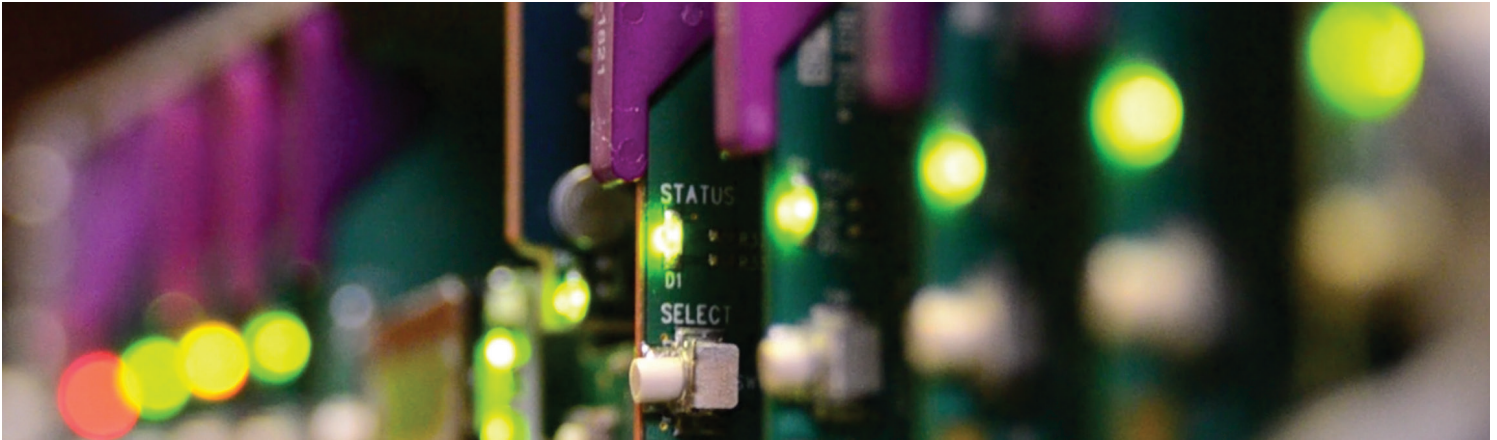


# QSFP+ Active Optical Cable

## 40 Gb/s Integrated Active Optical Cable (AOC)



The QSFP-CBL-xMM is perfect for high bandwidth, short-range data communications with 40 Gigabit hot-swappable ports for distances up to 5 meters.

Offering a lower cost solution than QSFP+ transceivers with MPO cables, the QSFP-CBL-xMM from Grass Valley, a Belden Brand, is a 4-channel pluggable integrated Active Optical Cable assembly for short-range data communication and interconnects applications.

The assembly contains four channels in each direction with 40 Gb/s aggregate bandwidth at distances of up to 5 meters (16 ft.). The electrical interfaces use 38-contact edge type connectors, compliant with SFF-8436. The AOC is QSFP+ MSA compliant, with low power consumption and a light weight.

### KEY FEATURES

- Four independent transmitters, and four independent receivers, all operate at 10 Gb/s
- Bidirectional operation, 4x10 Gb/s per direction
- Allows optical interoperability up to 5m (16 ft.) using an integrated Active Optical Cable assembly
- Multimode at 850 nm
- Hot pluggable
- Interoperable with other IEEE-compliant 40GBASE interfaces
- RoHS-6 compliance

### Applications

- 40G Ethernet interconnects

# QSFP+ Active Optical Cable

## SPECIFICATIONS

### QSFP-40G-AOC Quick Specifications

**Part Number:** QSFP-CBL-xMM

**Form Factor:** QSFP+

**TX Optical Wavelength:** 850 nm

### Distance:

1 m/3 ft. (QSFP-CBL-1MM)

3 m/10 ft. (QSFP-CBL-3MM)

5 m/16 ft. (QSFP-CBL-5MM)

### Cable Type:

MMF  
Rate Category: 40GBASE

### Interface Type:

AOC  
Digital Optical Mon. (DOM): Yes

Connector Type: QSFP+

Power Consumption: 1.5W

For specifications parameters definition, please refer to IEEE Std 802.3-2012, IEEE Standard for Ethernet, SECTION SIX, Clause 86 and Annex 86A.

## Absolute Maximum Ratings

Parameters	Symbols	Min	Max	Unit	Remarks
Storage temperature	$T_s$	-20	+85	deg.C	
Storage relative humidity	RH		85		
Supply voltage	$V_{cc}$	-0.3	+3.6	V	
ESD (HBM)	$V_{ESD}$	-1000	+1000	V	High speed interfaces
		-2000	+2000	V	Others
Transmitter single end input voltage	$V_{in\ p-p}$		1400	mV <sub>p-p</sub>	

## Recommended Operating Conditions

Parameters	Symbols	Min	Typ.	Max	Unit
Operating case temperature	$T_c$	0		+70	deg.C
Supply voltage	$V_{cc}$	3.13	3.3	3.47	V
Supply current	$I_{cc}$		280		mA@3.3V
Power supply noise tolerance				200	mV <sub>p-p</sub>
Bit rate	BR		10.3125		Gb/s
Rate tolerance		-100		+100	ppm

## Electrical Interfaces

### Transmitter Input Specification

Parameters	Min	Typ.	Max	Unit	Remarks
Single ended input voltage	-0.3		4	V	
AC common mode input voltage tolerance			15	mV <sub>rms</sub>	
J2 jitter tolerance			0.17	UI	@BER=1e-12
J9 jitter tolerance			0.29	UI	
DDPWS			0.07	UI	
Eye mask coordinate: X1, X2, Y1, Y2		0.11, 0.31 95, 350		UI mV	

### Receiver Output Specification at TP4

Parameters	Min	Typ.	Max	Unit	Remarks
Single ended output voltage	-0.3		4	V	
AC common mode output voltage			7.5	mV <sub>rms</sub>	
J2 jitter			0.42	UI	@BER=1e-12
J9 jitter			0.65	UI	
Output transition time (20% to 80%)	28			ps	
Eye mask coordinate: X1, X2, Y1, Y2		0.29, 0.5 150, 425		UI mV	

## Cable Specification

(Condition: Tc = 0 to 70° C)

Parameters	Value	Remarks
Type	OM2 Multimode Loose tube fiber	
Minimum Bend radius (mm)	30	
Cable diameter (mm)	3.0 ± 0.15	
Cable length (m/ft.)	1, 3, 5 / 3,10, 16	

## ORDERING

<b>QSFP-CBL-1MM</b>	QSFP+ to QSFP+ Active Optical Cable (AOC), length = 1m (3 ft.)
<b>QSFP-CBL-3MM</b>	QSFP+ to QSFP+ Active Optical Cable (AOC), length = 3m (10 ft.)
<b>QSFP-CBL-5MM</b>	QSFP+ to QSFP+ Active Optical Cable (AOC), length = 5m (16 ft.)