Product Specification

1~50m 800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable

PN: O800-NDR-A



Features

- Supports InfiniBand NDR twin-port connectivity
- Supports 2 × 400 Gb/s NDR port operation
- 850 Gb/s aggregate line bit rate
- 8 × 106.25 Gb/s PAM4 electrical lanes
- 850 nm VCSEL and PIN arrays
- Available lengths from 1 m to 50 m
- Hot-pluggable OSFP Finned Top form factor
- Single +3.3 V power supply
- Maximum power consumption <16 W per end
- Commercial operating case temperature range: 0°C to +70°C

Compliance

- InfiniBand Architecture Specification (IBTA), NDR
- OSFP MSA
- CMIS Rev. 5.1
- IEEE 802.3df
- IEEE 802.3ck
- RoHS compliant

Applications

- InfiniBand NDR
- AI/ML clusters
- High-Performance Computing (HPC)
- Cloud data centers
- NDR switch-to-switch links

Description

The O800-NDR-A is a hot-pluggable 800G Active Optical Cable (AOC) designed for InfiniBand NDR interconnections in AI, high-performance computing, and data center environments. Featuring OSFP Finned Top interfaces on both ends, the cable supports InfiniBand NDR twin-port operation with two 400 Gb/s NDR ports over eight 106.25 Gb/s PAM4 electrical lanes, providing an aggregate line bit rate of 850 Gb/s.

Each cable end integrates eight-channel 850 nm VCSEL transmitters, PIN receiver arrays, and high-speed signal-conditioning circuitry. Each electrical lane operates at 53.125 GBd PAM4 with a raw line bit rate of 106.25 Gb/s. The integrated multimode optical link provides reliable short-reach connectivity for compatible InfiniBand NDR switches and systems.

The cable is available in lengths from 1 m to 50 m and operates from a single +3.3 V power supply with a maximum power consumption of less than 16 W per end. Its integrated AOC architecture eliminates separate optical transceivers and external fiber patch cords, providing a compact and convenient interconnect solution for high-density InfiniBand NDR deployments.

The O800-NDR-A supports an eight-lane 100G-PAM4 electrical architecture and is designed in accordance with InfiniBand NDR requirements, OSFP MSA, CMIS Rev. 5.1, IEEE 802.3df, IEEE 802.3ck, and RoHS requirements.

Product performance Specifications

1、Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T_S	-40		+85	°C
Supply Voltage	V_CC	-0.3		3.6	V
Input Voltage	V_IN	-0.3		+ 0.3	V
Relative Humidity	RH	5		85	%

2、Recommended Operating Conditions

Parameter	Symbol	Min	Typ.	Max	Unit
Operating Case Temperature	T_C	0		+70	°C
Power Supply Voltage	V_CC	3.135	3.3	3.465	V
Relative Humidity	RH	5		85	%
Nominal Aggregate Data Rate			800		Gb/s
Aggregate Line Bit Rate	DR		850		Gb/s
Data Rate per Lane	BR		106.25		Gb/s

Signaling Rate per Lane	SR		53.125		GBd
Modulation Format			PAM4		
Cable Length	L	1		50	m

3、Power Supply and Electrical Specifications

Parameter	Symbol	Min	Typ.	Max	Unit
Power Supply Voltage	V_CC	3.135	3.3	3.465	V
Power Consumption per End	P_D			<16	W
Electrical Lane Count			8 TX / 8 RX		lanes
Data Rate per Lane	BR		106.25		Gb/s
Signaling Rate per Lane	SR		53.125		GBd

4、Host Electrical Interface

Parameter	Specification
Host Electrical Interface	8-lane 100G-PAM4 electrical interface
InfiniBand Interface	NDR
NDR Port Configuration	Twin-Port, 2 × 400 Gb/s
Electrical Lane Count	8 TX + 8 RX
Data Rate per Lane	106.25 Gb/s
Signaling Rate per Lane	53.125 GBd
Modulation Format	PAM4
Differential Impedance	100 Ω nominal
High-Speed Interface	AC-coupled differential

5、Transmitter Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Differential Input Impedance	Z_IN	90	100	110	Ω
Differential Input Voltage Amplitude	ΔV_IN	400		900	mVp-p
Input Logic Level High	V_IH	2.0		V_CC	V
Input Logic Level Low	V_IL	0		0.8	V

