

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

### Product Facts

- 4x solution featuring Tyco Electronics 38 position EVERCLEAR connector
- Lightpipe and heat sink options available
- Through-bezel and behind-bezel cage options with proven EMI containment
- Direct attach copper cables for short reach applications
- Quick release latching system
- MPO connectors plug into QSFP parallel optic transceiver modules

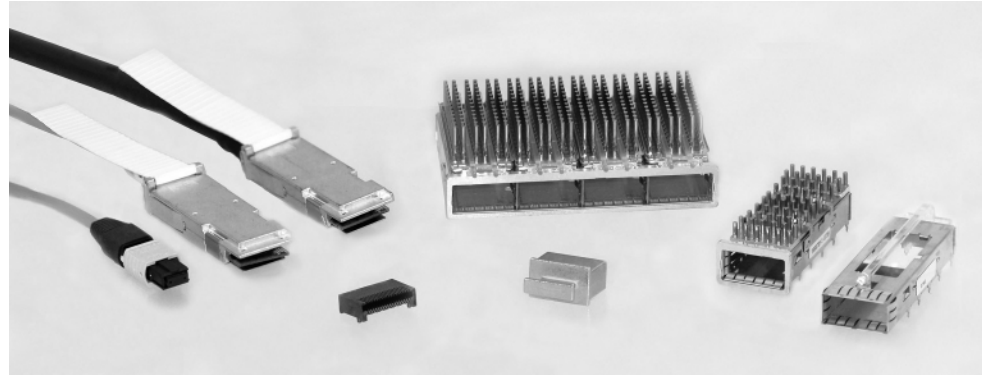
### Applications

- 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

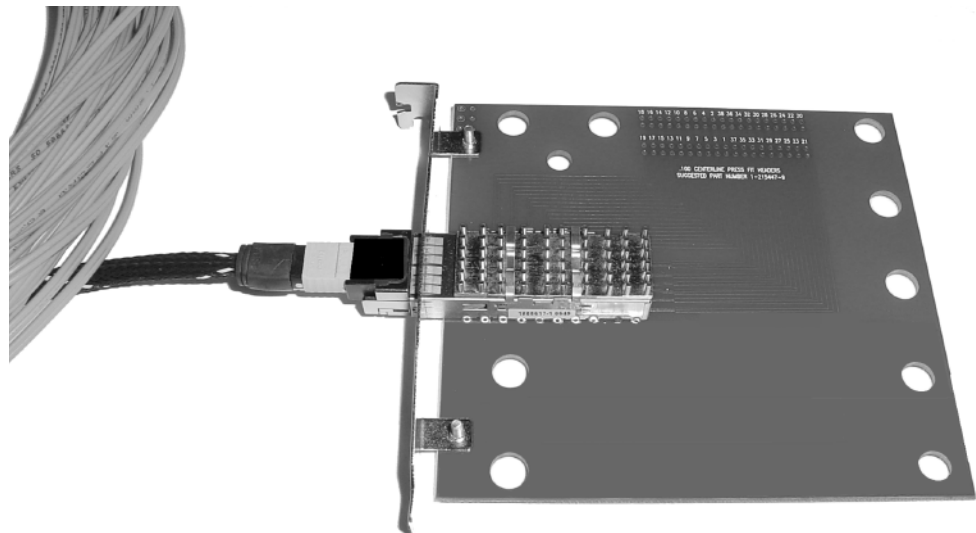


Tyco Electronics is a leading developer of Quad Small Form-factor Pluggable, a new high speed pluggable I/O interface. This interconnect system offers 4 channels, providing 3 times the density of SFP/SFP+ ports and 4 times the density of XFP. QSFP cages and connectors are

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. The QSFP product family includes cages in single and ganged configurations with various heatsink and

lightpipe options. The connector is a 38 position high speed SMT connector, and EMI plugs are offered for empty ports. Cabling options including direct attach copper cable assemblies, active optical assemblies, and MPO optical cable assemblies that plug into a QSFP transceiver module.

