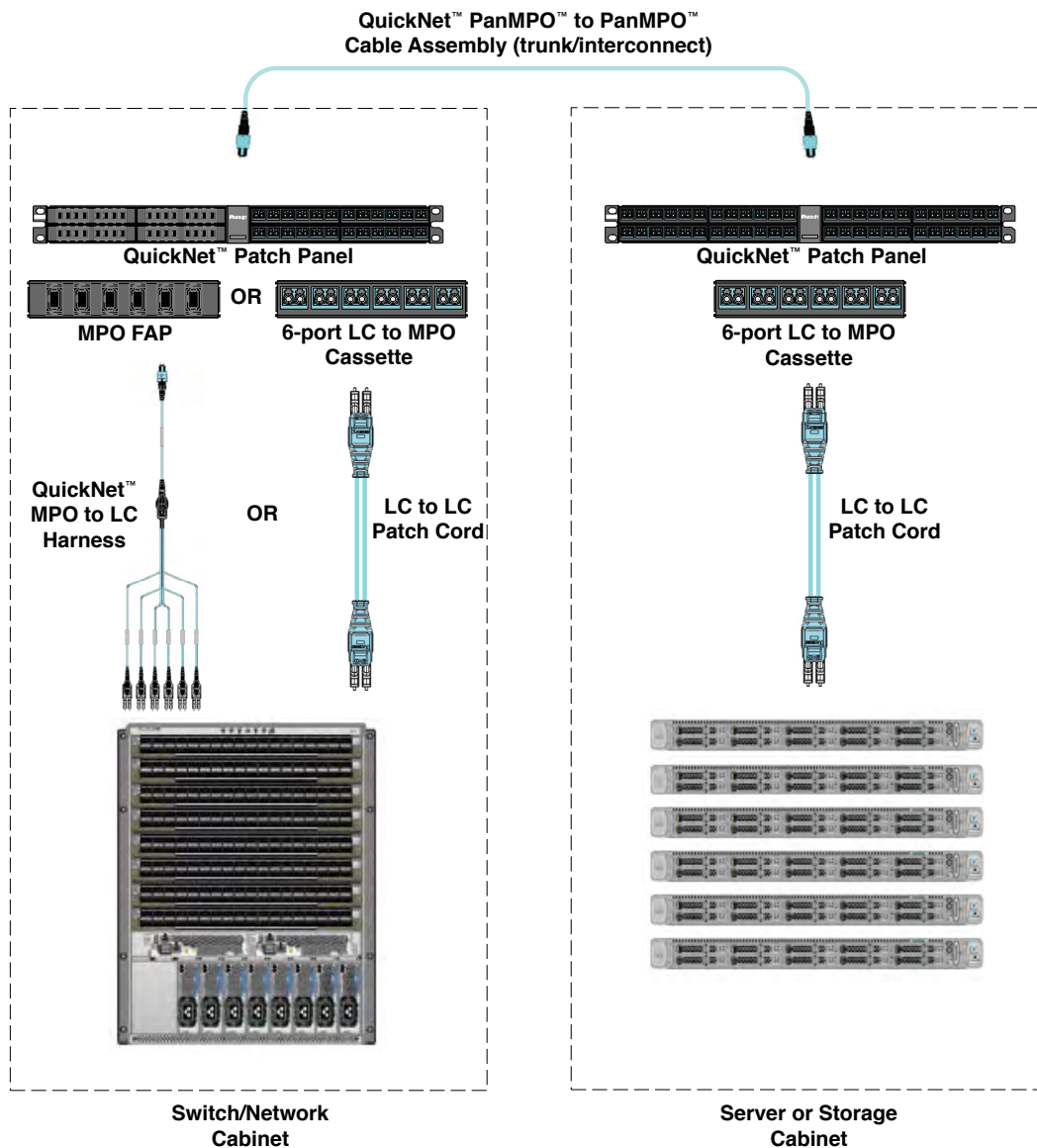
Figure 2: Two-Connector Chanel

How to Use QuickNet™ Fiber Cable Assemblies (continued)

Four-Connector Interconnect

In this configuration, permanent links are installed between QuickNet™ Patch Panels in the switch/network cabinet and server or storage cabinets and a common cross connect cabinet or rack. In this scenario, any fiber from any switch port or server uplink can be routed to anywhere within the datacenter. This option allows for easy moves, adds, or changes. The most common, flexible, and upgradeable QuickNet™ Fiber Solution is shown in Figure 3, below.
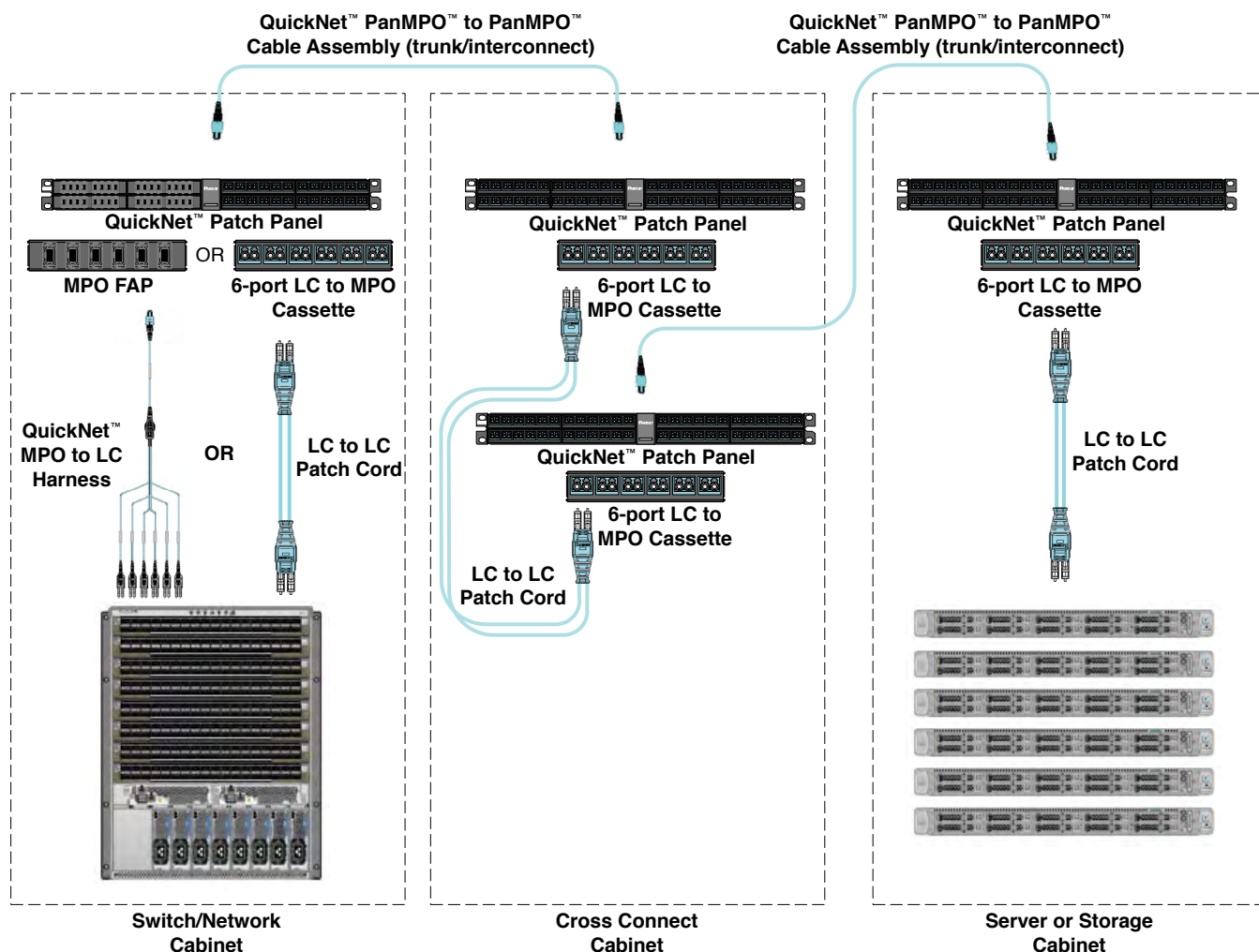
Figure 3: Four-Connector Channel with Cross Connect

Note: 40/100Gb Cisco® BiDi configuration shown with Duplex LC. For 40/100G-SR4, MPO Interconnects will be used for switch to patch panels/FAP's.

How to Use QuickNet™ Fiber Cable Assemblies (continued)

Switch Port Equipment Harnesses

Switch port equipment harnesses are utilized in the switching area of the data center and to consolidate cabling. The LC to MPO harnesses connects six (6) or four (4) (depending on the switch layout), LC transceivers in the switch to a single MPO connector in an adapter panel installed in the switch cabinet to within 15m of the switch cabinet. This allows for consolidation of the switch ports into a single MPO connector. Panduit switch port equipment harnesses come in three different breakout arrangements shown below in Figure 4. Figure 5 illustrates the application.