Signaling Rate per Lane	SR		53.125		GBd
Modulation Format			PAM4		

6、Receiver Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Differential Output Impedance	Z_OUT	90	100	110	Ω
Differential Output Voltage Amplitude	ΔV_OUT			850	mVp-p
Output Logic Level High	V_OH	V_CC − 0.5		V_CC	V
Output Logic Level Low	V_OL	0		0.4	V
Signaling Rate per Lane	SR		53.125		GBd
Modulation Format			PAM4		

7、Transmitter Optical Characteristics Per Lane

Parameter	Symbol	Min	Typ.	Max	Unit
Signaling Rate per Lane	SR		53.125		GBd
Modulation Format			PAM4		
Center Wavelength	λ_C	842	850	948	nm
RMS Spectral Width	Δλ_RMS			0.65	nm
Average Launch Power	P_AVG	-4.6		+4.0	dBm
OMAouter	OMA_OUTER	-2.6		+3.5	dBm
TDECQ	TDECQ			4.4	dB
Extinction Ratio	ER	2.5			dB
Transmitter Power Excursion	TPE			2.3	dB
Average Launch Power of OFF Transmitter	P_OFF			-30	dBm
RIN14OMA	RIN			-132	dB/Hz
Optical Return Loss Tolerance	ORL			14	dB

8、Receiver Optical Characteristics Per Lane

Parameter	Symbol	Min	Typ.	Max	Unit

Signaling Rate per Lane	SR		53.125		GBd
Modulation Format			PAM4		
Receiver Wavelength Range	λ_R	842	850	948	nm
Damage Threshold	TH_D	+5.0			dBm
Average Receive Power	P_RX	-6.3		+4.0	dBm
Receive Power (OMAouter)	RX_OMA			+3.5	dBm
Receiver Reflectance	R_R			-15	dB
Receiver Sensitivity (OMAouter)	R_SENS			max(-4.4, TECQ − 6.2)	dBm
Stressed Receiver Sensitivity	SRS			-1.8	dBm
LOS Assert	LOS_A	-15		-8.5	dBm
LOS De-assert	LOS_D			-6.5	dBm
LOS Hysteresis	LOS_H	0.5			dB

9、Encircled Flux Requirements

Parameter	Requirement
Encircled Flux at 19μm	≥86%
Encircled Flux at 4.5μm	≤30%

10、FEC and BER Specifications

Parameter	Symbol	Unit
Pre-FEC Bit Error Ratio	BER	$\leq 2.4 \times 10^{-4}$
Test Pattern		PRBS31Q
FEC		Host-side FEC
Modulation Format		PAM4
Signaling Rate per Lane		53.125GBd

11、Management Interface Specifications

Parameter	Specification
Management Interface	CMIS Rev. 5.1
Management Communication	2-wire I²C-based interface

Module Form Factor	OSFP
Managed Electrical Lanes	8
Module Identification	Supported
Module Status Monitoring	Supported

12、Cable and Mechanical Characteristics

Parameter	Specification
Cable Type	Active Optical Cable (AOC)
Connector End A	OSFP Finned Top
Connector End B	OSFP Finned Top
Fiber Type	Multimode Fiber (MMF)
Optical Architecture	8-channel parallel optics
Transmitter Type	850nm VCSEL Array
Receiver Type	PIN Photodiode Array
Cable Length Range	1–50m

13、Environmental and Regulatory Specifications

Parameter	Specification
Operating Case Temperature	0°C to +70°C
Storage Temperature	-40°C to +85°C
Relative Humidity	5% to 85%, non-condensing
Supply Voltage	+3.3V nominal
RoHS	Compliant

Pin-out Definition(OSFP)