### Connector/Cage Application

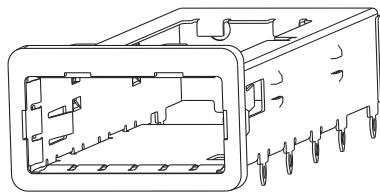
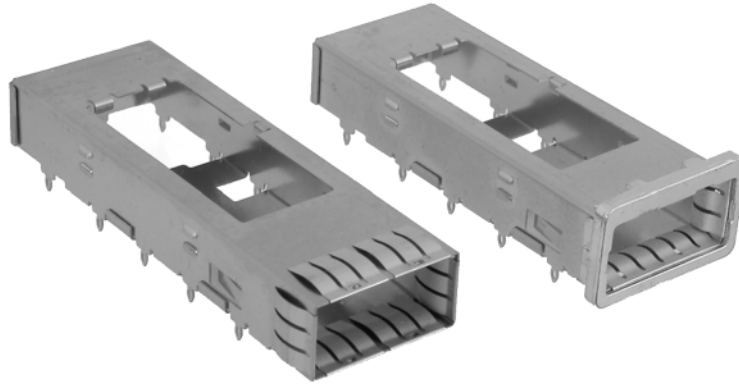


Fibre Channel is a trademark of the Fibre Channel Industry Association.  
INFINIBAND is a trademark of the InfiniBand Trade Association.

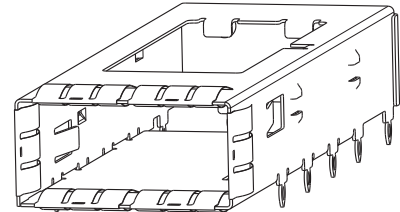
**QSFP Cages and Connectors**

**Cages**

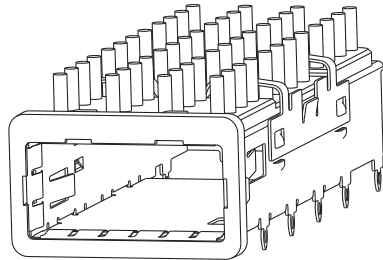
- Reliable springs and gasket designs for EMI containment
- Single and dual lightpipe options
- Riding heat sinks for thermal dissipation, various pin heights available
- Belly-to-belly compatible (double-sided PCB's)
- Press-fit termination
- Port-to port spacing — 21.0 mm (through-bezel)/ 23.5 mm (behind-bezel)
- Behind bezel design eliminates potential for mismatching plug



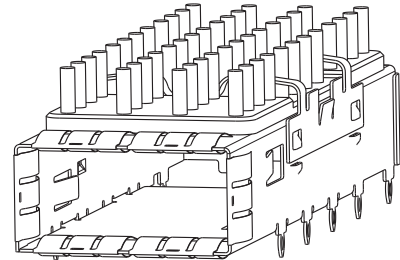
Behind-Bezel Cage



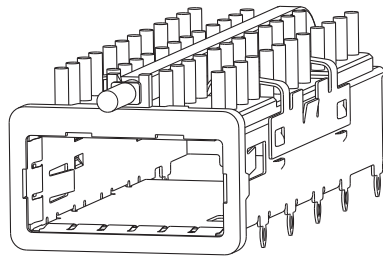
Through-Bezel Cage



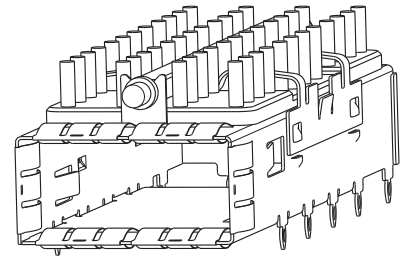
Behind-Bezel Cage with Heat Sink



Through-Bezel Cage with Heat Sink



Behind-Bezel Cage with Heat Sink and Lightpipe



Through-Bezel Cage with Heat Sink and Lightpipe

**QSFP Cage Kits**

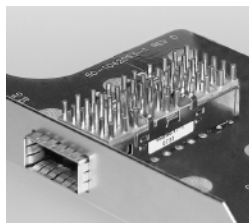
Part Number	Bezel Mount	Heat Sink	Lightpipe
1888617-1	Through-bezel	None	None
1888674-1	Through-bezel	None	Customer Applied
1888631-1	Through-bezel	PCI	None
1888631-2	Through-bezel	SAN	None
1888631-3	Through-bezel	Networking	None
1888972-1	Through-bezel	SAN	Yes
1888972-2	Through-bezel	Networking	Yes
1888781-1	Behind-bezel	None	None
1888968-1	Behind-bezel	PCI	None
1888968-2	Behind-bezel	SAN	None
1888968-3	Behind-bezel	Networking	None

