



# Quad Small Form-factor Pluggable (QSFP) Products

## DESCRIPTION

Tyco Electronics is a leading developer of Quad Small Form-factor Pluggable, a new high speed pluggable I/O interface products. This interconnect system offers 4 channels, providing 3 times the density of SFP/SFP+ ports. QSFP cages and connectors are designed for data rates up to 10 Gb/s, supporting Fibre Channel, Ethernet, SDH/SONET and INFINIBAND standards. The cage/connector system will accept optical or copper interfaces.

## APPLICATIONS

- Switches, routers, and host bus adapters (HBA's)
- Enterprise storage
- High density, high speed I/O
- Multiple channel interconnects

## TECHNICAL DOCUMENTS

Product Specification: 108-2286

INFINIBAND is a trademark of the InfiniBand Trade Association.  
Fibre Channel is a trademark of the Fibre Channel Industry Association.

## KEY FEATURES

- 4x solution featuring Tyco Electronics 38 position EVERCLEAR connector
- Light pipe and heat sink options available
- Through-bezel and behind-bezel cage options with proven EMI containment
- Direct attach copper cables for short reach applications
- Cable assemblies compatible with industry standard cages
- Quick release cable latching system
- Copper cable 360 degree braid crimp minimizes EMI
- Various specialty copper cable assemblies available
- MPO connectors plug into QSFP parallel optic transceiver modules
- Copper cable assembly performance is optimized when cable is engineered to system architecture

## FOR MORE INFORMATION

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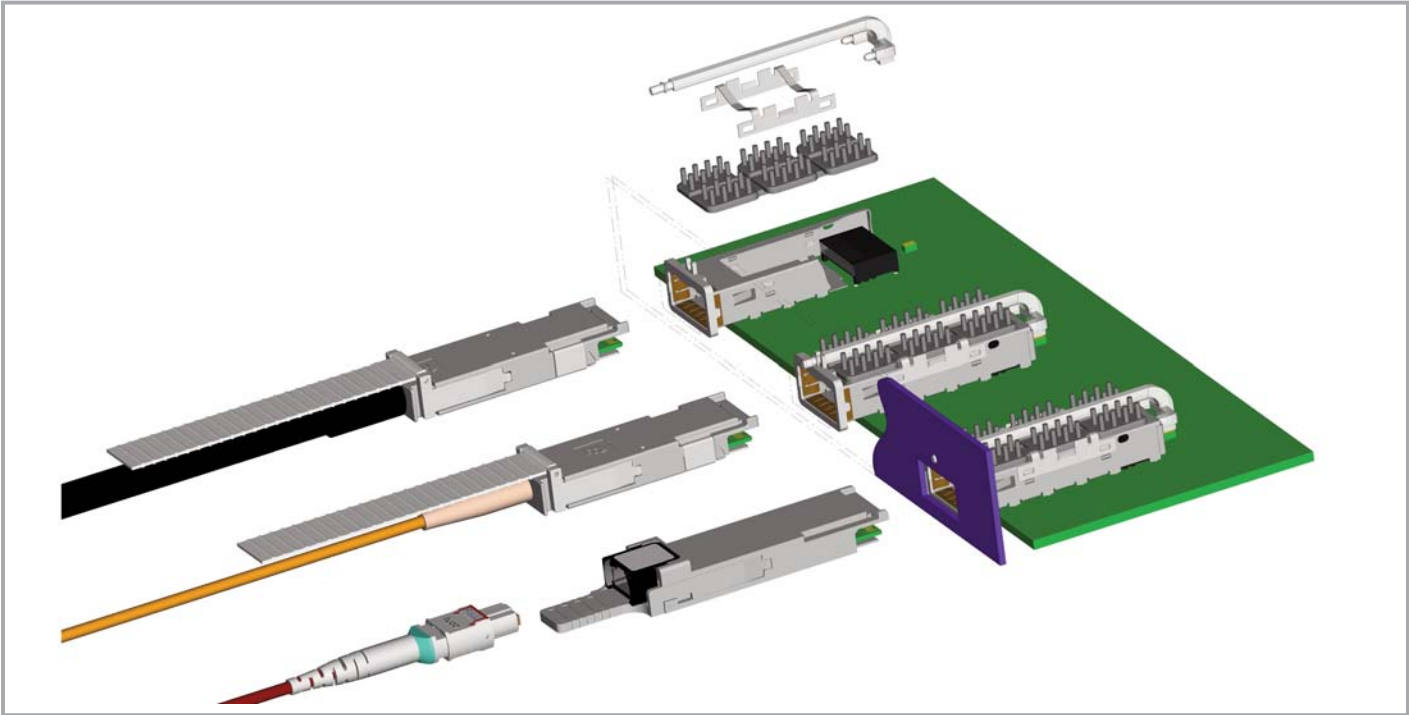
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DESCRIPTION

