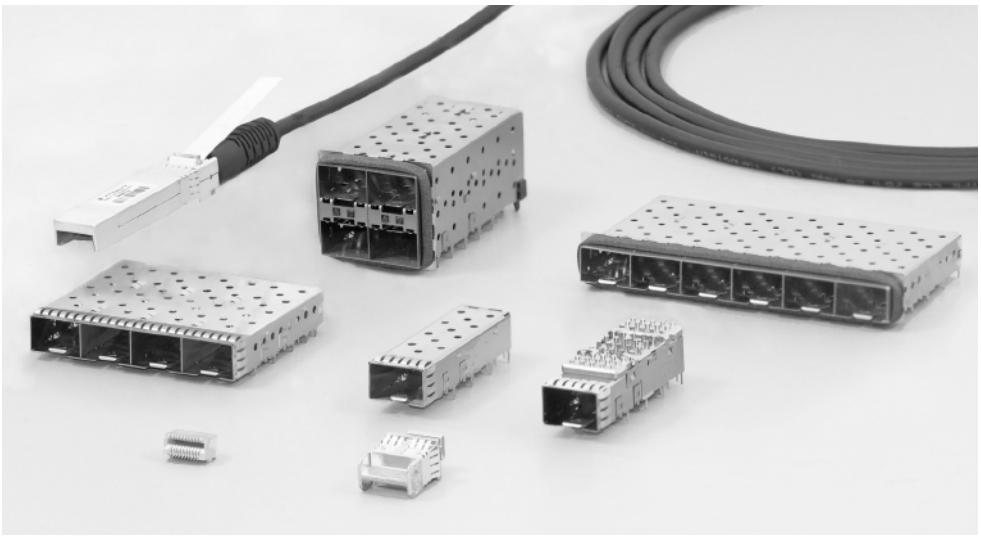
SFP+ Products

Product Facts

- **SFP+ interconnect system supports data rates of 10 Gb/s**
- **Connector designed to support 10 Gb/s+ signal speeds, backward compatible with SFP**
- **Both EMI spring and gasket options for cages provide excellent shielding**
- **All cage configurations are offered with lightpipes for LED applications**
- **Heat sink optional for single port cages**
- **Cages are available for PCI card applications (one degree mounting angle)**
- **Cages accommodate belly-to-belly mounting**
- **Stacked cages include integrated high speed connector using patented wafer construction**
- **Active and passive copper cable assemblies provide a cost-effective solution for short reach applications**

Applications

- **Storage**
- **Servers**
- **Networking**
- **Switches**
- **Routers**
- **Hubs**
- **Network Interface Cards (NICs)**



SFP+ extends the use of the Small Form-Factor Pluggable (SFP) interconnect up to 10 Gb/s. This system meets the performance requirements of SFF (Small Form-Factor) specification SFF-8431 and supports 8G Fibre Channel and 10G Ethernet applications. The SFP+ product family includes cages, connectors, and copper cable assemblies. SFP+ cages are offered with both EMI springs and elastomeric conductive gaskets for EMI containment at the panel opening, and come in single port, ganged and stacked port configurations. Connectors are designed to optimize performance at higher data rates. A conductive EMI plug is available to reduce EMI through an empty (unused) SFP+ cage port. Tyco Electronics also offers LC optical connectors and cable assemblies to link with SFP+ transceivers.

Technical Documents

Application Specifications

114-13120 Single & Ganged Cages
114-13219 Stacked Cages

Product Specification

108-2331

Industry Standards

SFF-8432	Cage and module definition
SFF-8083	Mating Interface and performance requirements
SFF-8431	Electrical Interface Specifications

Fibre Channel is a trademark of the Fibre Channel Industry Association.
PCI is a trademark of PCI-SIG.

