

Quick Reference Guide

SFP+ High Speed Copper Cable Assemblies

TE Connectivity's SFP+ direct attach copper cable assemblies are a high speed, cost effective alternative to fiber optics in 10Gb Ethernet, 8Gb Fibre Channel and InfiniBand applications. SFP+ copper cable assemblies enable hardware OEMs and data center operators to achieve high port density and configurability at a low cost and reduced power requirement. Tyco Electronics SFP+ copper assemblies meet the industry MSA for signal integrity performance.

FEATURES AND BENEFITS

- MSA SFF-8431 compliant
- Supports serial data rates up to 10Gbps
- Low cost alternative to fiber optic assemblies
- Low power consumption
- Enhanced EMI suppression
- Pull-to-release retractable pin latch
- 24AWG through 30AWG cable available
- Passive and active assemblies
- Uses MADISON CABLE brand TurboTwin parallel pair cable

PRODUCT APPLICATIONS

- Switches
- Networking – servers, routers and hubs
- Enterprise storage
- Telecommunication equipment
- Network Interface Cards (NIC's)

APPLICATIONS BY PROTOCOL

- 10 Gigabit Ethernet and Gigabit Ethernet (IEEE802.3ae)
- Fibre channel: 1, 2, 4 and 8 GFC
- InfiniBand standard SDR (2.5Gbps), DDR (5Gbps) and QDR (10Gbps)
- Fibre Channel over Ethernet (FCoE)
- Serial data transmission

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IPR2025-01218 (Marvell Semiconductor, Inc. v. Credo Technology Group Ltd.)

SFP+ Cable Assembly Part Number Selection Guide

Base P/N	Passive/Active	Data Rate	AWG	Minimum Cable Length	Maximum Cable Length	Equalization
2127934	Passive	10Gbps	24	0.5m	7m	UnEQ
2127933	Passive	10Gbps	26	0.5m	6m	UnEQ
2127932	Passive	10Gbps	28	0.5m	5m	UnEQ
2127931	Passive	10Gbps	30	0.5m	3m	UnEQ
2032757	Active	10Gbps	24, 28, 30	0.5m	15m	N/A

SFP+ Cable Assembly : Specifications

Connector

Interface	PCB paddle card
Contact Material	30µ Gold plated contact pads
Backshell Material	Tin plated Zinc diecast
EMI Spring	Tin plated copper alloy
Latch	Retractable pin
Latch Release	Molded thermoplastic pull tab
Retention Force	90N Max
Durability	100 cycles Min

Twin Axial Cable

Operating Temp	0 to +70 deg C	Impedance	100 ± 10 Ohms
Storage Temp	-40 to +80 deg C	Jacket Material	Flexible PVC
Inner Shield	Aluminum/Poly Tape	Bend Radius	3x OD Static
Outer Shield	Tin Plated Copper Braid		5x OD Dynamic
Safety Certications	UL Recognized	Cable OD	24AWG = 0.255 in
	CSA Certified		26AWG = 0.205 in
	RoHS Compliant		28AWG = 0.185 in
	REACH 2010 Compliant		30AWG = 0.170 in

SFP+ Cable Assembly : Electrical Performance

Passive SFP+ Cable Assemblies : WDP, VMA and VCR Measurements

A passive copper cable assembly will be compliant with the SFP+ MSA Rev 4.1 if the dWDP number is less than 6.75 dBe. The WDP measurements shown in the table below are for the indicated wire gauge and cable length of Tyco Electronics production assemblies. Any cable with the same wire gauge and shorter length than the length listed below will have a lower dWDP value.

To be compliant with SFF 8431 Rev 4.1, the VMA must be less than 4.5 dB and the VCR must be greater than 33 dB. The VMA and VCR measurements shown in the table below are for the indicated wire gauge and cable length of Tyco Electronics production assemblies. Any cable with the same wire gauge and shorter length than the length listed below will also meet the VMA and VCR limits.

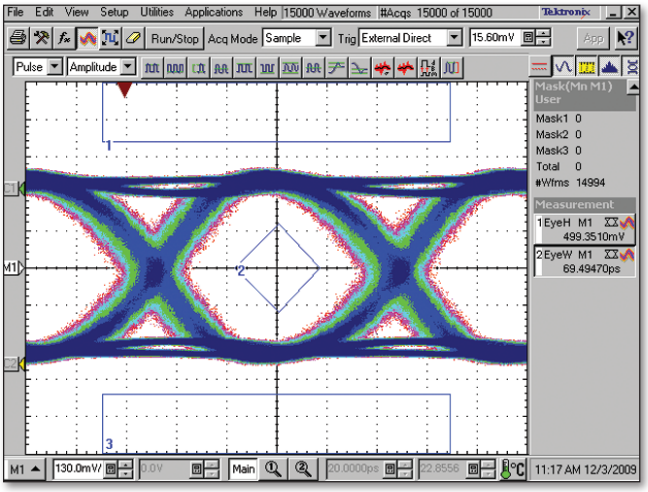
Cable Gauge	Cable Length	WDPo (dB)	WDPi (dB)	dWDP	VMA (dB)	VCR (dB)
Spec Limits	--	--	--	6.75	4.5	33.0
30 AWG	3 meter	6.16	2.4	3.76	3.03875	40.65720
28 AWG	5 meter	7.49	2.4	5.09	3.93609	38.53281
26 AWG	6 meter	8.36	2.4	5.96	3.94267	35.82669
24 AWG	7 meter	7.44	2.4	5.04	2.86154	37.79826