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

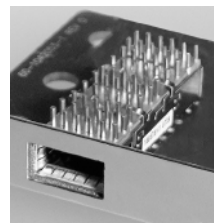
## QSFP Cages and Connectors (Continued)

### Cages (Continued)

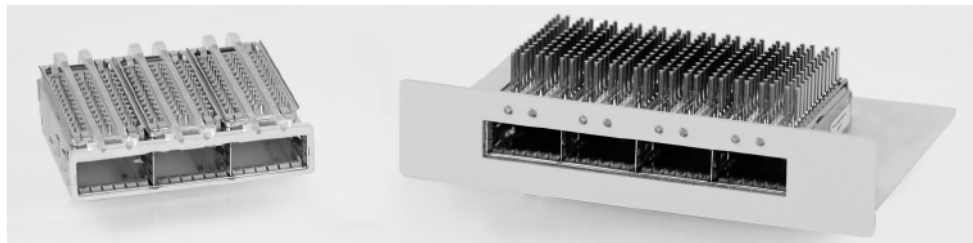
#### Cage Applications:



Through Bezel



Behind Bezel



#### Ganged QSFP Cages

Part Number	Configuration	Heat Sink	Max. Height of Heat Sink Above Board	Lightpipe
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	SAN	16.0 mm	None
2007625-2	1x4	Networking	23.0 mm	None
2007668-1	1x4	None	—	Option for lightpipe attachment (sold separately)
2007667-1	1x4	None	—	None

#### Dual Lightpipe

Part Number	Recommended LED Height
2007477-3	0.8 – 1.1 mm

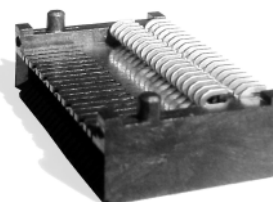
**Note:** Other lightpipe options available.

#### Connector Part Number 1761987-9

- 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)

#### EMI/Dust Plug Part Number 1888810-2

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



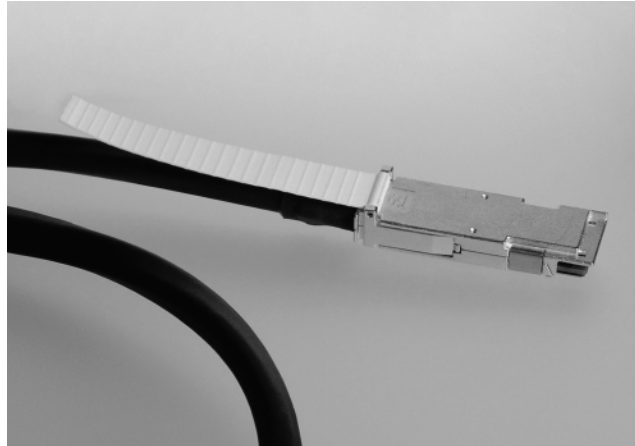
PCI is a trademark of PCI-SIG.

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

## QSFP Copper Cable Assemblies

### Product Facts

- 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
- 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 TURBOTWIN copper cable



Tyco Electronics is a leading developer of Quad Small Form Factor Pluggable (QSFP) high speed, high performance cable assemblies. The QSFP assembly offers 4 channels of data, providing

3 times the density of SFP/SFP+ ports. QSFP cable assemblies can support data rates up to 10Gbps per differential pair, and support Fibre Channel, Ethernet and InfiniBand standards.

### Applications

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

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**QSFP Copper Cable Assemblies** (Continued)

**QSFP Direct Attach Cable Assembly Part Numbers**

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	No	2 meter
	2074739-4	26	No	3 meter
	2074739-5	26	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	28	No	3 meter
	2015234-4	26	No	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	26	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
Optical Fiber Nonconductive Plenum	1985861-9	—	N/A	2 meter
	1985861-1	—	N/A	3 meter
	1985861-2	—	N/A	5 meter
	1985861-3	—	N/A	10 meter
	1-1985861-0	—	N/A	15 meter
	1985861-4	—	N/A	20 meter
	1985861-5	—	N/A	30 meter
	1985861-6	—	N/A	40 meter
	1985861-7	—	N/A	50 meter
1985861-8	—	N/A	100 meter	