Catalog 1773408-1
Revised 2-09

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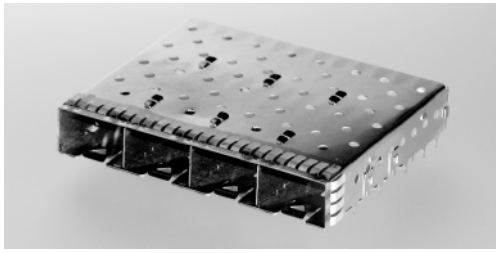
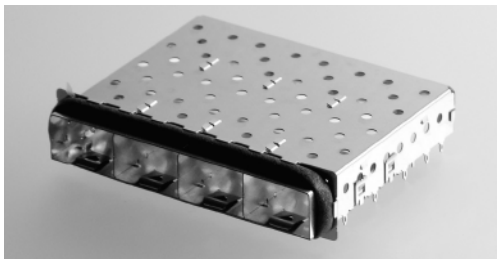
SFP+ Single Port and Ganged Cages

Cages with EMI Springs



Description	Single Port	1x2	1x4	1x6
Cage Assy w/ Lightpipes	2007254-1	2007262-1	2007178-1	2007250-1
Cage Assy	2007198-1	2007263-1	2007132-1	2007251-1
Cage Assy w/ PCI Heat Sink	2007464-1	—	—	—
Cage Assy w/ SAN Heat Sink	2007464-2	—	—	—
Cage Assy w/ Networking Heat Sink	2007464-3	—	—	—

Cages with Elastomeric Gaskets



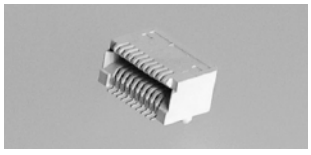
Description	1x2	1x4	1x6
Cage Assy w/ Lightpipes	2007180-1	2007093-1	2007169-1
Cage Assy	2007181-1	2007135-1	2007170-1

Cages for PCI Applications

One degree mounting angle to meet requirements of SFF-8075

Description	Solder	Press-Fit
Cage Assy	2007194-1	2007215-1
Cage Assy w/ PCI Heat Sink & Clip	2007193-1	2007277-1

Connectors



Contact Plating	Part Number
0.76 µm (30 µin) gold	1888247-1
0.38 µm (15 µin) gold	1888247-2

PCI is a trademark of PCI-SIG.

Note: All part numbers are RoHS compliant.

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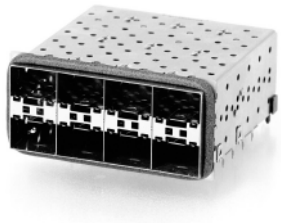
SFP+ Stacked (Dual Row) Cage/Connector Assemblies

Stacked SFP+ Cage/ Connector Assemblies



Description

EMI Containment Style	Lightpipe Option	2x1	2x2	2x4	2x6
Elastomeric Gasket	Four Per Column	2007538-5	2007417-5	2007399-5	2007567-5
Elastomeric Gasket	Inner Lightpipes Only	2007538-6	2007417-6	2007399-6	2007567-6
Elastomeric Gasket	Outer Lightpipes Only	2007538-7	2007417-7	2007399-7	2007567-7
Elastomeric Gasket	None	2007538-8	2007417-8	2007399-8	2007567-8
EMI Springs	Four Per Column	2007492-5	2007637-5	2007394-5	2007562-5
EMI Springs	Inner Lightpipes Only	2007492-6	2007637-6	2007394-6	2007562-6
EMI Springs	Outer Lightpipes Only	2007492-7	2007637-7	2007394-7	2007562-7
EMI Springs	None	2007492-8	2007637-8	2007394-8	2007562-8

Note: Tin plated compliant pins listed, tin-lead compliant pins available for signal connector. See Tyco Electronics drawing.

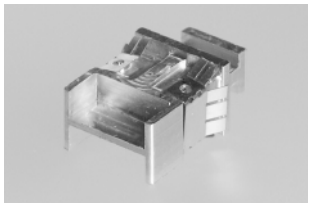
Dust Plug (Non-conductive)

For Uses In	Part Number
Single Port Cages	1367147-1 or 1761394-1
Ganged and Stacked (Multi-port) Cages	1761394-1

Note: Dust plug 1761394-1 has narrow width, required for port density in ganged and stacked cages.

EMI Plug Part Number 1888901-1

Springs comply with SFF-8432 requirements for Improved Pluggable Form-factor (IPF)



PCI is a trademark of PCI-SIG.

Note: All part numbers are RoHS compliant.