12-Fiber Harness with Equal Breakouts   **12-Fiber Harness with Staggered Breakouts**

12-Fiber Harness with Staggered Breakouts with Two Equal Legs

Figure 4: Harness Configurations

QuickNet™ Patch Panel

Example of Duplex LC Transceiver to MPO Harness Patching

QuickNet™ MPO to LC Harness

Switch/Network Cabinet
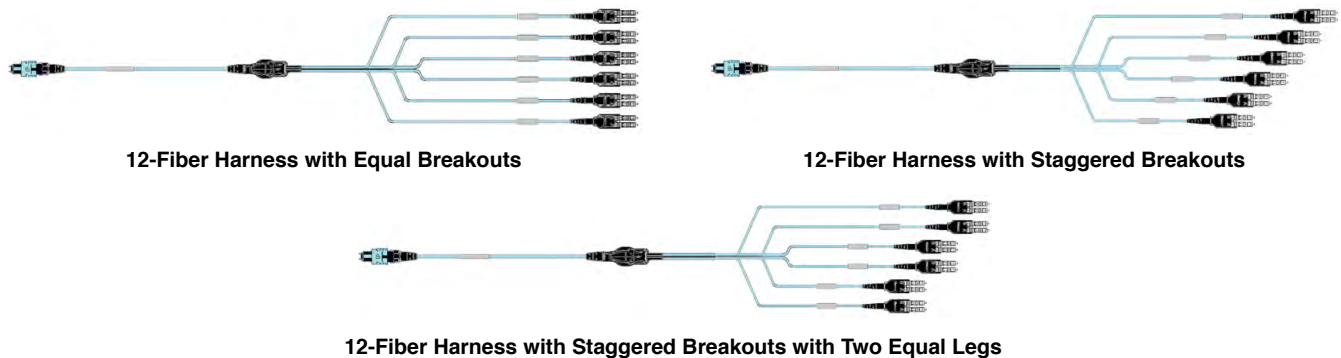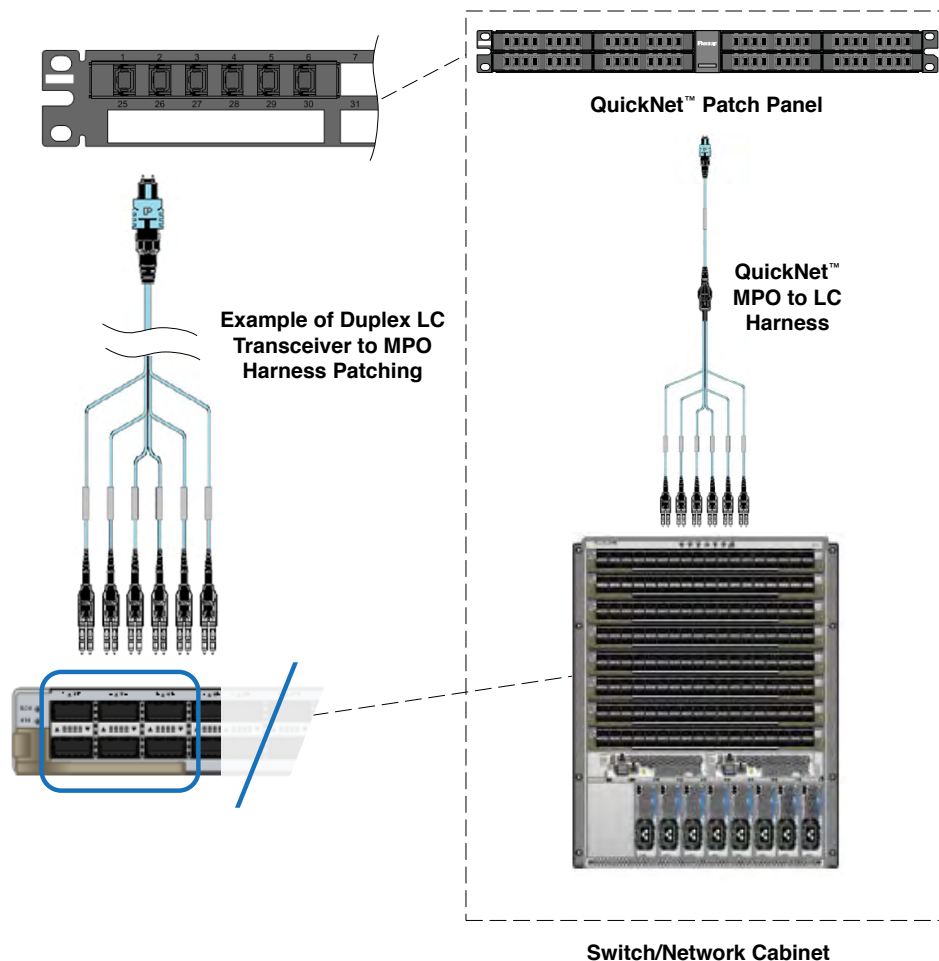
Figure 5: Switch Port Equipment Harnesses

How to Use QuickNet™ Fiber Cable Assemblies (continued)

HDQ Series High Density Cassettes

The QuickNet™ HDQ Series High Density Fiber Optic Cassettes can be used in high density network applications for cross connects to assist with switch port replication. These cassettes mirror 32-port and 48-port Cisco® blades and as shown in Figure 6. These give the end user (at a cross connect area) the ability to visualize the blade port location when conducting moves, adds, or changes. Panduit also offers generic 48-port and 72-port cassettes.
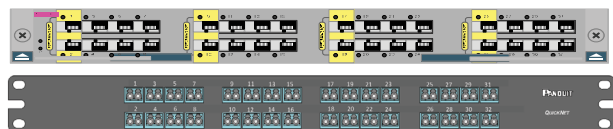
Cisco^ 32-Port Blade (top) and
Corresponding Panduit Cassette (bottom)
F1RC**-6412-10S

Cisco^ 48-Port Blade (top) and
Corresponding Panduit Cassette (bottom)
F1RC**-9612-10S

HDQ Series High Density Cassettes

QuickNet™ PanMPO™ to PanMPO™
Cable Assembly (Trunk/Interconnect)

QuickNet™ Patch Panel

MPO FAP OR 6-port LC to MPO Cassette

QuickNet™ MPO to LC Harness OR LC to LC Patch Cord

QuickNet™ HDQ Cassette

QuickNet™ PanMPO™ to PanMPO™ Cable Assembly to Server/Storage Cabinet

QuickNet™ Patch Panel

LC to LC Patch Cord 6-Port LC to MPO Cassette

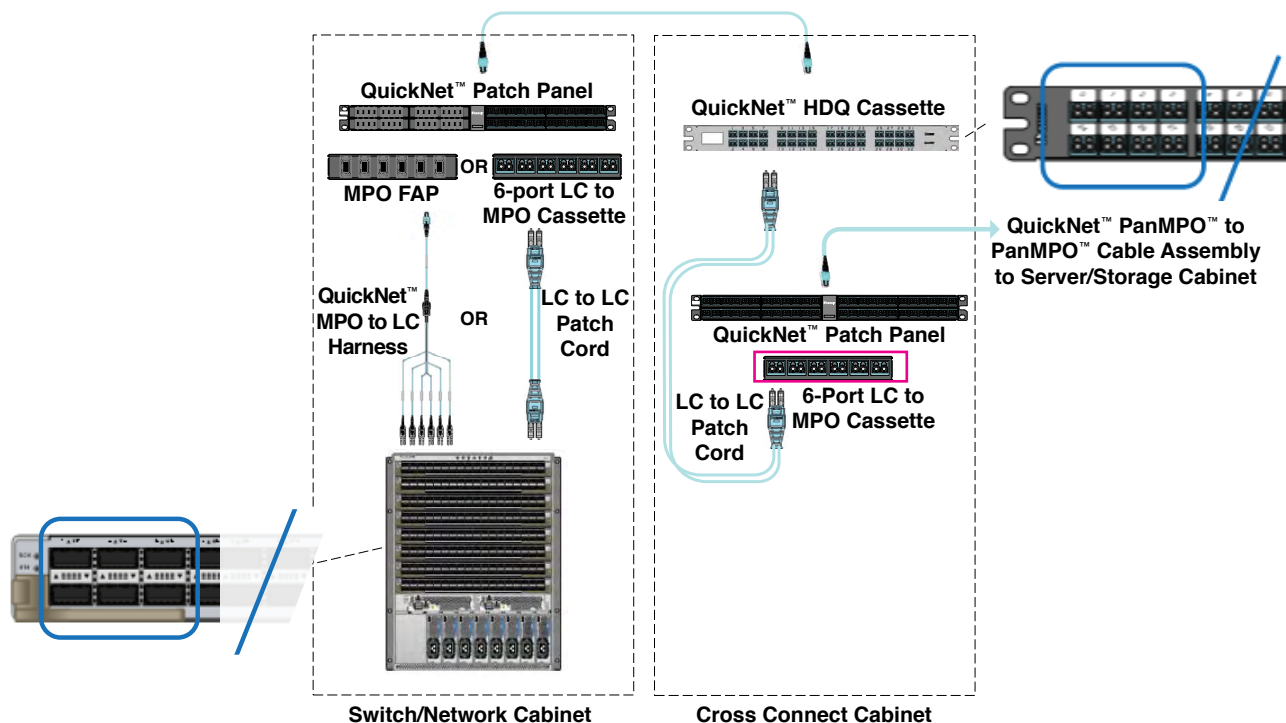**Switch/Network Cabinet**   **Cross Connect Cabinet**

Figure 6: HDQ Example

** = Performance and fiber type.
Speak to your Panduit representative for Brocade® options.
Cisco® is a registered trademark of Cisco Systems, Inc.