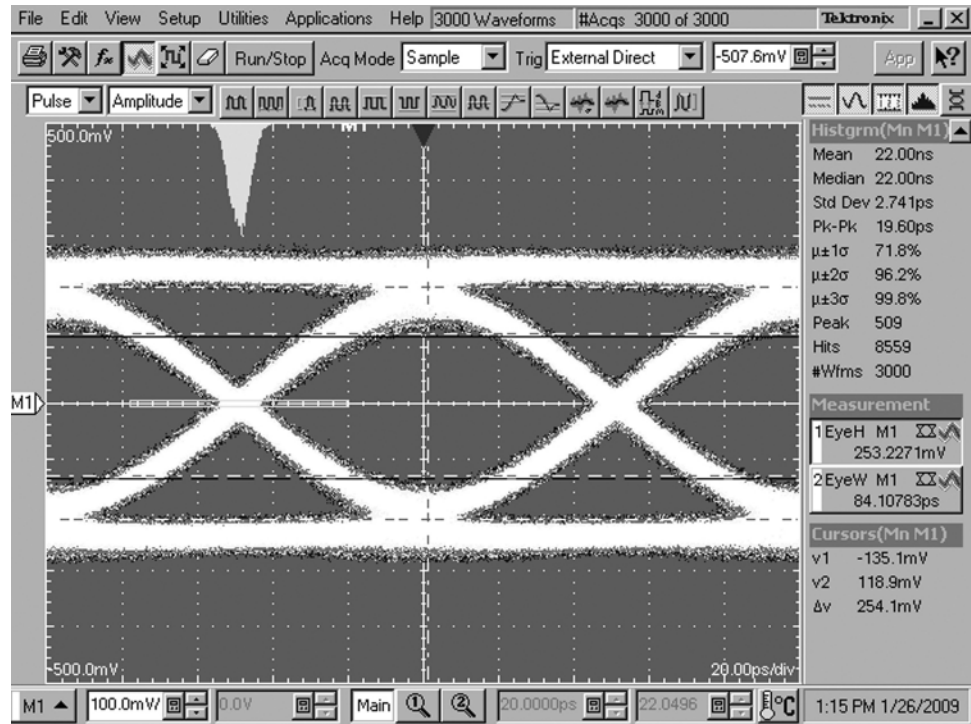
\*Engineered for use in systems that utilize self-equalizing features (EDC).

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

**QSFP Copper Cable Assemblies (Continued)**

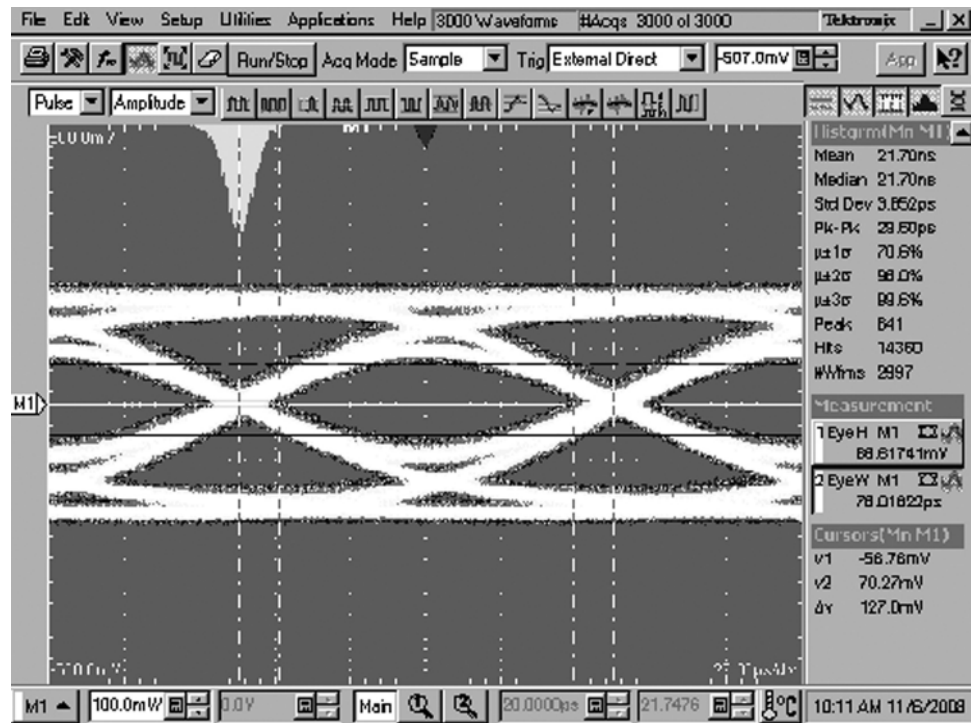
**10 Gbps Stressed Eye Pattern for QSFP QDR Cable Assembly — 2 Meters**  
Part Number 2015234-2

