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Fiber Optic Transceiver Breakout
Cable Ordering Guide: Cisco Nexus

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Step 1:

Identify your breakout cable assembly by performance level, fiber type and connector end for your application

Did you know?

• As you increase data rates, reach decreases

• Only 10% of data centers exceed 100m

• Every connection introduces dB loss which further reduces the distance

Performance Level	Fiber Type	Cisco Transceiver Part Number: End 1	Cisco Transceiver Part Number: End 2	Scenario References*
800G to 100G (x8)	SMF	**QDD-8X100G-FR** 2km Reach Parallel G.652 Singlemode Fiber Dual MPO-12 Male Connectors	**QSFP-100G-DR-S (x8) or QSFP-100G-FR-S (x8) or QSFP-100G-LR-S (x8)** 2km Reach (only 500m for DR-S) Duplex G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
400G to 100G (x4)	MMF	**QDD-400G-SR4.2-BD** 70m OM3, 100m OM4/OM5 Reach Parallel Multimode Fiber MPO-12 Male Connector	**QSFP-100G-SR1.2** 100m reach Parallel Multimode Fiber Duplex LC Connector	Table 1 or 2
400G to 100G (x4)	SMF	**QDD-400G-DR4-S** 500m Reach Parallel G.652 Singlemode Fiber MPO-12 Male Connector	**QSFP-100G-FR-S (x4) or QSFP-100G-DR-S (x4), or QSFP-100G-LR-S (x4)** 500m Reach Duplex G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
400G to 100G (x4)	SMF	**QDD-4X100G-FR-S** 2km Reach Parallel G.652 Singlemode Fiber MPO-12 Male Connector	**QSFP-100G-FR-S (x4) or QSFP-100G-DR-S (x4), or QSFP-100G-LR-S (x4)** 2km Reach Parallel G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
400G to 100G (x4)	SMF	**QDD-4X100G-LR-S** 10km Reach Parallel G.652 Singlemode Fiber MPO-12 Male Connector	**QSFP-100G-FR-S (x4) or QSFP-100G-DR-S (x4), or QSFP-100G-LR-S (x4)** 10km Reach Parallel G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
200G to 100G (x2)	MMF	**QDD-2X100-SR4-S** 100m Reach Parallel Multimode Fiber MPO-24 Male Connector	**QSFP-100G-SR4-S (x2)** 100m Reach Parallel Multimode Fiber Duplex LC Connector	Table 1 or 2
200G to 100G (x2)	SMF	**QDD-2X100-CWDM4-S** 2km Reach Duplex SMF Fiber Dual Duplex CS	**QSFP-100G-CWDM4-S (x2) or QSFP-100G-SM-SR (x2)** 2km Reach Singlemode Fiber Duplex LC Connector	Table 3 Only

*Scenario References: Tables 1 and 3 utilize breakout cassettes, Tables 2 and 4 utilize breakout harness cabling.

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Step 1: continued

Identify your breakout cable assembly by performance level, fiber type and connector end for your application

Performance Level	Fiber Type	Cisco Transceiver Part Number: End 1	Cisco Transceiver Part Number: End 2	Scenario References*
200G to 100G (x2)	SMF	**QDD-2X100-LR4-S** 10km Reach Duplex SMF Fiber Dual Duplex CS	**QSFP-100G-LR4-S (x2)** 10km Reach Duplex SMF Fiber Duplex LC Connector	Table 3 Only
100G to 25G (x4)	MMF	**QSFP-100G-SL4** 30M OM4 Reach Parallel Multimode Fiber MPO-12 Male Connector	**SFP-25G-SL (x4) or** **SFP-25G-SR-S (x4)** 30M OM4 Reach Parallel Multimode Fiber Duplex LC Connector	Table 1 or 2
100G to 25G (x4)	MMF	**QSFP-100G-SR4-S** **70m OM3, 100m OM4/OM5 Reach** Parallel Multimode Fiber MPO-12 Male Connector	**QSFP-100G-FR-S (x4) or** **QSFP-100G-DR-S (x4), or** **QSFP-100G-LR-S (x4)** 500m Reach Duplex G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
100G to 25G (x4)	SMF	**QDD-4X100G-FR-S** 2km Reach Parallel G.652 Singlemode Fiber MPO-12 Male Connector	**SFP-25G-SR-S (x4) or** **SFP-25G-SL** 70m OM3, 100m OM4/OM5 Reach Duplex Multimode Fiber Duplex LC Connectors	Table 1 or 2
40G to 10G (x4)	SMF	**QSFP-4X10G-LR-S** 10km Reach Parallel G.652 Singlemode Fiber MPO-12 Male Connector	**SFP-10G-LR-S (x4) OR** **SFP-10/25G-LR-S (x4)** 10km Reach Duplex G.652 Singlemode Fiber Duplex LC Connector	Table 3 or 4
	MMF	**QSFP-40G-SR4** 100m OM3, 150m OM4/OM5 Reach Parallel Multimode Fiber MPO-12 Male Connector **QSFP-40G-CSR4** 300m OM3, 400m OM4/OM5 Reach Parallel Multimode Fiber MPO-12 Male Connector	**SFP-10G-SR-S (x4)** 100m OM3, 150m OM4/OM5 Reach **OR** **SFP-10/25G-CSR-S (x4) 300m OM3,** **4**00m OM4/OM5 Reach Duplex Multimode Fiber Duplex LC Connector	Table 1 or 2