Panduit Fiber Cable Assembly Options
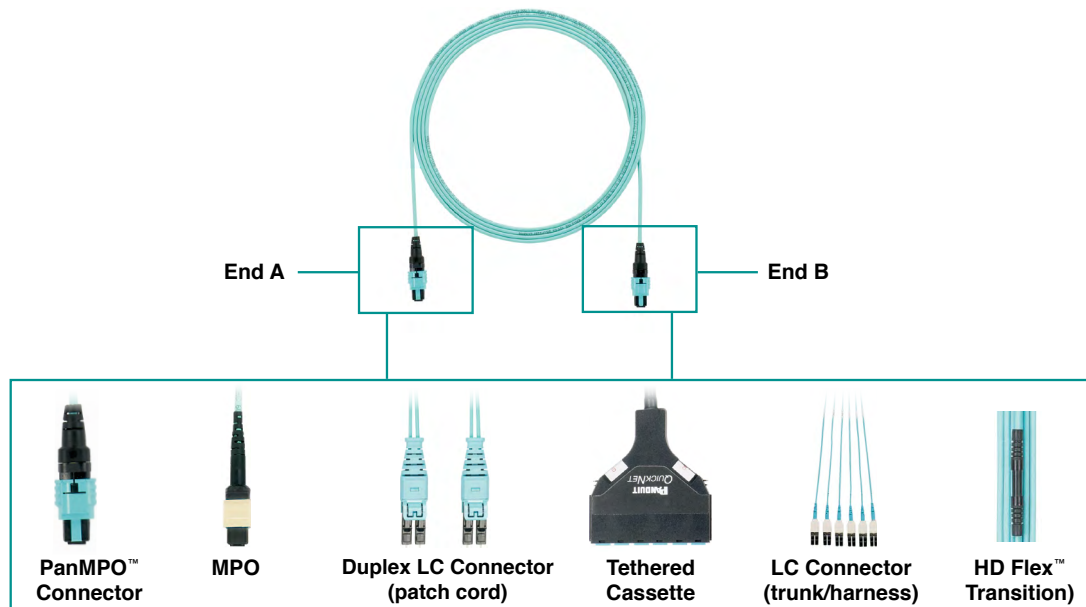
Figure 7: Panduit Fiber Ends Options

PanMPO™ Cable Assemblies
Easily convert between male and female gender and between key-up and key
    down polarity for 10/40/100G Ethernet installation
Connector changes are made in the field as needed
Available on trunks, harnesses, and interconnects
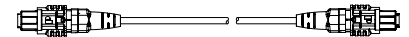
Duplex LC to Duplex LC Patch Cord
Patch cord with duplex LC connectors on both ends
Typically used in cross-connect and as equipment patch cords in data centers
Connect to pre-terminated cassettes in main, horizontal, and equipment distribution

MPO to MPO Trunks/Interconnect
Trunk or interconnect fiber cable with 12-fiber MPO connector(s) or LC
    connectors on each end
Trunks offer greater mechanical protection (3x crush) than interconnects and
    are built with a pulling eye. Preferred for lengths >30m/100 ft.
Typically used in cabinet-to-cabinet permanent backbone links
Installs into all Panduit Fiber Adapter Panels (FAP) or cassettes
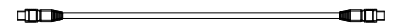
MPO to LC Harness
Harness cable with 12-fiber or 8-fiber LC connector(s) on one end and one
    MPO connector on the other end
Typically used for connectivity between the switch in horizontal cabling
Installs into Panduit Fiber Connectivity solutions/patch panels on one end
    and switch ports on the other end
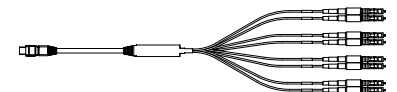
Panduit Fiber Cable Assembly Options (continued)

Cassette to Cassette Trunk
Cassette of either 12 LC or 4, 6, 8 MPO connectors on each end
Typically used for intra-row connectivity
Factory tested as permanent link (does not require re-test in the field)
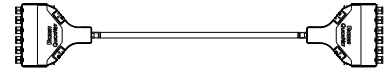
Cassette to MPO Trunk
Cassette of either 12 LC or 4, 6, 8 MPO connectors on one end to discrete
   connectors on the other end.
Typically used for inter-row connectivity
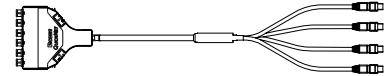
Cassette to LC Trunk
Cassette of either 12 LC or 4, 6, 8 MPO connectors on one end to discrete
   connectors on the other end.
Typically used for inter-row connectivity
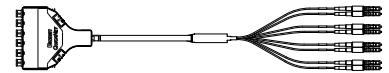
10G to 40G to 100G Migration

PanMPO™ Connectors make 10G to 40G to 100G migration easy.
Discover how easy here: http://www.panduit.com/panmpo

10G Universal Cassette Method with PanMPO™ –MMF

Pins retracted on both ends

SFP-10G-SR   A to B Patch Cord   Method B Female to Female PanMPO™ Trunk   A to B Patch Cord   SFP-10G-SR

40/100G Method B with PanMPO™ –MMF

Pins extended on both ends

40 or 100GBASE-SR QSFP+   Method B Female to Female PanMPO™ Trunk   Method B FAP   Method B Male to Male PanMPO™ Trunk   Method B FAP   Method B Female to Female PanMPO™ Trunk   40 or 100GBASE-SR QSFP+

**40/100G Method A with PanMPO™ –SMF**

Pins extended on both ends

QSFP-100G-PSM4-S   Method A Female to Female PanMPO™ Trunk   Method A FAP   Method B Male to Male PanMPO™ Trunk   Method A FAP   Method A Female to Female PanMPO™ Trunk   QSFP-100G-PSM4-S

40/100G Universal Cassette Method with PanMPO™ –MMF

Pins retracted on both ends

QSFP-40/100G-SRBD   A to B Patch Cord   Method B Female to Female PanMPO™ Trunk   A to B Patch Cord   QSFP-40/100G-SRBD

40/100G Universal Cassette Method with PanMPO™ –SMF

Pins retracted on both ends

QSFP-100G-FR-S   A to B Patch Cord   Method B Female to Female PanMPO™ Trunk   A to B Patch Cord   QSFP-100G-FR-S

Figure 8: 10/40/100 Channel Path

Panduit recommends the use of Method B polarity for 40/100G multimode parallel fiber solutions. Method B (Key-Up to Key-Up array connectivity) is widely used throughout the industry and is discussed in TIA-568-C.1. Method B array connectivity allows for the same equipment patch cords to be used whether the channel is comprised of the LC based 10GBASE-SR technology using array solutions in the horizontal cabling infrastructure for the MPO based 40GBASE-SR4 or 100G-PSM4-S technology using array solutions throughout the infrastructure. (Note: for 100G-PSM4-S the use of Method A FAP's with a single Method A trunk, remainder are Method B).

To assist with the array polarity and gender, Panduit is offering the PanMPO™, which is a gender/polarity changeable MPO connector. PanMPO™ will allow for either male/female gender or Key-Up/Key-Down or Key-Up/Key-Up MPO trunk configurations.

How to Select Panduit Fiber Cable Assemblies

The Panduit fiber product family has a wide range of available configurable options from standard MPO to MPO cable assemblies to fully custom assemblies that are user-defined. In this section, each of the main configuration options for Panduit fiber is explained, and typical considerations for data center applications are covered.