Active SFP+ Cable Assemblies

SFF-8431 requires active SFP+ cable assemblies to meet an output eye mask requirement when a minimal eye is transmitted through the cable assembly. The input eye mask is measured by transmitting a 10.3125 Gbps PRBS 2^{31}-1 signal into a module compliance test fixture and measuring the eye pattern through the mated host compliance test fixture. Once the input signal is established, the cable assemblies are measured through the module compliance test fixture. All cable assemblies meet the bit error rate requirement of $1x10^{-12}$. This design allows for output de-emphasis and signal amplitude to be adjusted to accomodate customer requirements.

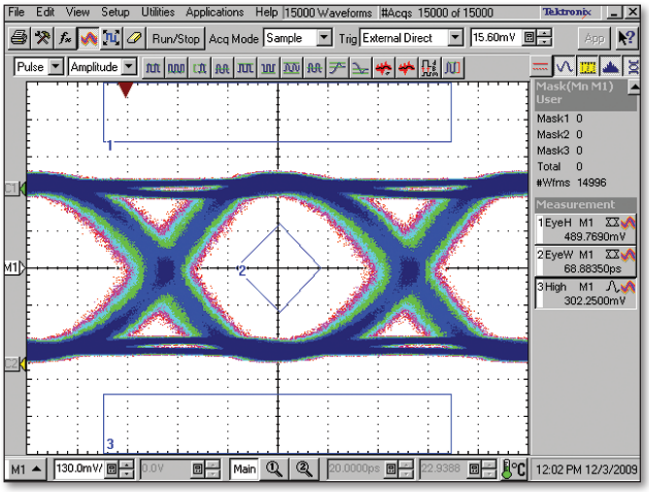
Output Eye Pattern Performance for 8m, 10m, 15m Active SFP+ DAC

8 Meter 30 AWG with Crosstalk



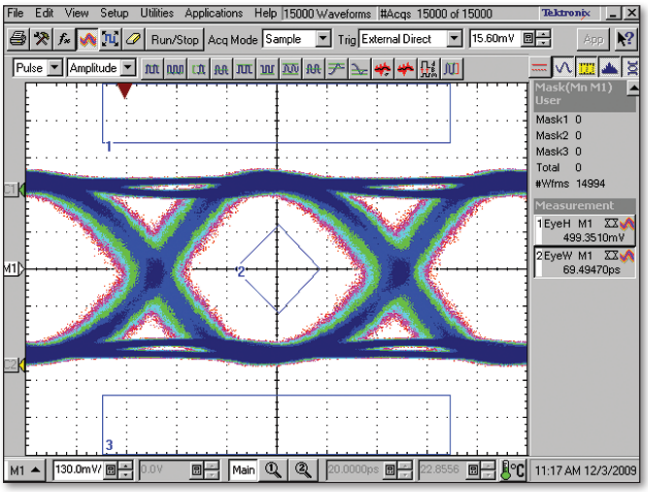
Eye Height = 499 mV, Eye Width = 69.5 ps

10 Meter 28 AWG with Crosstalk



Eye Height = 489 mV, Eye Width = 68.8 ps

15 Meter 24 AWG with Crosstalk



Eye Height = 491 mV, Eye Width = 64.5 ps

Frequently asked questions

What are the performance requirements for the cable assembly?
Tyco Electronics SFP+ copper passive and active cable assemblies meet the signal integrity requirements defined by the industry MSA SFF-8431. We can custom engineer cable assemblies to meet the requirements of a customer's specific system architecture.

Are passive or active cable assemblies required?
Passive cables have no signal amplification in the assembly and rely on host system Electronic Dispersion Compensation (EDC) for signal amplification/equalization. Active cable assemblies have signal amplification and equalization built into the assembly. Active cable assemblies are typically used in host systems that do not employ EDC. This solution can be a cost savings to the customer.

What wire gauge is required?
Tyco Electronics offers SFP+ cable assemblies in wire gauges #24 through #32 to support customers' specific cable routing requirements. Smaller wire gauges results in reduced weight, improved airflow and a more flexible cable for ease of routing.

What cable lengths are required?
Cable length and wire gauge are related to the performance characteristics of the cable assembly. Longer cable lengths require heavier wire gauge, while shorter cable lengths can utilize a smaller gauge cable.

Are there any special customer requirements?
Examples of special customer requirements include: custom cable lengths, EEPROM programming, labeling and packaging, pull tab length and color, company logo, signal output de-emphasis, and signal output amplitude. We can custom engineer cables to specific customer system architecture.

FOR MORE INFORMATION

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1-1773456-2 DTC PDF 03/2014

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