*Scenario References: Tables 1 and 3 utilize breakout cassettes, Tables 2 and 4 utilize breakout harness cabling.

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Step 1: (continued)
Identify your breakout cable assembly by performance level, fiber type and connector end for your application

Description

QDD-8X100G-FR

The **QDD-8X100G-FR** module supports 100G breakout link lengths of up to 2 km. The module has eight pairs of single-mode fiber with MPO-12 APC connectors. It is compliant to the IEEE 802.3cu for 100GBASE- FR1. The 400 Gigabit Ethernet signal is carried over eight parallel lanes by one wavelength per lane. It can be used as 8x100G breakout to QSFP28 100G-DR (up to 500 m), 100G-FR (2 km), and 100GLR (2 km). It may also be used as two independent 400GBASE-DR4 transceivers in a single port. FEC is performed on the host platform.

QDD-400G-SR4.2-BD

The **QDD-400G-SR4.2-BD** module supports link lengths of up to 150m over. The module has 4 pairs using two wavelengths for both Tx and Rx bidirectionally (850nm and 910nm). This is accomplished using pairs 1-4 and 9-12 of a MPO-12 connector, which can be broken out to Duplex LC.

QDD-400G-DR4-S

The **QDD-400G-DR4-S** module supports link lengths of up to 500m parallel singlemode fiber (SMF) with MPO-12 connector. It is compliant to IEEE 802.3bs protocol and 400GAUI-8/CEI-56G-VSR-PAM4 standards. The 400 GbE signal is carried over four parallel lanes by one wavelength per lane. This transceiver requires patch cords with Angled Physical Contact (APC) MPO connectors. It can be used as 4 x100G breakout to QSFP28-100G-FR-S. FEC is performed on the host platform

QDD-4X100-FR-S

The **QDD-4X100-FR-S** module supports link lengths of up to 2km parallel singlemode fiber (SMF) with an MPO-12 connector. It is compliant to IEEE 802.3cu protocol. The 400GbE signal is carried over four parallel lanes by one wavelength per lane. This transceiver requires patch cords with Angled Physical Contact (APC) MPO connectors.

QDD-4X100G-LR-S

The **QDD-4X100G-LR-S** module supports link lengths of up to 10km parallel singlemode fiber (SMF) with a n MPO-12 connector. It is compliant to the IEEE 802.3cu 100GBASE-LR1, and 400GAUI-8/CEI-56G VSRPAM4 standards. The 400GbE signal is carried over four parallel lanes by one wavelength per lane. It can be used as 4x100G breakout to QSFP28 100G-DR, 100G-FR, and 100G-LR. This transceiver requires patch cords with Angled Physical Contact (APC) MPO connectors. FEC is performed on the host platform.

QDD-2X100-SR4-S

The **QDD-2X100-SR4-S** module supports link lengths of up to 100m on OM4 MMF with an MPO-24 connector. It is compliant to IEEE 802.3 100GBASE-SR4 requirements. The module provides backwards compatibility to two 100GBASE-SR4 transceivers, improving port efficiency to legacy 100G optical interfaces
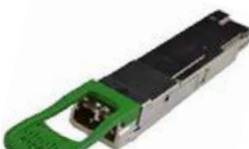
QDD-2X100-CWDM4-S

The **QDD-2X100-CWDM4-S** module supports link length of up to 2km over SMF and uses a dual duplex CS connector. It is compliant to the 100G-CWDM4 MSA. The 100GbE signal is carried over four CWDM grid optical wavelengths at 25Gb/s each. FEC is performed on the host platform.