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SFP+ Copper Cable Assemblies

Product Facts

- **Truly broadband — operates from 1 Gbps to 10 Gbps**
- **Compatible with industry standard SFP cages**
- **100 Ohm differential impedance**
- **3.3 V input source voltage**
- **EEPROM signature which can be customized**
- **Pull-to-release retractable pin latch design**
- **Pull tab allows compact belly-to-belly application**
- **360 degree cable braid crimp and enhanced EMI skirt**
- **Various wire gauges provide flexible cable management options**
- **Uses MADISON TURBOTWIN copper cable**

The Tyco Electronics SFP+ direct attach copper cable assembly is a low cost alternative for short reach applications. The design allows for a serial data transmission up to 10 Gbps in each direction. These SFP+ 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 and EMI skirt help ensure that EMI radiation is sufficiently suppressed. Additionally, the copper cable acts as a natural heat sink. The low power consumption assists in making the passive copper cable assembly an economic solution for within rack, or rack to rack applications. Standard SFP+ assemblies are offered in 24 AWG, however, several smaller wire gauges are available.

Type	Part Number	AWG	Description
Standard Passive	2032237-1	24	0.5 meter SFP+ Cable Assembly
	2032237-2	24	1 meter SFP+ Cable Assembly
	2032237-4	24	3 meter SFP+ Cable Assembly
	2032237-6	24	5 meter SFP+ Cable Assembly
	1-2032237-1	24	10 meter SFP+ Cable Assembly
Other AWG Passive	2032247-1	26	0.5 meter SFP+ Cable Assembly
	2032247-2	26	1 meter SFP+ Cable Assembly
	2032247-4	26	3 meter SFP+ Cable Assembly
	2032247-6	26	5 meter SFP+ Cable Assembly
	1-2032247-1	26	10 meter SFP+ Cable Assembly
	2053649-1	28	0.5 meter SFP+ Cable Assembly
	2053649-2	28	1 meter SFP+ Cable Assembly
	2053649-4	28	3 meter SFP+ Cable Assembly
	2053649-6	28	5 meter SFP+ Cable Assembly
	2032246-1	30	0.5 meter SFP+ Cable Assembly
	2032246-2	30	1 meter SFP+ Cable Assembly
	2032246-4	30	3 meter SFP+ Cable Assembly
	2032246-6	30	5 meter SFP+ Cable Assembly
Active (Coming Soon)	2032757-1	24	1 meter SFP+ Cable Assembly
	2032757-5	24	5 meter SFP+ Cable Assembly
	1-2032757-0	24	10 meter SFP+ Cable Assembly
	1-2032757-5	24	15 meter SFP+ Cable Assembly

Note: All part numbers are RoHS compliant.

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SFP+ Copper Cable Assemblies (Continued)

High Speed Electrical Measurements

Tyco Electronics SFP+ passive copper cable assemblies are fully compliant to SFF-8431.

WDP Measurements

WDP measurements listed in the table below are for set lengths at two different cable gauges. Any cable with the same gauge and a shorter length than the length listed will have a lower dWDP number. Measurements were taken with an input signal that had pre-emphasis applied to achieve a WDPi of 2.4 dBe while using the SFP+ Module Compliance Board (MCB) and Host Compliance Board (HCB). A copper cable assembly will be compliant with the SFP+ MSA Rev 3.2 if the dWDP number is less than 6.75 dBe.

WDP Specifications

Cable Gauge	Cable Length	WDPo (dB)	WDPi (dB)	dWDP
Spec Limit	**—**	**—**	**—**	**6.75**
30 AWG	3 meter	6.16	2.4	3.76
28 AWG	5 meter	7.49	2.4	5.09
26 AWG	6 meter	8.36	2.4	5.96
24 AWG	7 meter	7.44	2.4	5.04

VMA and VCR Measurements

VMA and VCR measurements listed in the table below are for the set lengths. To be compliant with SFF 8431 Rev 3.2 the VMA measurements must be less than 4.5 dB while testing with the module compliance test board. The VCR measurement is determined by computing VMA and NEXT RMS voltage measurements. The VCR measurement must be greater than 33 dB to be SFF-8431 Rev 3.2 compliant.

VMA and VCR Specifications

Cable Gauge	Cable Length	VMA (dB)	VCR (dB)
Spec Limit	**—**	**4.5**	**33**
30 AWG	3 meter	3.03875	40.6572
28 AWG	5 meter	3.93609	38.53281
26 AWG	6 meter	3.94267	35.82669
24 AWG	7 meter	2.86154	37.79826

For additional SFP+ cable assembly technical information, see customer drawing 2032237.

Note: All part numbers are RoHS compliant.

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Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А