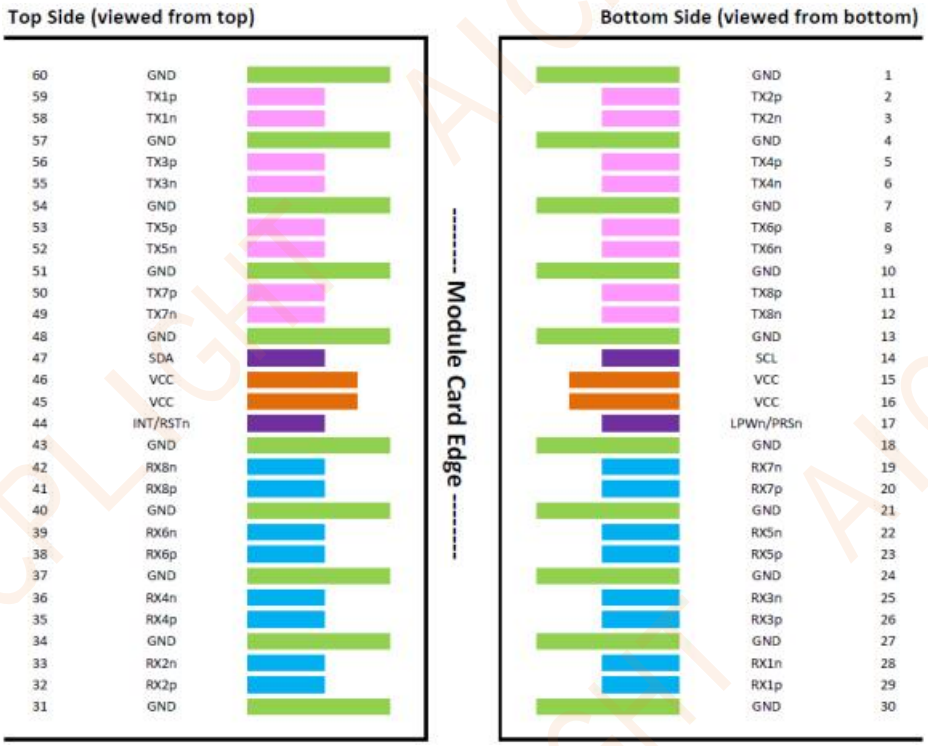


Figure4:Pin view(OSFP)

Pin Function Definitions(OSFP)

Pin	Logic	Symbol	Description	Note
1		GND	Ground	
2	CML-I	TX2p	Transmitter Data Non-Inverted	
3	CML-I	TX2n	Transmitter Data Inverted	
4		GND	Ground	
5	CML-I	TX4p	Transmitter Data Non-Inverted	
6	CML-I	TX4n	Transmitter Data Inverted	
7		GND	Ground	
8	CML-I	TX6p	Transmitter Data Non-Inverted	
9	CML-I	TX6n	Transmitter Data Inverted	
10		GND	Ground	
11	CML-I	TX8p	Transmitter Data Non-Inverted	
12	CML-I	TX8n	Transmitter Data Inverted	
13		GND	Ground	
14	LVCMOS-I/O	SCL	2-wire Serial interface clock	1
15		VCC	+3.3V Power	
16		VCC	+3.3V Power	

17	Multi-Level	LPWn/PRSn	Low-Power Mode / Module Present	2
18		GND	Ground	
19	CML-O	RX7n	Receiver Data Inverted	
20	CML-O	RX7p	Receiver Data Non-Inverted	
21		GND	Ground	
22	CML-O	RX5n	Receiver Data Inverted	
23	CML-O	RX5p	Receiver Data Non-Inverted	
24		GND	Ground	
25	CML-O	RX3n	Receiver Data Inverted	
26	CML-O	RX3p	Receiver Data Non-Inverted	
27		GND	Ground	
28	CML-O	RX1n	Receiver Data Inverted	
29	CML-O	RX1p	Receiver Data Non-Inverted	
30		GND	Ground	
31		GND	Ground	
32	CML-O	RX2p	Receiver Data Non-Inverted	
33	CML-O	RX2n	Receiver Data Inverted	
34		GND	Ground	
35	CML-O	RX4p	Receiver Data Non-Inverted	
36	CML-O	RX4n	Receiver Data Inverted	
37		GND	Ground	
38	CML-O	RX6p	Receiver Data Non-Inverted	
39	CML-O	RX6n	Receiver Data Inverted	
40		GND	Ground	
41	CML-O	RX8p	Receiver Data Non-Inverted	
42	CML-O	RX8n	Receiver Data Inverted	
43		GND	Ground	
44	Multi-Level	INT/RSTn	Module Interrupt / Module Reset	2
45		VCC	+3.3V Power	
46		VCC	+3.3V Power	
47	LVCMOS-I/O	SDA	2-wire Serial interface data	1
48		GND	Ground	
49	CML-I	TX7n	Transmitter Data Inverted	
50	CML-I	TX7p	Transmitter Data Non-Inverted	
51		GND	Ground	
52	CML-I	TX5n	Transmitter Data Inverted	
53	CML-I	TX5p	Transmitter Data Non-Inverted	
54		GND	Ground	
55	CML-I	TX3n	Transmitter Data Inverted	
56	CML-I	TX3p	Transmitter Data Non-Inverted	