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Step 1: (continued)
Identify your breakout cable assembly by performance level, fiber type and connector end for your application

Description

QDD-2X100-LR4-S

The **QDD-2X100-LR4-S** module supports link lengths up to 10km over SMF and uses a dual duplex CS connector. It is compliant to IEEE 802.3 100GBASE-LR4 requirements. The module provides backward compatibility to two 100GBASE-LR4 transceivers, improving port efficiency to legacy 100G optical interfaces.

QSFP-100G-SL4

The **QSFP-100G-SL4** module supports link lengths up to 30m over OM4 MMF with MPO-12 connectors. It primarily enabled high-bandwidth optical links over 12-fiber parallel fiber terminated with MPO connectors. This transceiver supports 100GBase Ethernet rate. it is interoperable with QSFP-100G-SR4-S and SFP-25G-SL or SFP-25G-SR-S in breakout mode where in all cases the reach is limited to 30 m.

QSFP-100G-SR4-S

The **QSFP-100G-SR4-S** module supports link lengths up to 100m over OM4 MMF with MPO-12 connectors. It primarily enables high-bandwidth 100G optical links over 12-fiber parallel fiber terminated with MPO connectors. This transceiver supports 100GBase Ethernet rate.

QSFP-100G-PSM4-S

The **QSFP-100G-PSM4-S** module supports link lengths up to 500m over SMF with MPO-12 connectors. The 100GbE signal is carried over 12-fiber parallel fiber terminated with MPO connectors.

QSFP-4X10G-LR-S

The **QSFP-4X10G-LR-S** module supports link lengths up to 10km over SMF with MPO-12 connectors. It enables high-bandwidth 40G optical links over 12-fiber parallel fiber terminated with MPO connectors. It is optimized to guarantee interoperability in 4x10G mode over the full specification rang of 10GBASE-LR and the SFP-10/25G-LR-S (in 10G mode). QSFP-4X10G-LR-S does not support FCoE.

QSFP-40G-SR4

The **QSFP-40G-SR4** module supports link lengths up to 150M on OM4 MMF. It primarily enables high-bandwidth 40G optical links over 12-fiber parallel fiber terminated with MPO connectors. It is interoperable with any IEEE 40GBASE-SR4 and in 4x10G mode with 10GBASE-SR and SFP-10/25G-CSR (in 10G mode). It can also be used in a 4x10G breakout mode for interoperability with 10GBASE-SR and SFP-10/25GCSR-S (in 10G mode) interfaces up to 150m on OM4. The 4x10G connectivity is achieved using an external 12-fiber parallel to 2-fiber duplex breakout cable, which connects the 40GBASE-SR4 module to four 10GBASE-SR optical interfaces.

QSFP-40G-CSR4

The **QSFP-40G-CSR4** module supports link lengths up to 400m on parallel OM4 MMF fiber using MPO-12 connectors. Each 10G lane of this module is compliant to the IEEE 10GBASE-SR specification. This module can be used for native 40G optical links over 12-fiber parallel cables with MPO connectors or in a 4x10G breakout mode with parallel to duplex fiber breakout cables for connectivity to four 10GBASE-SR interfaces. Cisco QSFP-40G-CSR4 is optimized to guarantee interoperability over the complete specification range of 10GBASE-SR.

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Step 1: (continued)
Identify your breakout cable assembly by performance level, fiber type and connector end for your application

Description (non-breakout transceivers)
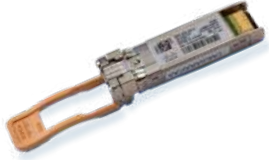
SFP-25G-SR-S

The **SFP-25G-SR-S** module supports a link length of 70/100m on OM3/4 multimode fiber (MMF). This module requires RS-FEC on the host ports.

SFP-10/25G-CSR

The **SFP-10/25G-CSR** module supports a link length of up to 300/400m over OM3/4 at 10G, and up to 300/400m over OM3/4 at 25G*. It also supports link lengths of 82m over OM2 at 10G, and up to 70m over OM2 at 25G. This module requires RS-FEC on the host port for full reach operation at 25G. Using BASE-R FEC the module can support 70/100m over OM3/4 and with-out FEC it can support 30/50m over OM3/4 at 25G*. For 10G operation FEC is not required.

SFP-10/25G-LR-S

The **SFP-10/25G-LR-S** module supports a link length of 10km on standard singlemode fiber (SMF) G.652 at both 10G and 25G. This module requires RS-FEC on the host ports for operation at 25G.

10GBASE-SR

The **10GBASE-SR** module supports a link length of 26m on standard Fiber Distributed Data Interface (FDDI) grade multimode fiber (MMF). Using 2000 MHz*km MMF (OM3), up to 300m link lengths are possible. Using 4700 MHz*km MMF (OM4), up to 400m link lengths are possible.