- Data Rate: 10 Gbps
- Input Voltage: 800 mV
- Data Pattern: PRBS 9
- Eye Height: 254.1 mV
- Jitter: 19.6 ps
- 2 m 28 AWG QSFP Equalized QDR Cable Assembly



**10 Gbps Stressed Eye Pattern for QSFP QDR Cable Assembly — 5 Meters**  
Part Number 2015234-5

- Data Rate: 10 Gbps
- Input Voltage: 800 mV
- Data Pattern: PRBS 9
- Eye Height: 127.0 mV
- Jitter: 29.6 ps
- 5 m 26 AWG QSFP Equalized QDR Cable Assembly

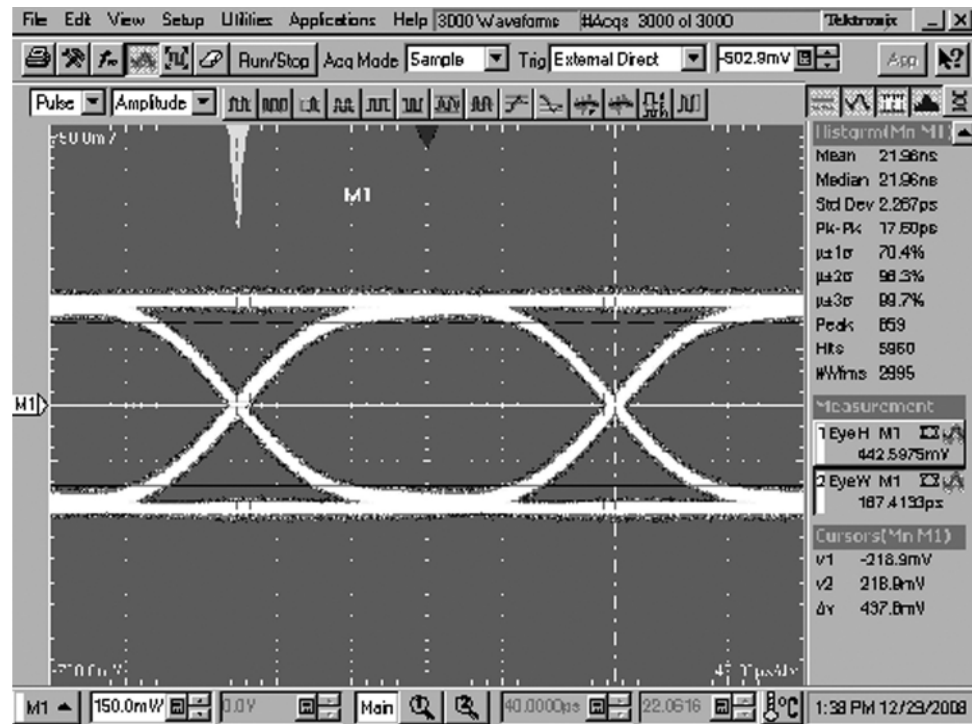


**Note:** All part numbers are RoHS compliant.

**QSFP Copper Cable Assemblies (Continued)**

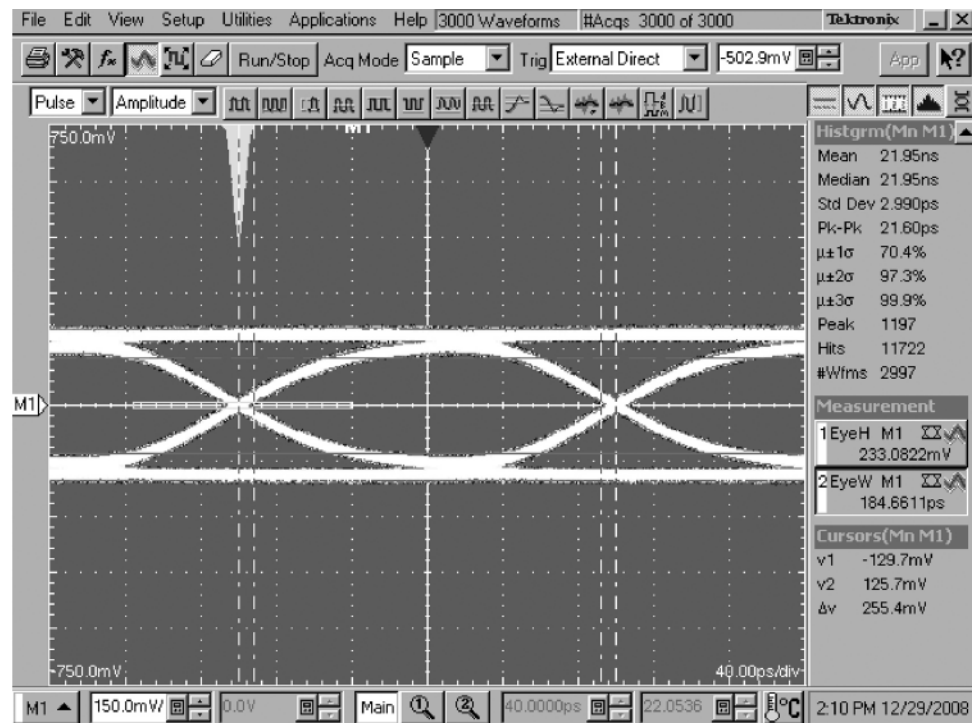
**5 Gbps Stressed Eye Pattern for QSFP DDR Cable Assembly — 2 Meters**  
Part Number 2053638-2

- Data Rate: 10 Gbps
- Input Voltage: 800 mV
- Data Pattern: PRBS 9
- Eye Height: 437.8 mV
- Jitter: 17.6 ps
- 2 m 28 AWG QSFP Unequalized DDR Cable Assembly



**5 Gbps Stressed Eye Pattern for QSFP DDR Cable Assembly — 5 Meters**  
Part Number 2053638-5

- Data Rate: 10 Gbps
- Input Voltage: 800 mV
- Data Pattern: PRBS 9
- Eye Height: 255.4 mV
- Jitter: 21.6 ps
- 5 m 26 AWG QSFP Equalized DDR Cable Assembly



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

## MPO Optical Connectors and Cable Assemblies

### QSFP Optical Jumper

- Uses 50/125µm 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	1 m
1938208-5	5 m
1-1938208-0	10 m
2-1938208-0	20 m
5-1938208-0	50 m

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

