

## *Mini-SAS HD Active Optical Cable*

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### Product Overview

TMC's 48Gbps Mini-SAS HD AOC offers a high performance solution that is compliant with SFF-8644 MSA for storage applications. Each lane speed supports up to 12Gbps to meet SAS-3 standards, and is also backwards compatible with SAS-2.1 6-Gbps speeds. Out-of-band (OOB) low-speed hand-shaking communication is supported with optical mode selection.



### Features

- 4Tx/Rx, Full-Duplex AOCs, Maximum aggregate speed of 48-Gbps for SAS3.0
- Backwards compatible to 6-Gbps SAS-2.1 of optical-mode capable systems with out-of-band (OOB) signal supported
- Bit-Error-Rate (BER) better than  $10^{-12}$
- Link length up to 100-m via OM3 MMF
- Round, Halogen Free cable with small 3.0-mm outer diameter for flexible routing and easy cable management
- Compliant to the SFF-8644 MSA standard in mechanical specification
- Management interface compliant to SFF-8636
- QSFP+ to Mini-SAS HD AOC is available upon customer request

## *Mini-SAS HD Active Optical Cable*

### Recommended Operating Conditions

Parameter	Min	Typical	Max	Unit	Note
Case Operating Temperature	0	40	65	°C	SFF-8644
Power Supply Voltage	3.135	3.3	3.465	V	
Data Rate per Channel		12.0		Gbps	
Power Supply Noise Ripple Susceptibility (PSNR)			50	mV	1
Bit Error Ratio		10 <sup>-12</sup>			2
Control Input Voltage High	2		V <sub>CC</sub> +0.3	V	
Control Input Voltage Low	-0.3		0.8	V	
Two Wire Serial (TWS) Interface Clock Rate		100		kHz	

Notes:

1. Power supply noise is defined as peak-to-peak noise amplitude over 1K to 15 MHz frequency range at host supply side by the recommended power supply filter for module. See Section 10 for the recommended power supply filter.
2. Bit-Error-Rate (BER) test can be compliant to SCRAMBLED\_0 defined in Working Draft SAS Protocol Layer - 3 (SPL-3).

### Electrical Characteristics

Parameter	Min	Typical	Max	Unit	Note
<b>Transceiver</b>					
Transceiver Power Consumption			1	W	
Transceiver Power-On Initialization Time			2000	ms	1
<b>Transmitter</b>					
Maximum input peak to peak voltage (2× Z2)			1200	mVpp	2
Minimum input eye opening (2× Z1)	200			mVpp	2
Maximum half of TJ (X1)			0.175	UI	2
Maximum RJ			0.15	UI	2
Center of bit time (X2)		0.5		UI	2
<b>Receiver</b>					
Maximum output peak to peak voltage (2× Z2)			1200	mVpp	2
Minimum out eye opening (2× Z1)	190			mVpp	2
Maximum half of TJ (X1)			0.26	UI	2

## *Mini-SAS HD Active Optical Cable*

Parameter	Min	Typical	Max	Unit	Note
Maximum RJ			0.27	UI	2
Center of bit time (X2)		0.5		UI	2

Notes:

1. "Initialization Time" is the time from when the supply voltages reach and remain above the minimum "Recommended Operating Conditions" to the time when the module enables TWS access. The module at that point is fully functional.
2. Refer to the 12Gbps active cable eye mask from SAS-3 working draft Rev. 05a of Figure 101 and Table 31.