10GBASE-LR

The **10GBASE-LR** module supports a link length of 10km on standard G.652 singlemode fiber (SMF).

Cisco Resources:
Cisco Optics-to-Device Compatibility Matrix visit, https://tmgmatrix.cisco.com.
Cisco Optics-Innovation for the 400G era and beyond, visit www.cisco.com/go/optics.

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Step 2:

Identify the enclosure system(s) that meet your application needs. Universal wired fiber cassettes provide optimal interoperability across fiber cabling systems.

For more information about universal wired fiber cassettes, see our video.

HD Flex™ Fiber Enclosures

The HD Flex™ Fiber Cabling System is the highest density solution designed to set you free by removing the barriers of architecture, deployment, scalability and maintenance challenges.

- Provides up to 144 fibers (72 duplex ports) per RU of density

- Enclosures and panels are adaptable between 4, 6, and 12-port configurations

- Split tray feature allows each half of the tray to be pulled out independently

For more information about the HD Flex™ Fiber Cabling System, reference the system brochure or visit panduit.com/hdflex

QuickNet™ Patch Panels

Panduit QuickNet™ Patch Panels provide the flexibility to deployment both copper and fiber connectivity in the same RU.

- High-density patch panels conserve valuable rack space with 96 fibers (48 duplex ports) per RU

- Available in flat or angled patch panels to facilitate proper bend radius control and minimize the need for horizontal cable managers

For more information about the QuickNet™ Fiber Cabling System, reference the QuickNet™ Data Center Application Guide

Opticom® Fiber Enclosures

Opticom® Fiber Enclosures accept pre-terminated, splice-on, and field terminated fiber connectivity.

- Slide-out, tilt-down drawer provides up to 96 LC fibers per RU

- Integral bend radius control and cable management for fiber optic patch cords

For more information about the Opticom® Fiber Enclosures, reference the spec sheet

PanMPO™ Fiber Connector

The PanMPO™ Fiber Connector is a unique, patented MPO design that specifically addresses today's needs for fast and efficient Ethernet and Fiber Channel migration to help maximize return on cabling infrastructure investment and minimize downtime. Protect your investments today; minimizing installed cost of high-speed data center engineered links securing your position as a next-generation data center prepared to face future demands.

- Innovative push-pull boot to allow for easy installation and removal

- Alignment pins and tool are permanently housed and protected inside the connector allowing for a tool-less change of gender and polarity

- Easy migration from serial duplex(SR/SR/BiDi) to parallel (SR4.x) while maintaining compliance with cabling standards (TIA and ISO/IEC)

- Connector cleaning – the pin retraction feature allows for complete cleaning of the MPO surface

- Link certification – the gender changing ability of PanMPO™ on test leads allows for multiple test scenarios without the need for multiple test lead styles (which increase test variability)

- Mistake proofing – PanMPO™ Patch Cords can be reconfigured for gender and polarity in the field

For more information on the PanMPO™ Fiber Connector, visit panduit.com/panmpo.

Signature Core™ Fiber Optic Cabling System

Signature Core™ OM4+ Fiber Optic Cabling Systems extend the reach of standards-based Ethernet, BiDi, and Shortwave Wavelength Division Multiplexing (SWDM). Both are fully compliant and interoperable with standards based OM3, OM4 and OM5 solutions.

- ignature Core™ OM4+ Cabling extends reach on average by 20% compared to standard OM4

- Signature Core™ Fiber Media solutions allow for design flexibility (more connectors in the channel)

For more information on the Signature Core™ Fiber Optic Cabling System, visit here.

Step 3:
Select the components to build out your end-to-end fiber connectivity channel.
Note: Tables 1 and 3 utilize breakout cassettes, Tables 2 and 4 utilize breakout harness cabling.

Table 1: Multimode Fiber (MMF) PanMPO™ – 12 to 4xLC Duplex with Breakout Cassettes

Interconnects	Fiber Adapter Panels	Enclosures	Trunk Cable	Enclosures	Cassettes	Patch Cords
MPO12 (Female/Female)	HD Flex		PanMPO – OM4 Method B (Male/Female)	HD Flex		Duplex LC
	FHMP-6-BCG	FLEX1U06		FLEX1U06	FHC3ZO-08-10B	
	QuickNet			QuickNet		
FRZT^77Y001F*	FQMAP66CG	QAPP24BL	FYZT^78Y001F*	QAPP24BL	FQ3ZO-08-10B	FZ2E^LNLNSNM*
	Opticom			Opticom		
	FAPH0612CGMPO	FCE1U		FCE1U	FC3XN-16-10NMBN^^	

*Interconnects, trunk cable and patch cords are available in a variety of lengths, feet or meters; select the part numbers for additional information.
^Interconnects, trunk cable and patch cords are available in P = OFNO (Plenum), R = ONFR (Riser), L = LSZH or B = Euroclass B2ca.
^^Cassettes offers 2-MPO12 inputs to 8-LC Duplex outputs.