Fiber Type

The fiber type selected in the assembly indicates the maximum data rate that will be supported.
Cable choices:

- OS1/OS2 (Singlemode)
- OM3
- OM4, OM4 Signature Core™
- OM5, OM5 Signature Core™

Laser optimized multimode fibers, OM3, OM4 exceed domestic and international standards for optical fiber and support a diverse set of legacy and contemporary applications including Ethernet and Fibre Channel, among many others. For 10GbE applications, the following link lengths are supported:

- OS1/OS2: 10km
- OM3: 300m
- OM4: 400m, OM4 Signature Core™ 550m
- OM5: 400m, OM5 Signature Core™ 465m

Note: Additional guidance on the supported link reaches for data center applications with various channel insertion losses is available in the Reach Table on page 13 of this document, as well as at http://www.panduit.com.

Cable color defines fiber media type:

- OS1/OS2: Yellow
- OM3: Aqua
- OM4: Aqua
- OM4 Signature Core™: Aqua
- OM5 Signature Core™: Lime Green

Fiber Count

Fiber count choices:

Interconnects	Harnesses	Trunks	
• 12-fiber	• 8-fiber	• 12-fiber	• 144-fiber
• 24-fiber	• 8-fiber QSFP to SFP+	• 24-fiber	• 288-fiber
	• 12-fiber	• 48-fiber	• 432-fiber
		• 72-fiber	• 576-fiber
		• 96-fiber	• 864-fiber

How to Select Panduit Fiber Cable Assemblies (continued)

Cable Flame Rating

Cable flame rating choices are:

- Low Smoke Zero Halogen (LSZH), tested to IEC 60332, 60754, and 610345, and Euroclass B2ca, Cca tested to EN 50399, EN 60332-1-2 and EN ISO 1716
- Optical Fiber Non-Conductive Plenum (OFNP), tested to NFPA 262
- Optical Fiber Non-Conductive Riser (OFNR), tested to UL-1666

Low Smoke Zero Halogen (LSZH) rated cable is jacketed with compounds that emit limited smoke and no halogen when exposed to high heat sources. It is the preferred jacket in the EMEA region.

Plenum (OFNP) is jacketed with a fire-retardant plastic.

Riser (OFNR) cables contain no electrically conductive materials. These are used in a contained area, usually a vertical shaft.

Trunk Type and Terminations

Both ends of a Panduit Fiber cable assembly include one of a range of factory termination options – each end can be different and are selected based upon the desired application of the trunk or harness within the data center.

Termination choices are:

- Duplex LC to Duplex LC
- PanMPO™ to PanMPO™
- PanMPO™ to LC
- MPO to LC
- Cassette to Cassette
- Cassette to MPO/Duplex LC

Insertion Loss is the amount of power lost at each mated pair of connectors. Maximum insertion loss per connector pair:

- Multimode PanMPO™ to PanMPO™: 0.35dB
- Multimode LC to LC: 0.25dB
- Singlemode MPO to MPO: 0.75dB
- Singlemode LC to LC: 0.35dB

How to Select Panduit Fiber Cable Assemblies (continued)

Assembly Options

Options include:

- No Pulling Eye
- Pulling Eye on one end (as show in Figure 9)
- Pulling Eye on both ends

A pulling eye is a loop of braided sleeve material that is applied to one or both ends of a Panduit fiber trunk assembly and is used to pull the cable in the pathways at deployment.
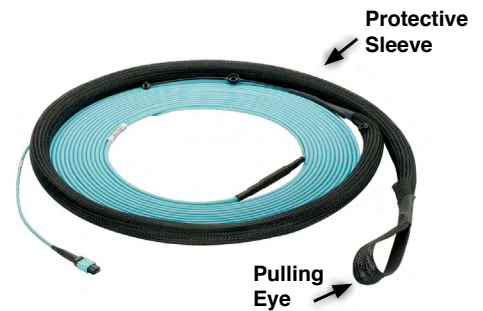
Figure 9: Pulling Eye Option

Labeling

All Panduit fiber cable assemblies have an assembly label on each end which includes the part number, length, and a serialized quality control number.

Label example is show in Figure 10.

P/N: FZTYP7E7EAAF200
END A 200 FEET
S/N: 14125328K-0001

Figure 10: Labels

Application Reach Table

Panduit laser optimized OM3, OM4 multimode fibers meet domestic and international standards. Signature Core™ exceeds domestic and international standards for optical fiber. This includes TIA-492AAAB, TIA-492AAAC, TIA-492AAAD, and IEC 60793-2-10, and supports a diverse set of legacy and contemporary applications including Ethernet, Fibre Channel, Infiniband™, and FICON (Fiber Connection) among others.

See Figure 11 below for common datacenter application reaches.

Note: Maximum channel lengths will increase or decrease based on higher or lower loss budgets.
For a more exhaustive application list, see http://www.panduit.com.

Application	Connectivity Budget (dB) 1.5* Fiber Category				
	OM3	OM4	OM4+ Signature Core™	OM5	OM5+ Signature Core™
	Maximum Channel Length (meters)				
10 Gb/s Ethernet (10GBASE-SR)	300	400	550	400	465
25 Gb/s Ethernet (25GBASE-SR)	90	125	160	125	140
50 Gb/s Ethernet (50GBASE-SR)	70	100	130	100	115
16G Fibre Channel (FC, SAN)	100	125	200	125	160
32G Fibre Channel (FC, SAN)	70	100	125	100	115
64G Fibre Channel (Duplex**) (FC, SAN)	70	100	125	100	100
128G Fibre Channel (FC, SAN)	60	85	95	85	90
Cisco® 40G BiDi	100	135	200	150	175
Cisco® 100G BiDi	70	100	150	150	150
40 Gb/s Ethernet (4x10) (40GBASE-SR4)	100	125	165	125	145
100 Gb/s Ethernet (4x25) (100GBASE-SR4)	70	100	125	100	115
40 Gb/s Ethernet (40G SWDM4)	240	350	440	440	485
100 Gb/s Ethernet (100G SWDM4)	75	100	150	150	185

Figure 11: Application Reach Table

*Two mated connector pairs @ 0.75dB/ea – 1.5dB.
**for 64GB Fibre Channel parallel versions, use 16G FC reach limits.
Cisco® is a registered trademark of Cisco Technology, Inc.

Guide for Measuring Panduit Fiber Cable Assembly Lengths

Proper measuring for Panduit fiber cable assembly lengths is straightforward but does require some detailed information about the data center layout. For the most accurate length measurements, it is best to work from layout drawings and know the specific equipment to be used, the cabinet dimensions, and the desired positions in the cabinets of enclosures and equipment (RU position).

The illustration below shows a typical data center link and the sections that must be considered to property measure for Panduit fiber cable assembly lengths. This example shows an overhead in-row installation. For other configurations, adjust accordingly. (For example, with underfloor configurations, measure down from the panels/enclosures to the pathway).

Recommended steps for measuring Panduit fiber cable assembly lengths:

1. Calculate or measure the length of each section of the link.
   a. Harness length: A1 + A2
   b. Horizontal cable length: B + C + D

2. Round the total upward to the nearest foot to get the minimum Panduit fiber cable assembly length
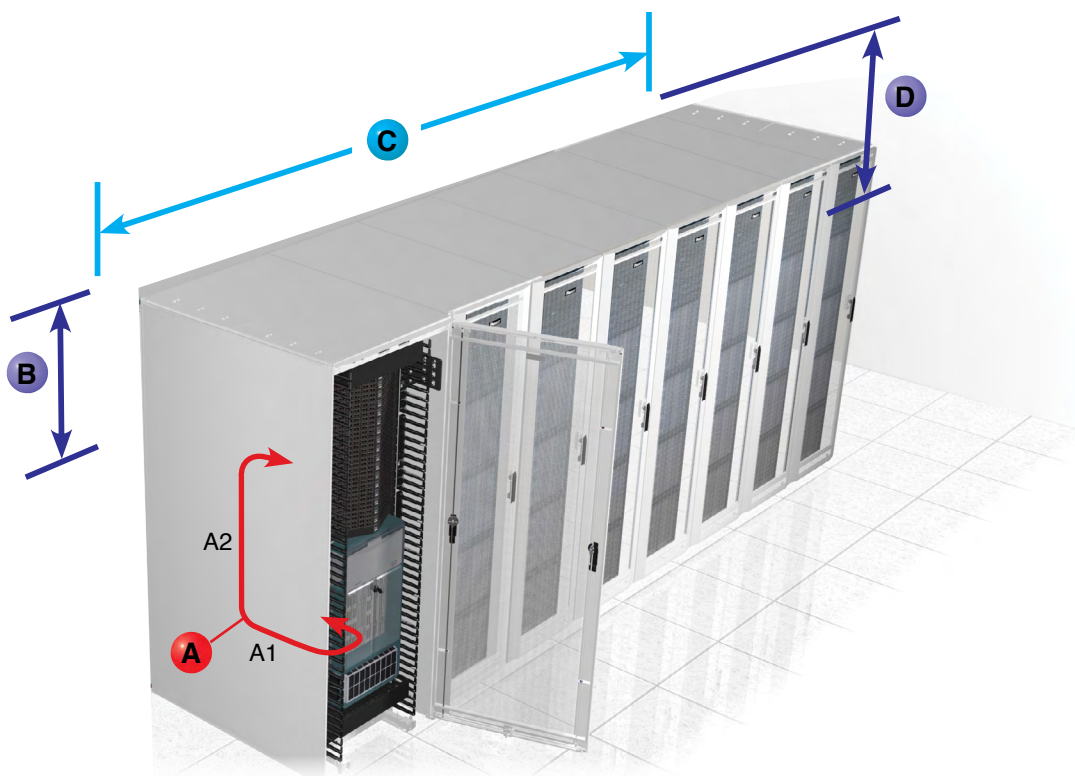
Figure 12: End of Row Link

Link Sections and Guide for Measuring:

A **In-cabinet length:** The total length of the cable inside the cabinet (A1 + A2).