The QSFP application consists of:

- a 38-position high speed surface mount connector for the host board
- a cage which provides EMI containment and guidance for the mating plug
- a mating plug, which may be in the form of:
  - a pluggable transceiver, which accepts an MPO optical cable
  - a direct-attach QSFP copper cable assembly
  - a direct-attach PARALIGHT active optical cable
- Cage accessories include heatsinks, lightpipes, and EMI/dust plugs.

APPLICATIONS FOR PLUGGABLE I/O INTERFACES:

Application	Data Rate	Pluggable Interface						
		SFP	XFP	X2	XPAK	Xenpak	SFP+	QSFP
Fibre Channel	1G	X						
Fibre Channel	2G	X						
Fibre Channel	4G	X					X	
Fibre Channel	8G						X	
Ethernet	1G	X						
Ethernet	10G		X	X	X	X	X	X
Ethernet	40G							X
InfiniBand Standard	2.5G	X						
InfiniBand Standard	5G	X					X	
InfiniBand Standard	10G				X		X	
InfiniBand Standard	20G							X
InfiniBand Standard	40G							X

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INFINIBAND is a trademark of the InfiniBand Trade Association.



- Tape and reel packaged for pick and place SMT processing
- 38 position EVERCLEAR connector
- Designed to optimize signal integrity through 10 Gb/s

Connector (front)

Connector (bottom)

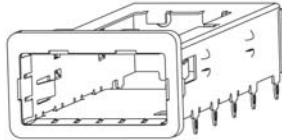
- Provides EMI containment for unused ports
- Keeps interface free of contamination or debris
- Ergonomic Design



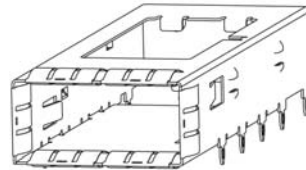
## Quad Small Form-factor Pluggable (QSFP) Products

### CAGES

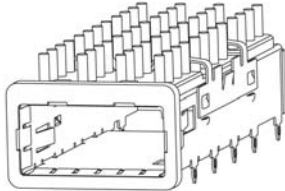
- Proven springs and gasket designs for EMI containment
- Single and dual lightpipes
- Riding heatsinks for thermal dissipation, various fin heights available
- Belly-to-belly compatible (double-sided PCB's)
- Press-fit termination
- Port-to-port spacing-21.0mm (through-bezel)/23.5 (behind-bezel)



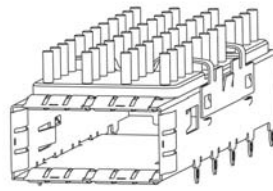
Behind-Bezel Cage



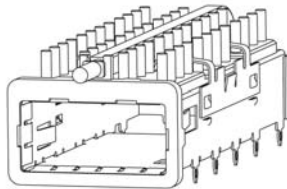
Through-Bezel Cage



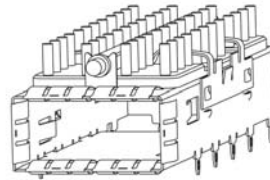
Behind-Bezel Cage with Heatsink



Through-Bezel Cage with Heatsink



Behind-Bezel Cage with Heatsink and Lightpipe



Through-Bezel Cage with Heatsink and Lightpipe

QSFP Cage Kits:	Part Number	Bezel Mount	Heatsink	Max height of heatsink above PCB	Lightpipe
	1888617-1	Through-bezel	None	--	None
	1888674-1	Through-bezel	None	--	customer applied
	1888631-1	Through-bezel	PCI	13.7 mm	None
	1888631-2	Through-bezel	SAN	16.0 mm	None
	1888631-3	Through-bezel	Networking	23.0 mm	None
	1888972-1	Through-bezel	SAN	16.0 mm	Yes
	1888972-2	Through-bezel	Networking	23.0 mm	Yes
	1888781-1	Behind-bezel	None	--	None
	1888968-1	Behind-bezel	PCI	13.7 mm	None
	1888968-2	Behind-bezel	SAN	16.0 mm	None
	1888968-3	Behind-bezel	Networking	23.0 mm	None