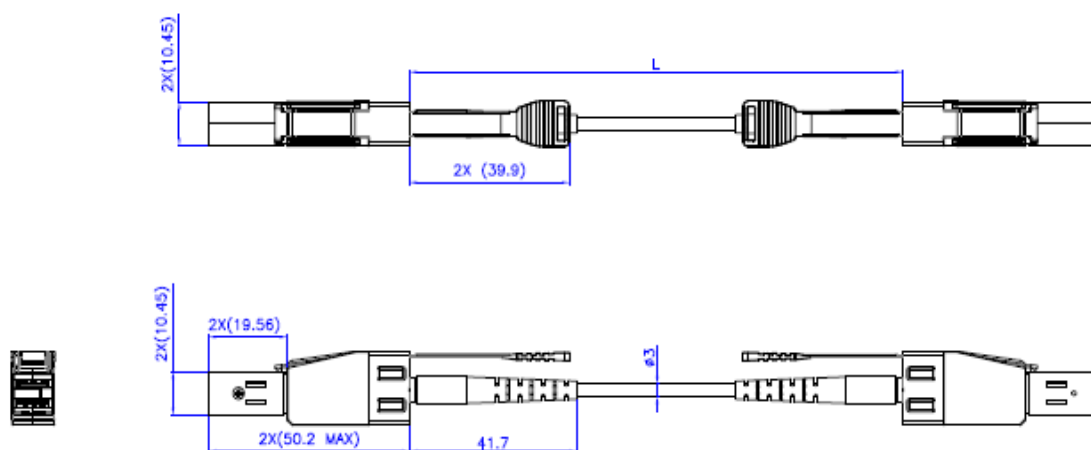
## Optical Cable Specification

Parameter	Specification	Notes
Minimum Cable Bending Radius	30 mm	
Cable Cross-Section Dimension	Round Type Cable with 3 mm in Dia.	
Cable Cover Type	LSZH	1
Standard Cable Length	3,7,10, 20, 30, 50, 100-m	2
Cable Length Tolerance	+1.0 / -0 m	

Notes:

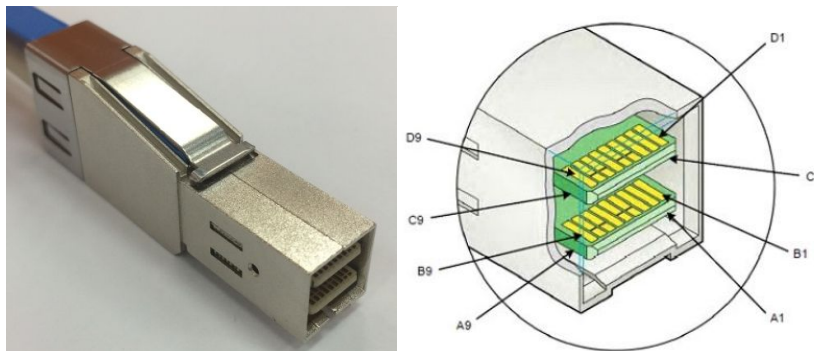
1. Standard cable insulation is LSZH. Other jacket types available upon request.
2. Different cable length may be recommended to adopt different multi-mode fiber (MMF) grades of OM2, OM3, or OM4

## Product Dimension



## *Mini-SAS HD Active Optical Cable*

### PIN Definition



Signal	Pin	Mating Level	Definition
Reserved	A1	Second	Reserved for future use
IntL	A2	Second	Management interface interrupt signal
GND	A3	First	Signal ground
RX1+	A4	Third	Fixed side receiver channel 1 non-inverting input
RX1-	A5	Third	Fixed side receiver channel 1 inverting input
GND	A6	First	Signal ground
RX3+	A7	Third	Fixed side receiver channel 3 non-inverting input
RX3-	A8	Third	Fixed side receiver channel 3 inverting input
GND	A9	First	Signal ground
Vact	B1	Second	Free side power input for non-management interface circuitry
ModPrsL	B2	Second	Free side active low present output
GND	B3	First	Signal ground
RX0+	B4	Third	Fixed side receiver channel 0 non-inverting input
RX0-	B5	Third	Fixed side receiver channel 0 inverting input
GND	B6	First	Signal ground
RX2+	B7	Third	Fixed side receiver channel 2 non-inverting input
RX2-	B8	Third	Fixed side receiver channel 2 inverting input
GND	B9	First	Signal ground
SCL	C1	Second	Management interface serial clock
SDA	C2	Second	Management interface serial data output
GND	C3	First	Signal ground
TX1+	C4	Third	Fixed side transmitter channel 1 non-inverting output
TX1-	C5	Third	Fixed side transmitter channel 1 inverting output

*Mini-SAS HD Active Optical Cable*

Signal	Pin	Mating Level	Definition
GND	C6	First	Signal ground
TX3+	C7	Third	Fixed side transmitter channel 3 non-inverting output
TX3-	C8	Third	Fixed side transmitter channel 3 inverting output
GND	C9	First	Signal ground
Vact	D1	Second	Free side power input for non-management interface circuitry
Vman	D2	Second	Free side power input for management interface circuitry
GND	D3	First	Signal ground
TX0+	D4	Third	Fixed side transmitter channel 0 non-inverting output
TX0-	D5	Third	Fixed side transmitter channel 0 inverting output
GND	D6	First	Signal ground
TX2+	D7	Third	Fixed side transmitter channel 2 non-inverting output
TX2-	D8	Third	Fixed side transmitter channel 2 inverting output
GND	D9	First	Signal ground

**Ordering Information**

The product part number for selected standard lengths is listed below.

Part Number	Length	Note
C5555-1M-O	1m	
C5555-3M-O	3m	
C5555-5M-O	5m	
C5555-7M-O	7m	
C5555-10M-O	10m	
C5555-20M-O	20m	
C5555-30M-O	30m	
C5555-50M-O	50m	
C5555-100M-O	100m	