    A1 – Horizontal distance from switch face to vertical manager – Panduit recommends 1m breakout or stagger to allow for cable routing and management.

    A2 – Distance from vertical manager to patch panel in cabinet – this can vary depending upon where the patch panel is located within the cabinet.

B **Patch panel-to-pathway length:** The distance from the patch panel in cabinet to the cable pathway.

C **Length along pathway:** The total distance along the pathway between the cabinet entry/exit points.

D **Pathway-to-patch panel length:** Similar to B.

Length Measurement Example
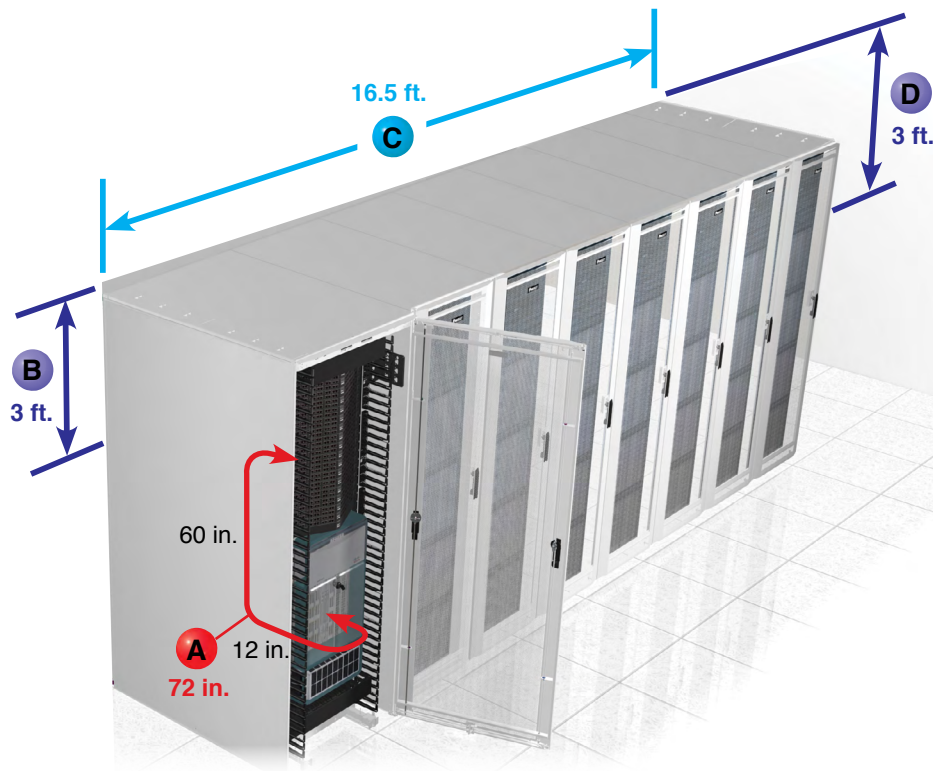
Figure 13: Measurement Example

Example: In-cabinet length: 72 in. (12 in. + 60 in.)

A A1 – Distance from switch plate to vertical manager = 12 in.

A2 – Distance from vertical manager to patch panel = 60 in.

B **Patch panel-to-pathway length:** 3 ft.

C **Length along pathway:** 16.5 ft. (assuming seven 24 in. wide server cabinets and cable exit on far side of 30 in. wide network cabinet = (7 x 2 ft.) + 30 in.)

D **Pathway-to-patch panel length:** 3 ft.

Total harness length = (12 in. + 60 in.) = 72 in. = **6 ft.**

Total horizontal cable length = (3 ft. + 16.5 ft. + 3 ft.) = 22.5 ft. = **23 ft.**

Tips for Measuring Lengths:
- The specified length of a QuickNet™ Fiber Cable Assembly is the distance as measured from the front of the connector on one end to the front of the connector on the other end. Other than a nominal manufacturing tolerance there is no additional length built into a QuickNet™ Fiber Cable Assembly.
- Remember to account for any turns or obstructions in the pathway that may lead to additional length needed (for example, ducting, support posts, etc.).
- Cable assembly bend radius limits must be taken into consideration, especially for multiple turns within cabinets or as the cable assembly transitions to or from the pathways, and may require additional length of the assembly.

Panduit Fiber Part Numbers

Fiber Cable Assemblies – Part Numbers
Opti-Core® Fiber Optic Patch Cords and Pigtails

Steps to Select:

1 Select Cable Options

2 Select Ends A and B

3 Select Construction/Performance

4 Select Length

1 Cable

2 End A **3** Const./Perf End B **2**

4 Length

Fiber	Cable				END A		END B		Const. Perf	Other		Length		
	Fiber	Count	Cable	Jacket	Connector	No Variant	Connector	No Variant		None	Unit	3-Digit Length		
F	**X**	**2**	**E**	**R**	**Q**	**1**	**Q**	**1**	**S**	**N**	**M**	**0**	**0**	**1**

Connector Type - End A
1 = LC Simplex
A = SC-APC
L = LC Duplex
Q = Push-Pull LC Duplex
SN = SC Duplex
U = Uniboot

Connector Variant (End A)
A = APC (OS2 Only)
1 = Push-Pull (LC Duplex Only)
N = No Variant

Meter

**Length
1m to 50m (001-050)
1m increments**

Fiber Type
9 = OS1/OS2 9/125µm
X = OM3 50/125µm
Z = OM4 50/125µm

Fiber Count
1 = 1-Fiber
2 = 2-Fiber(s)

Cable Type
3 = 3.0mm (standard for SC)
B = 900µm buffer (pigtail only)
E = 1.6mm (standard for LC)
R = Rounte 2.0mm (Uniboot Only)

Jacket Type
L = Low Smoke Zero Halogen (LSZH)
R = Riser (OFNR)
P = Plenum (OFNP)

Performance/Polarity
S = Optimized IL, Standard Polarity
O = Optimized IL, Standard Polarity* (Uniboot only)
N = Ultra IL, Standard Polarity

Connector Type - End B
1 = LC Simplex
A = SC-APC
L = LC Duplex
Q = Push-Pull LC Duplex
SN = SC Duplex
U = Uniboot

Connector Variant (End B)
1 = Push-Pull (LC Duplex Only)
A = APC (OS2 Only)
N = No Variant

Above part number FX2ERQ1Q1SNM001: Fiber, OM3 50/125µm 2-fiber 1.6mm riser, LC push-pull connector to LC push-pull connector, Standard IL, 1m.
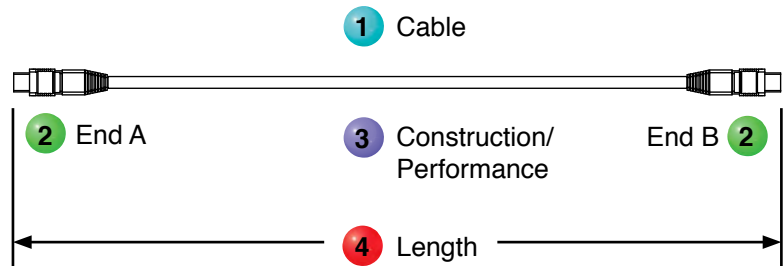
Panduit Fiber Part Numbers

Fiber Cable Assemblies – Part Numbers (continued)
QuickNet™ Round Interconnect Cable Assemblies

Steps to Select:

1 Select Cable Options

2 Select Ends A and B

3 Select Construction/Performance

4 Select Length

1 Cable

2 End A   **3** Construction/Performance   End B **2**

4 Length

Fiber		Cable			END A		END B		Const. Perf	Other	Length		
	Fiber	Count	Cable	Jacket	Connector	No Variant	Connector	No Variant		None	Unit	3-Digit Length	
F	X	T	R	P	7	N	7	N	A	N	M	0	0	1

Fiber Type
9 = OS2 9/125µm
X = OM3 50/125µm
Z = OM4 50/125µm

Fiber Count
T = 12-Fibers

Cable Type
R = 3.0mm round indoor

Jacket Type
L = Low Smoke Zero Halogen (LSZH)
P = Plenum (OFNP)

Connector Type - End A
5 = MPO Female (OS2 only)
6 = MPO Male (OS2 only)
7 = PanMPO™ Female
8 = PanMPO™ Male

Connector Type - End B
5 = MPO Female (OS2 only)
6 = MPO Male (OS2 only)
7 = PanMPO™ Female
8 = PanMPO™ Male

Polarity/Performance
A* = Method A - Standard IL
B* = Method B - Standard IL
X = Method A - Optimized IL
Y = Method B - Optimized IL
*A & B Performance Modes are for OS2 ONLY

Length
1m to 50m (001-050)
1m increments
3 Ft. to 150 Ft. (003 - 150)
1 Ft. Increments

Unit of Length
M = Meters
F = Feet

**Above part number FXTRP7N7NANM001:** Fiber, OM3 50/125µm 12-fiber 3.0mm round indoor OFNP cable with PanMPO™.
*PanMPO™ Option is only available with multimode (OM3/OM4) assemblies.