## Quad Small Form-factor Pluggable (QSFP) Products *continued*



### Ganged QSFP Cages:

	Part Number	Port Configuration	Heatsink	Max height of heatsink above PCB	Lightpipe
<b>Cage Kits</b>	2057042-1	1x3	PCI	13.7 mm	included
	2057042-2	1x3	SAN	16.0 mm	included
	2057042-3	1x3	Networking	23.0 mm	included
	2007456-1	1x3	PCI	13.7 mm	none
	2007456-2	1x3	SAN	16.0 mm	none
	2007456-3	1x3	Networking	23.0 mm	none
	2007473-1	1x3	none	-	option for lightpipe attachment (sold separately)
	2007474-1	1x3	none	-	none
	2057183-1	1x4	PCI	13.7 mm	included
	2057183-2	1x4	SAN	16.0 mm	included
	2057183-3	1x4	Networking	23.0 mm	included
	2007625-1	1x4	PCI	13.7 mm	none
	2007625-2	1x4	SAN	16.0 mm	none
	2007625-3	1x4	Networking	23.0 mm	none
	2007668-1	1x4	none	-	option for lightpipe attachment (sold separately)
	2007667-1	1x4	none	-	none
<b>Dual Lightpipe</b>	2007477-3			Recommended LED height: 0.8 - 1.1 mm	other lightpipe options available



# Direct Attach Copper Cables (QSFP) Products

## DIRECT ATTACH COPPER CABLES

### DESCRIPTION

Tyco Electronic's QSFP direct attach copper cable assembly is a low cost alternative for short reach 4X applications. The design allows for a serial data transmission up to the QDR rate of 10Gbps/lane, for an aggregate 40Gbps. QSFP cable assemblies are hot swappable and the programmed EEPROM signature enables the host to differentiate between a copper cable assembly and a fiber optic module. The mechanical design of the braid crimp ensures that EMI radiation is suppressed. Additionally, the copper cable acts as a natural heat sink. Low power consumption assists in making the passive copper cable assembly an economic solution for within rack, or rack-to-rack applications. Standard QSFP assemblies are offered in 26AWG and 28AWG, however, other wire gauges can be engineered.



### KEY FEATURES

- Assemblies available at DDR (5Gbps/lane) and QDR (10Gbps/lane) data rates
- Compatible with industry standard QSFP cages
- EEPROM signature which can be customized
- Pull tab unlatching allows compact belly-to-belly application
- Equalized and unequalized assemblies
- 360 degree cable braid crimp suppresses EMI
- Specialty and cross-over cables are available
- Optimum cable performance is obtained when cable equalization is customized to system architecture
- Uses Madison Cable's high speed TurboTwin parallel pair copper cable

### Standard QSFP to QSFP:

Type	Part Number	AWG	Equalized	Assembly Length
DDR (5Gbps) PASSIVE	2074739-1	28	No	0.5 meter
	2074739-2	28	No	1 meter
	2074739-3	28	Yes	2 meter
	2074739-4	28	Yes	3 meter
	2074739-5	28	Yes	4 meter
	2074739-6	26	Yes	5 meter
	2074739-8	26	Yes	7 meter
	1-2074739-1	26	Yes	10 meter
QDR (10Gbps) PASSIVE	2015234-1	28	No	1 meter
	2015234-2	28	No	2 meter
	2015234-3	26	Yes	3 meter
	2015234-4	26	Yes	4 meter
	2015234-5	26	Yes	5 meter
	2015234-6	26	Yes	6 meter
	2015234-7	26	Yes	7 meter
	2015234-8	26	Yes	8 meter
	2015234-9	28	No	0.5 meter
QDR (10Gbps) UNEQUALIZED PASSIVE*	2053638-1	26	No	1 meter
	2053638-2	26	No	2 meter
	2053638-3	26	No	3 meter
	2053638-4	26	No	4 meter
	2053638-5	26	No	5 meter
	1-2053638-0	26	No	10 meter
QDR (10Gbps) ACTIVE (IN DEVELOPMENT)	2015446-1	26	N/A	1 meter
	2015446-2	26	N/A	2 meter
	2015446-3	26	N/A	3 meter
	2015446-4	26	N/A	4 meter
	2015446-5	26	N/A	5 meter
	1-2015446-0	26	N/A	10 meter
	1-2015446-5	26	N/A	15 meter

\*Engineered for use in systems that utilize self-equalizing features (EDC).