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



## QSFP PARALIGHT Active Optical Cable Assemblies

### Applications

- High Performance Computing Clusters
- Supercomputers
- High End Servers
- Mass Storage
- Metro Network Switch/Cross Connect
- High End Carrier Class Routers
- DDR InfiniBand Applications (QDR available end of 2008)
- Other 2.5–5.0 Gb/s Applications (e.g. 10 Gb Fibre Channel or 10 Gig Ethernet XAUI on ports providing InfiniBand pinout 3.3 V power)



### Electrical/Optical

- 20 Gb/s bidirectional — 40 Gb/s product available late 2008
- Compatible with SDR and DDR (InfiniBand) standards (QDR available early Q2 2009)
- Low power consumption — under 1 watt per end

### Mechanical/Environmental

- Up to 150 meters — longer lengths available upon request
- 25 mm bend radius
- Operating temperature 0°C to 60°C
- Storage Temperature -25°C to 70°C
- 4 channels each direction

### Materials

- OFNR/CSA-FT-6 (plenum) cable
- OFN-LS (LSZH rated) cable

Fibre Channel is a trademark of the Fibre Channel Industry Association.  
 INFINIBAND is a trademark of the InfiniBand Trade Association.  
 XAUI is a trademark of the 10Gigabit Ethernet Alliance XAUI Interoperability Group.

### Part Numbers

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

\*\*Also known as CX4 and SFF-8470

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

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