Panduit Fiber Part Numbers

Fiber Cable Assemblies – Part Numbers (continued)
QuickNet™ Small Diameter Trunk Cable Assemblies

Steps to Select:

1 Select Cable Options

2 Select Ends A and B

3 Select Construction/Performance

4 Select Transition Option and Length

1 Cable

2 End A   **4** Transition   **3** Construction/ Performance   End B **2**
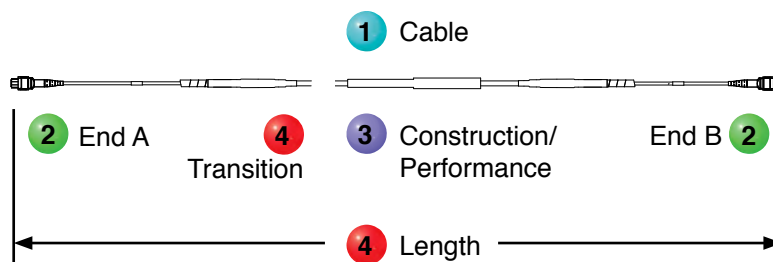
4 Length

Fiber				END A	END B	Const. Perf	Transition			Length		
	Cable	Count	Type	Jacket	Connector A	Connector B				Unit		3-Digit Length
F	Y	X	T	P	7	7	Y	0	0	1	F	0	3	0

Cable Type
T = Indoor Trunk (> 48-Fibers)
Y = Indoor Small Diameter Trunk Cable

Fiber Type
9 = OS2 9/125µm
S = OM4+ 50/125µm
X = OM3 50/125µm
Z = OM4 50/125µm

Fiber Count
T = 12-Fibers
U = 24-Fibers
W = 48-Fibers
X* = 72-Fibers
Y* = 96-Fibers
A* = 144-Fibers
72, 96, 144 fibers are ONLY available in Standard Transition 005 or 006 (see Serial Table)

Jacket Type
B = Euroclass B2ca
L = Low Smoke Zero Halogen (LSZH)
P = Plenum (OFNP)

**Connector Type -
End A / End B**
55 = 12-Fiber MPO Female to MPO Female (OS2 only)
66 = 12-Fiber MPO Male to MPO Female (OS2 only)
77 = 12-Fiber PanMPO Female to PanMPO Female
88 = 12-Fiber PanMPO Male to PanMPO Male

Polarity/Performance
A = OS2, Method A, Standard IL
B = OS2, Method B, Standard IL
X = OM3/OM4, Method A - Optimized IL
Y = OM3/OM4, Method B - Optimized IL
K = OM4+, Method A, Ultra IL
L = OM4+, Method B, Ultra IL

Serial	Transition	Pulling Eye
001	HD Flex™	Yes
002	HD Flex™	No
005	Standard	Yes
006	Standard	No

Length
15 Ft. to 999 Ft. (015-999)
1 Ft. Increments

Unit of Length
F = Feet

Above part number FYXTRP77Y001F030: OM3 12-Fiber HDFlex™ Indoor Small Diameter Trunk,plenum 1x12F PanMPO™ Female with 1m breakout to 1x12F PanMPO™ Female with 1m breakout, Polarity B, optimized IL, pulling eye end A, 30' fiber.
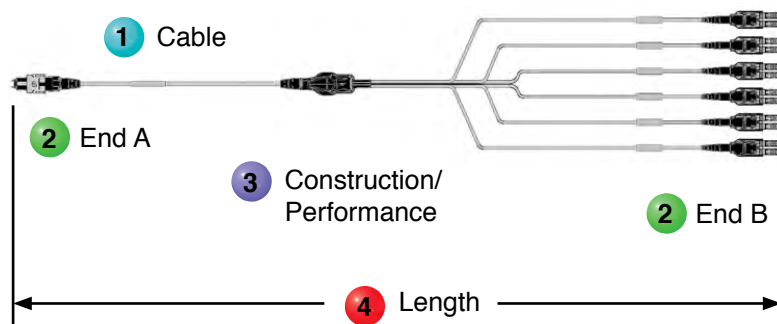
Panduit Fiber Part Numbers

Fiber Cable Assemblies – Part Numbers (continued)
QuickNet™ Harness and Staggered Harness Cable Assemblies

Steps to Select:

1 Select Cable Options

2 Select Ends A and B

3 Select Construction/Performance

4 Select Length

1 Cable

2 End A

3 Construction/Performance

2 End B

4 Length

Fiber		Cable		END A		END B		Const. Perf	Other	Length		
	Fiber	Count	Cable	Jacket	Connector	Variant	Connector	Variant		None	Unit	3-Digit Length
F	X	T	R	P	6	N	L	S	S	N	M	0	0	3

Fiber Type
9 = OS1/ OS2 9/125µm
X = OM3 50/125µm
Z = OM4 50/125µm

Fiber Count
8 = 8-Fiber
T = 12-Fiber

Cable Type
H = Flat ribbon (OS1/OS2)
R = 3.0mm round indoor (OM3/OM4)

Jacket Type
L = Low Smoke Zero Halogen (LSZH)
P = Plenum (OFNP)

Connector Type - End A
5 = MPO Female (OS2 only)
6 = MPO Male (OS2 only)
7 = PanMPO™ Female
8 = PanMPO™ Male

Connector Type - End B
L = LC Duplex
U = LC Uniboot PanMPO (OM3/OM4 only)

Connector Varient
D = 1m equal breakout
S = 61cm equal breakout
N = No variant
F = Staggered pair 1 longest breakout
G = Staggered pair 1 shortest breakout
H = Staggered pairs 1 and 2 longest breakouts
J = Staggered pairs 1 and 2 shortest breakouts

Polarity/Performance
S = Standard Polarity - Standard IL
O = Standard Polarity, Optimized IL
Q = 40GbE Migration

Length
1m to 30m (001-030) 1m increments
3 Ft. to 100 Ft. (003 - 100) 1 Ft. Increments

Unit of Length
M = Meters
F = Feet

Above part number FXTRP6NLSSNM003: Fiber, OM3 50/125um 12-Fiber 3.00mm round OFNP with MPO male connectors with no variant on End A and LC Duplex connectors with 61cm equal breakout on End B, Standard IL – straight thru (MPO Discrete), 3m in length.

*PanMPO™ Option is only available with multimode (OM3/OM4) assemblies.

Note: Harness and Staggered Harness Cable Assemblies are not intended to be used for breakout or data rate migration solutions.
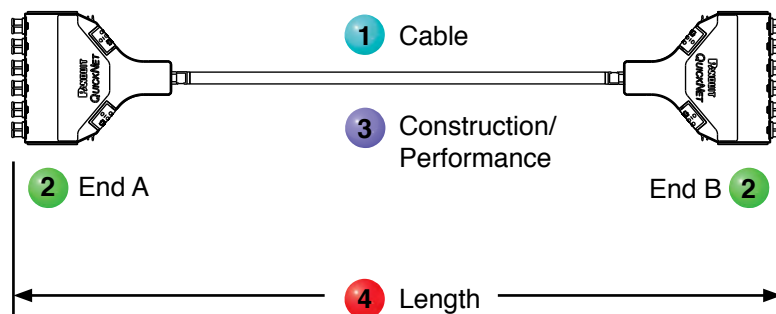
Panduit Fiber Part Numbers

Fiber Cable Assemblies – Part Numbers (continued)
QuickNet™ SFQ Trunk Cable Assemblies

Steps to Select:

1 Select Cable Options

2 Select Ends A and B

3 Select Construction/Performance

4 Select Length

1 Cable

3 Construction/Performance

2 End A

End B **2**

4 Length

Fiber	Cable			END A		END B		Const. Perf	Other	Length		
	Fiber	Count	Cable	Jacket	Connector	Variant	Connector	Variant		None	Unit	3-Digit Length
F	X	T	S	P	X	N	X	N	S	N	M	0	3	0