Table 2: Multimode Fiber (MMF) PanMPO™ – 12 to 4xLC Duplex Breakout Harness Cabling

Interconnects	Fiber Adapter Panels	Enclosures	Trunk Cable	Enclosures	Fiber Adapter Panels	Harnesses
PanMPO – OM4 Method B (Female/Female)	HD Flex		PanMPO – OM4 Method B (Male/Male)	HD Flex		Duplex LC
	FHMP-6-BCG	FLEX1U06		FLEX1U06	FHMP-6-BCG	
	QuickNet			QuickNet		
FRZT^77Y001F*	FQMAP66CG	QAPP24BL	FYZT^88Y001F*	QAPP24BL	FQMAP66CG	FZ8R*5NLSQNF***
	Opticom			Opticom		
	FAPH0612CGMPO	FCE1U		FCE1U	FAPH0612CGMPO	
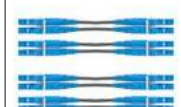
*Interconnects, trunk cables and harnesses are available in a variety of lengths, feet or meters; select the part numbers for additional information.
^Interconnects, trunk cables and harnesses are available in P = OFNO (Plenum), R = ONFR (Riser), L = LSZH or B = Euroclass B2ca.

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Step 3: (continued)
Select the components to build out your end-to-end fiber connectivity channel.

Table 3: Singlemode Fiber (SMF) PanMPO™ – 12 to 4xLC Duplex with Breakout Cassettes

Interconnects	Fiber Adapter Panels	Enclosures	Trunk Cable	Enclosures	Cassettes	Patch Cords
PanMPO – OM4 Method B (Female/Female)	HD Flex		PanMPO – OS2 Method A (Male/Female)	HD Flex		Duplex LC
	FHMP-6-ABL	FLEX1U06		FLEX1U06	FHC39N-08–10A	
	QuickNet			QuickNet		
FR9T^77A001F*	FQMAP65BL	QAPP24BL	FY9T^78A001F*	QAPP24BL	FQ39N-08-10A	F92E^LNLNSNM*
	Opticom			Opticom		
	FAPH0612BLMPO	FCE1U		FCE1U	FC39N-16-10NMAN^^	

*Interconnects, trunk cable and patch cords are available in a variety of lengths, feet or meters; select the part numbers for additional information.
^Interconnects, trunk cable and patch cords are available in P = OFNO (Plenum), R = ONFR (Riser), L = LSZH or B = Euroclass B2ca.
^^Cassettes offers 2-MPO12 inputs to 8-LC Duplex outputs. (CS Cassettes not pictured, please see www.panduit.com for additional information)

Table 4: Singlemode Fiber (SMF) PanMPO™ – 12 to 4xLC Duplex Breakout Harness Cabling

Interconnects	Fiber Adapter Panels	Enclosures	Trunk Cable	Enclosures	Fiber Adapter Panels	Harnesses
PanMPO – OS2 Method A (Female/Female)	HD Flex		PanMPO – OS2 Method A (Male/Female)	HD Flex		Duplex LC
	FHMP-6-ABL	FLEX1U06		FLEX1U06	FHMP-6-ABL	
	QuickNet			QuickNet		
FR9T^77A001F*	FQMAP65BL	QAPP24BL	F9TY^78A001F*	QAPP24BL	FQMAP65BL	F98R^5NQSQNF*
	Opticom			Opticom		
	FAPH0612BLMPO	FCE1U		FCE1U	FAPH0612BLMPO	

*Interconnects, trunk cables and harnesses are available in a variety of lengths, feet or meters; select the part numbers for additional information.
^Interconnects, trunk cables and harnesses are available in P = OFNO (Plenum), R = ONFR (Riser), L = LSZH or B = Euroclass B2ca.

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For more information on the complete Panduit Fiber Solution, reference the Fiber Solutions Quick Reference Guide

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Additional Resources
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Panduit Cisco Fiber Resources, visit www.panduit.com/panduitciscofiber
Panduit Part Configurator Tools, visit www.panduit.com/partconfigurators
Cisco Optics-to-Device Compatibility Matrix visit, https://tmgmatrix.cisco.com/
Cisco Optics-Innovation for the 400G era and beyond, visit www.cisco.com/go/optics