## Direct Attach Copper Cables (QSFP) Products Continued

### DIRECT ATTACH COPPER CABLES

#### QSFP Specialty Cable Assemblies:

Type	Part Number	AWG	Equalized	Assembly Length
QSFP to 4 SFP+ 10Gbps per Channel	2053453-1	26	No	1 meter
	2053453-2	26	No	2 meter
	2053453-3	26	No	3 meter
	2053453-4	26	Yes	5 meter
QSFP to InfiniBand Standard 5Gbps per Channel	2074119-1	28	No	1 meter
	2074119-2	26	No	3 meter
	2074119-3	26	No	5 meter
QSFP to Mini SAS 3.125Gbps per Channel	2053877-1	28	No	1 meter
	2053877-2	28	No	2 meter
	2053877-3	28	No	3 meter
	2053877-4	26	No	4 meter
	2053877-5	26	Yes	5 meter
	1-2053877-1	28	No	0.5 meter
QSFP to 16 SMA RF Coax Test Assembly	2053606-1	N/A	No	0.5 meter

## PARALIGHT (QSFP) Products

### PARALIGHT

- 4 transmit and 4 receive channels at up to 5 Gb/s per channel
- 10 Gb/s samples available early 2009
- Industry standard (SFF-8470) electrical connector (aka InfiniBand Standard 4X, IB 4X, CX4, Fiber Channel)
- Internally terminated optics — no optical connector to clean



Length (meters)	Cable Type	Infiniband 4x Part Numbers	InfiniBand 4X to QSFP Part Numbers	QSFP to QSFP Part Numbers
2	OFNP*	1985427-9	1985554-9	1985861-9
3	OFNP*	1985427-1	1985554-1	1985861-1
5	OFNP*	1985427-2	1985554-2	1985861-2
10	OFNP*	1985427-3	1985554-3	1985861-3
15	OFNP*	1-1985427-0	1-1985554-0	1-1985861-0
20	OFNP*	1985427-4	1985554-4	1985861-4
30	OFNP*	1985427-5	1985554-5	1985861-5
40	OFNP*	1985427-6	1985554-6	1985861-6
50	OFNP*	1985427-7	1985554-7	1985861-7
100	OFNP*	1985427-8	1985554-8	1985861-8

\*OFNP = Optical Fiber Nonconductive Plenum

**Note:** InfiniBand Standard 4x is also known as CX4 and SFF-8470.

**Note:** Longer lengths available upon request.

**Note:** All part numbers are RoHS compliant.

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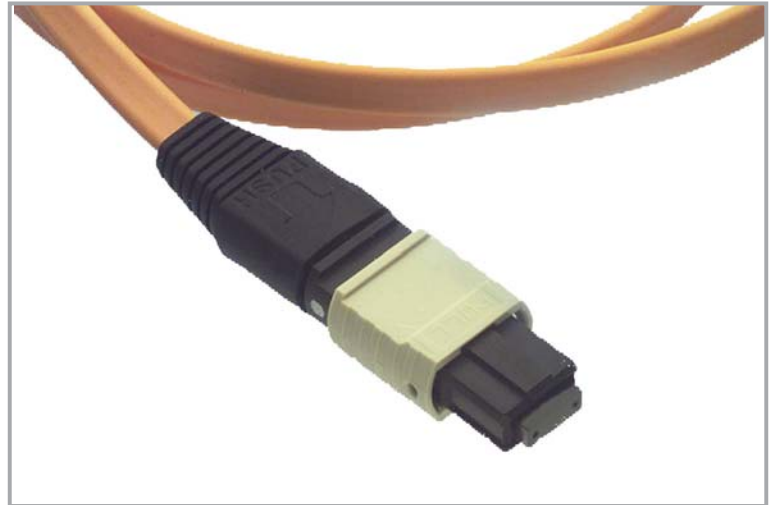
## FIBER OPTIC CABLES

### QSFP Optical Jumper:

- Uses 50/125um MM fiber (500MHz-km BW at 850nm and 1300nm wavelengths) with OFNR-rated jacket
- Fiber path is reversed (1 to 12, 2 to 11, 3 to 10, 4 to 9, fibers 5, 6, 7, 8 not used)

Other options include:

- Custom lengths
- High bandwidth cable (up to 2000MHz-km)
- OFNP rated jacket
- Fanout to LC for interface to SFP optical ports



### MPO to MPO suitable for interface to transceiver

Part Number	Standard Length
1938208-1	1m
1938208-5	5m
1-1938208-0	10m
2-1938208-0	20m
5-1938208-0	50m

**Note:** See drawing for part numbers of other standard lengths

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