Fiber Type
9 = OS1/ OS2 9/125µm
X = OM3 50/125µm
Z = OM4 50/125µm

Fiber Count
T = 12-Fibers
W = 48-Fibers
X = 72-Fibers
Y = 96-Fibers

Cable Type
S = Indoor trunk

Jacket Type
L = Low Smoke Zero Halogen (LSZH)
P = Plenum (OFNP)

Connector Type - End A
V = MPO Female Cassette
X = LC Cassette (12-F only)
Y = MPO Male Cassette

Connector Variant
2 = 2.0mm upjacket (LC only)
E = 39" Breakout (MPO only)
N = No Variant (Cassette only)

Connector Type - End B
5 = MPO Female Connectors
6 = MPO Male Connectors
V = MPO Female Cassette
X = LC Cassette (12-F only)
Y = MPO Male Cassette
L = LC Duplex Connectors

Polarity/Performance
A = Method A - Standard IL (MPO-MPO)
S = Standard Polarity, Standard IL (MPO-LC, LC-LC)

Connector Variant
2 = 2.0mm upjacket (LC only)
E = 39" Breakout (MPO only)
N = No Variant (Cassette only)

Length
5m to 30m (005-030)
1m increments
15 Ft. to 100 Ft. (015 - 100)
1 Ft. Increments

Unit of Length
M = Meters
F = Feet

Above part number FXTYPXNXNONF030: Fiber, OM3 50/125µm 12-Fiber indoor trunk plenum cable with QuickNet® LC Cassettes on each end with no variant, Polarity A, Standard IL, 30 feet in length.

*PanMPO™ Option is only available with multimode (OM3/OM4) assemblies.

Selecting Fiber Optic Cassettes to Support Panduit Fiber Cabling System Deployments

SFQ, Opticom®, and HD Flex™ Cassettes are available in OS1/OS2, OM3, OM4, and Signature Core™

Modular Cassettes

QuickNet™ SFQ

- Streamlined and flexible connectivity solution for use in main, horizontal and equipment distribution areas
- Snap-in rear mount allows for easy installation into an open rack
- Pre-terminated LC, SC and MPO* adapters for quick deployment
- Offered in a wide range of performance and polarity configurations (including 4-to-1 break-out)
- SFQ cassette part numbers begin with FQ and FQ3 (4-to-1 break-out)
- SFQ cassettes snap-in QuickNet™ Angled (QAPP24BL) and Flat (QPP24BL) Patch Panels

Opticom® Cassettes

- Flexible connectivity solution for use in main, horizontal and equipment distribution areas
- Snap-in front mount allows for easy installation into adapter patch panels or cassette enclosures
- Pre-terminated LC, SC and MPO* adapters for quick deployment
- Offered in a wide range of performance and polarity configurations (including 4-to-1 break-out)
- OptiCom® Cassette part numbers begin with FC2 and FC3 (4-to-1 break-out)
- OptiCom® Cassettes snap-in OptiCom® Fiber Adapter Patch Panels (CFAPPBL1) and QuickNet™ Fiber Cassette Enclosures (FCE1U, FRME1U, FMT1)

HD Flex™ Cassettes

- Flexible connectivity solution for use in main, horizontal and equipment distribution areas
- Supports deployment options for both Ethernet and Fibre Channel networks
- Provides options for Ultra Low Loss (IL)
- Many options available for reach and breakout construction to fit application requirements
- Provides flexibility and manageability for lower installation costs
- LC connectors contain integral shutters to help prevent contamination

Selecting Fiber Optic Cassettes to Support Panduit Fiber Cabling System Deployments (continued)

QuickNet™ SFQ Series MPO* Fiber Optic Cassettes

Fiber	Cable				Fiber Count		Adapter		Polarity/Performance
Fiber	Type	Type	Perf.		Count		Adapter		Polarity
F	**Q**	**X**	**O**	**-**	**1 2**	**-**	**1**	**0**	**A**	**S**

Fiber Product
F = Fiber

Product Type
Q = QuickNet™

Fiber Type
9 = OS1/OS2 9/125µm (available with standard loss only)
X = OM3 10Gig 50/125µm
Z = OM4 10Gig 50/125µm
S = Signature Core OM+ Fiber, Available with ultra low loss only and in 12-Fiber LC

Fiber Performance
N = Standard IL (0.75dB Max)
O = Optimized IL (0.5dB Max)

Dash

Fiber Count
06 = 6-Fiber Total
08 = 8-Fiber Total
12 = 12-Fiber Total

Dash

Adapter Type
03 = Duplex SC Adapter (6-Fiber Only)
10 = Duplex LC Adapter (8 or 12-FIber Only)

Polarity/Performance
AS = Method A, Standard
AF = Modified Method A, pair-flipped
U = Universal

Above part number FQXO-12-10AS: QuickNet™ OM3 10Gig 50/125µm Optimized IL, 12-Fiber Duplex LC, Method A, Standard Cassette.

Selecting Fiber Optic Cassettes to Support Panduit Fiber Cabling System Deployments (continued)

Opticom® Fiber Optic Cassettes
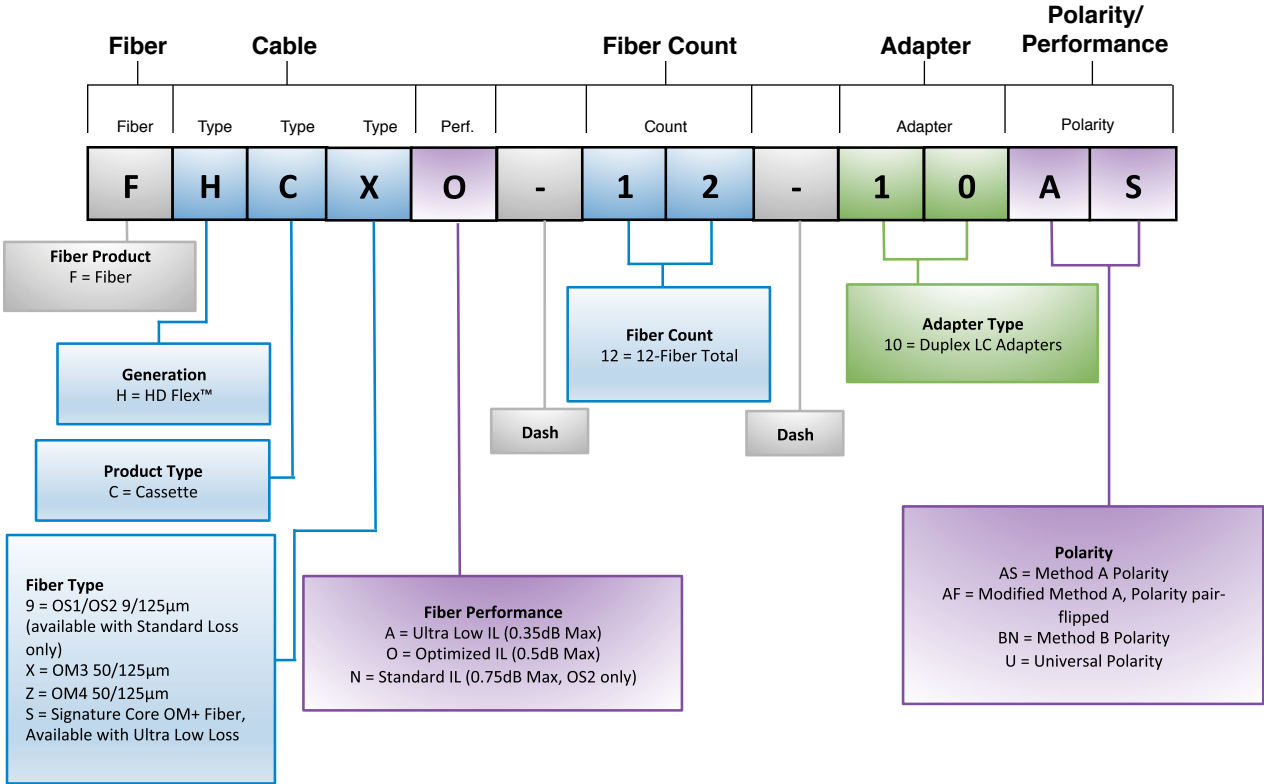
Fiber		Cable				Fiber Count		Adapter		Polarity/Performance
Fiber	Type	Type	Type	Perf.		Count		Adapter		Polarity
F	C	2	Z	O	-	2 4	-	1 0	A	S

Fiber Product
F = Fiber

Product Type
C = Cassette

Generation
2 - Second Generation

Fiber Type
9 = OS1/OS2 9/125μm (available with standard loss only)
X = OM3 10Gig 50/125μm
Z = OM4 10Gig 50/125μm

Fiber Performance
N = Standard IL (0.75dB Max)
O = Optimized IL (0.5dB Max)

Dash

Fiber Count
06 = 6-Fiber Total
08 = 8-Fiber Total
12 = 12-Fiber Total

Dash

Adapter Type
03 = Duplex SC Adapter (6 or 12-Fiber Only)
10 = Duplex LC Adapter (12 or 24-Fiber Only)
3S = Simplex SC Adapter (6 or 12-Fiber Only)

Polarity/Performance
AS = Method A, Standard
AF = Modified Method A, pair-flipped
B1 = Method B, B1 (1-1 array) *
B2 = Method B, B2 (1-12 array) *
*B1 needs to be paired with B2
*B2 needs to be paired with B1

Above part number FC2ZO-24-10AS: Opticom® OM4 24-Fiber Optimized IL, with Duplex LC Adapters, Method A.