57		GND	Ground	
58	CML-I	TX1n	Transmitter Data Inverted	
59	CML-I	TX1p	Transmitter Data Non-Inverted	
60		GND	Ground	

Note1: Open-Drain with pull up resistor on Host.

Note2: See pin description for required circuit.

Monitoring Specification

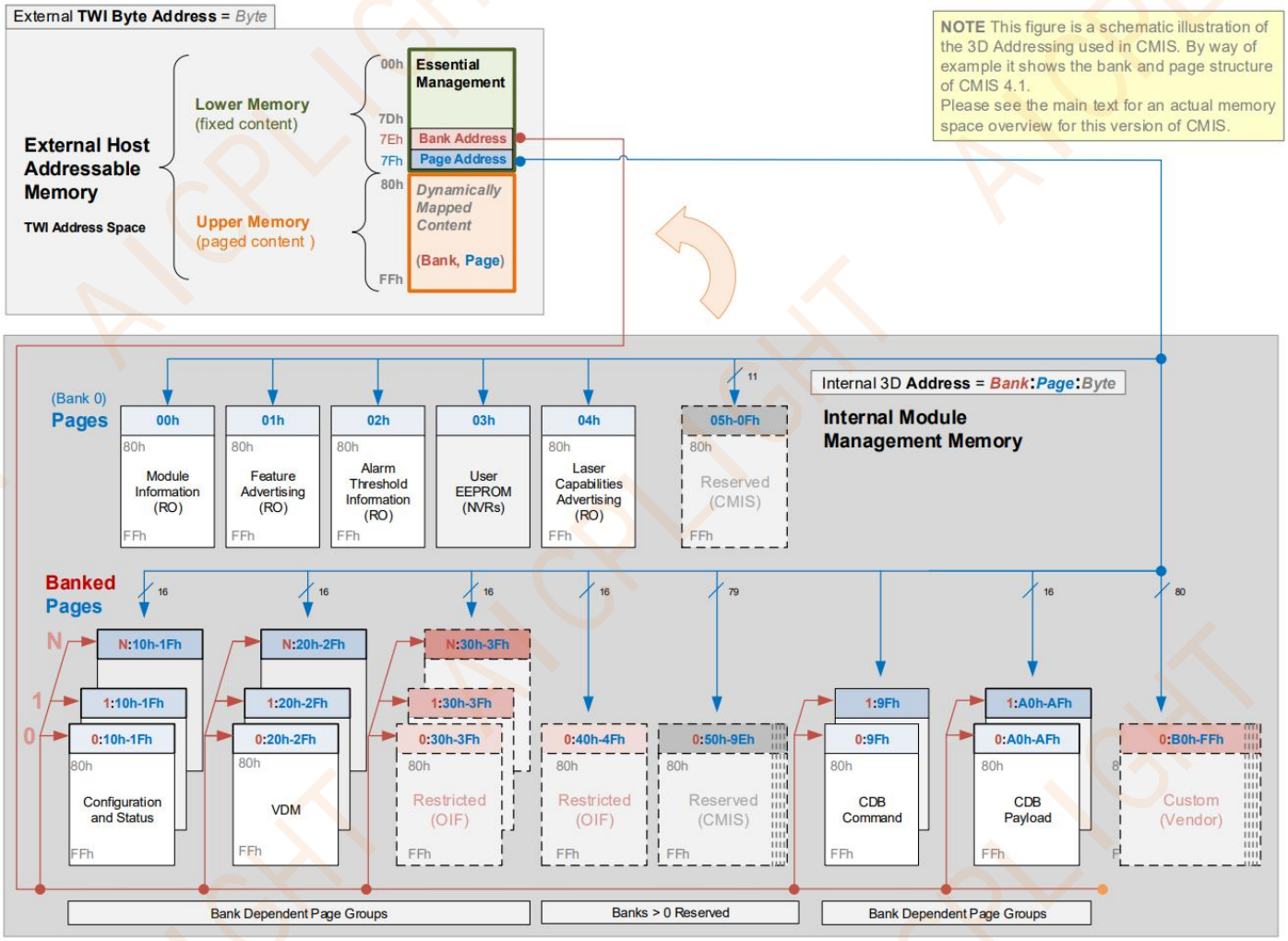
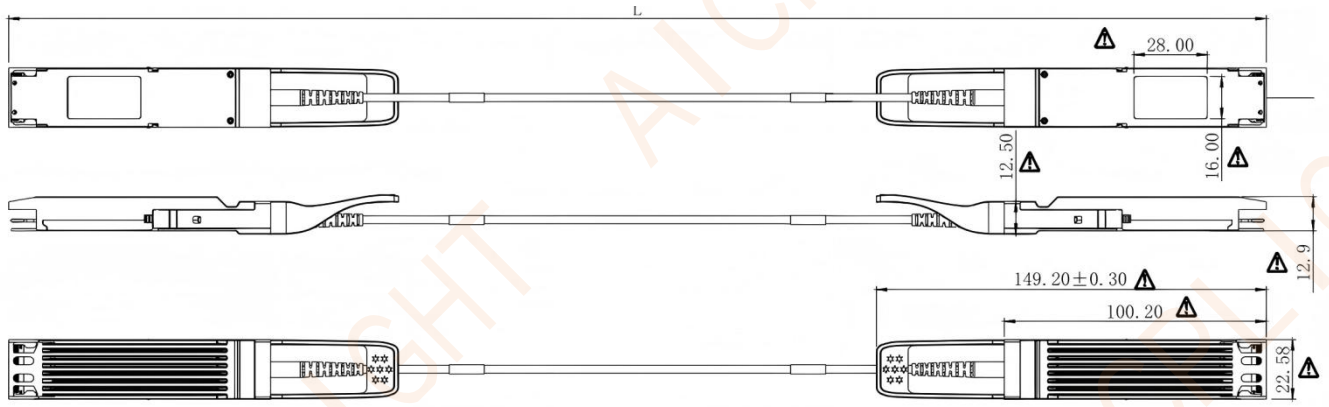