Selecting Fiber Optic Cassettes to Support Panduit Fiber Cabling System Deployments (continued)

HD Flex™ Fiber Optic Cassettes (6-Port Duplex LC to MPO)*

Fiber	Cable				Fiber Count		Adapter	Polarity/Performance
Fiber	Type	Type	Type	Perf.	Count		Adapter	Polarity
F	**H**	**C**	**X**	**O**	**-**	**1 2**	**-**	**1 0**	**A S**

Fiber Product
F = Fiber

Generation
H = HD Flex™

Product Type
C = Cassette

Fiber Type
9 = OS1/OS2 9/125µm (available with Standard Loss only)
X = OM3 50/125µm
Z = OM4 50/125µm
S = Signature Core OM+ Fiber, Available with Ultra Low Loss

Fiber Performance
A = Ultra Low IL (0.35dB Max)
O = Optimized IL (0.5dB Max)
N = Standard IL (0.75dB Max, OS2 only)

Fiber Count
12 = 12-Fiber Total

Dash

Dash

Adapter Type
10 = Duplex LC Adapters

Polarity
AS = Method A Polarity
AF = Modified Method A, Polarity pair-flipped
BN = Method B Polarity
U = Universal Polarity

Above part number FHCXO-12-10AS: HD Flex™ OM3 50/125µm 12-Fiber Optimized IL, with Duplex LC Adapters, Method A Standard Cassette.

*For all other HD Flex™ Cassette configurations, please reference this guide:
https://www.panduit.com/content/dam/panduit/en/support/flex-fiber-cabling/spec-sheets/HD-Flex-Fiber-Optic-Cassettes.pdf,
or search Panduit.com for document "FBSP96--WW-ENG".

Panduit Fiber Accessory Part Numbers
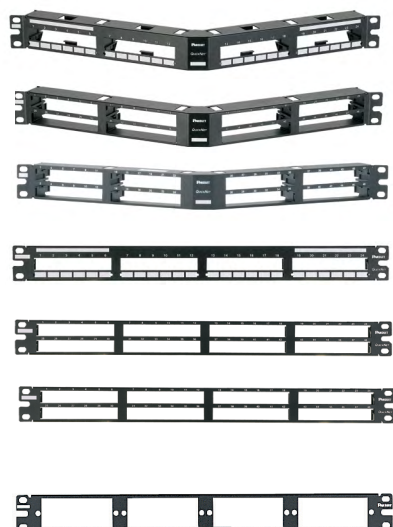
Common Accessories (QuickNet™ and Opticom®)

QuickNet™ Patch Panels
- Designed to enable rapid installation
- Available in angled or flat versions, standard or all metal, Black or White (replace 'BL' with 'WH' in part number)
- Standard density (24 ports in 1 RU) or high density (48 ports in 1 RU)
- QuickNet™ Patch Panels include horizontal numbering; for cassette-terminated switch port harnesses, QuickNet™ Patch Panels with vertical numbering are available with odd numbers across the top row of ports and even numbers across the bottom (to emulate switch port numbering)

QuickNet™ Patch Panel Blank
- QuickNet™ Panel Blanks are available to block out temporarily unused openings in QuickNet™ Patch Panels to ensure proper airflow

Other variations may be possible, contact Panduit Customer Service for more information.

Part Number	Part Description
QuickNet™ Angled Patch Panels (for SFQ Cassettes)	
QAPP24BL	24-port, angled patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters.
QAPP48HDBL	48-port, angled patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters.
QAPP48HDVNSBL	48-port, angled patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters. Numbering sequence is top to bottom across patch panel.
QPP24BL	24-port, patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters.
QPP48HDBL	48-port, patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters.
QPP48HDVNSBL	48-port, patch panel which accepts QuickNet™ Pre-Terminated Cassettes and Patch Panel Adapters. Numbering sequence is top to bottom across patch panel.
QuickNet™ Patch Panel Blank	
QPPBBL	QuickNet™ Patch Panel Blank reserves space for future use and promotes proper airflow and cooling. Use QPPLC24 for label/label cover.
QuickNet™ Patch Panel Label Kit	
QPPLC24	Label/label cover kit for 24-port QuickNet™ Patch Panels. Each kit contains four labels and four clear label covers per bag.
QuickNet™ Cassette Rear Cable Manager (for SFQ Cassettes)	
FQCRCM	Manages up to one meter of slack for each of 16 MTP* interconnect cables in support of QuickNet™ SFQ Cassettes, QuickNet™ HDQ Cassettes, or QuickNet™ MTP Cassettes.
Opticom® Fiber Adapter Patch Panels (for Opticom® Cassettes)	
CFAPPBL1	Flat fiber patch panel. Holds up to four FAP or FMP adapter panels. Also available in angled (FCAPPBL1A) and (CFAPPBL2 and CFAPPBL2A).
Opticom® QuickNet™ Fiber Cassette Enclosures (for Opticom® Cassettes)	
FCE1U	Holds up to four QuickNet™ Cassettes, FAP adapter panels. Also available in FCE2U.

Panduit Fiber Accessory Part Numbers (continued)

Common Accessories continued (HD Flex™)

Part Number	Part Description
HD Flex™ Fiber Enclosures (For HD Flex™ Cassettes)	
FLEX1U06**	Modular design accepts up to 12 HD Flex™ Fiber Cassettes or Fiber Adapter Panels per 1 RU. Compatible with all HD Flex™ Fiber Cassettes and Fiber Adapter Panels, rack/cabinet rail mounting cable management bracket, front and rear accessible enclosure tray, split enclosure tray, multi-positional enclosure tray.
FLEX4U06**	Modular design accepts up to 12 HD Flex™ Fiber Cassettes or Fiber Adapter Panels per 1 RU. Compatible with all HD Flex™ Fiber Cassettes and Fiber Adapter Panels, rack/cabinet rail mounting cable management bracket, front and rear accessible enclosure tray, split enclosure tray, multi-positional enclosure tray. For a total of up to 48 HD Flex™ Cassettes.
HD Flex™ Patch Panels	
FLEX1UPN06**	1 RU HD Flex™ 6-Port Enclosure with (12) cassette/FAP openings
FLEX4UPN06**	4 RU HD Flex™ 6-Port Enclosure with (12) cassette/FAP openings.
HD Flex™ Accessories - Rear Cable Managers	
FLEX-RCM1U**	1 RU HD Flex™ Rear Cable Manager.
FLEX-RCM4U**	4 RU HD Flex™ Rear Cable Manager.
HD Flex™ Accessories - Front Cable Managers	
FLEX-FCM1UA**	1 RU HD Flex™ Front Cable Manager.
FLEX-FCM4UA**	4 RU HD Flex™ Front Cable Manager.
HD Flex™ Accessories – Flex Plate	
FLEX-PLATE1UPR**	1 RU HD Flex™ Enclosure Trunk Slack Plate and Cover
FLEX-PLATE4UPR**	4 RU HD Flex™ Enclosure Trunk Slack Plate and Cover.
FLEX-PLATE1UR**	1 RU HD Flex™ Enclosure Trunk Slack Plate.
FLEX-PLATE4UR**	4 RU HD Flex™ Enclosure Trunk Slack Plate.

**Offered in White (add WH to part number for White).

For more options, visit: https://www.panduit.com/content/dam/panduit/en/support/flex-fiber-cabling/HD-Flex-Order-Guide.pdf

Complete Solutions from Panduit

Panduit cabinet and rack systems offer a portfolio of innovative products with modular designs for greater thermal management, with energy efficiency, and effective space utilization while managing, showcasing, and protecting equipment.

The Panduit Difference

Panduit is committed to delivering a consistently high level of quality and service the world over. With a presence in more than 100 countries, local Panduit sales representatives and technical specialists offer guidance and support that bring value to your business. Our global supply chain, which includes manufacturing, customer service, logistics, and distribution partners, provides prompt response to your inquiries and streamlines delivery to any worldwide destination.

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