Figure5: Memory map

Memory map Table

Byte	Unit	Name	Description
		Lower Page 00h	
0-2	3	Management Characteristics	Basic Information about how this module is managed
3	1	Global Status Information	Current state of Module, Interrupt signal status
4-7	4	Flag Summary	Summary of Flags set on specific Pages (and Banks)
8-13	6	Module-Level Flags	Flags that are not lane or Data Path specific
14-25	12	Module-Level Monitors	Monitors that are not lane or Data Path specific
26-30	5	Module-Level Controls	Controls applicable to the module as a whole
31-36	6	Module-Level Masks	Mask bits for the Module-Level Flags
37-38	2	CDB Command Status	Status of current CDB command
39-40	2	Module Active Firmware Version	Module Active Firmware Version number
41	1	Fault Information	Fault cause for entering ModuleFault state
42-63	22		Reserved
64-84	21		Custom
85-117	33	Supported Applications Advertising	Applications supported by module Data Path(s)
118-125	8	Password Facilities	Password Entry and Change (mechanism only)
126-127	2	Page Mapping	Page mapping into host addressable Upper Memory
		Upper Page 00h	
128	1	SFF8024IdentifierCopy	Copy of Byte 00h:0
129-144	16	VendorName	Vendor name (ASCII)
145-147	3	Vendor OUI	Vendor IEEE company ID
148-163	16	Vendor PN	Part number provided by vendor (ASCII)
164-165	2	Vendor Rev	Revision level for part number provided by vendor (ASCII)
166-181	16	Vendor SN	Vendor Serial Number (ASCII)
182-189	8	DateCode	Manufacturing Date Code (ASCII)
190-199	10	CLEICode	Common Language Equipment Identification Code (ASCII)
200-201	2	ModulePowerCharacteristics	Module power characteristics
202	1	CableAssemblyLinkLength	Cable length (for cable assembly modules only)
203	1	ConnectorType	Connector type of the media interface
204-209	6	Copper Cable Attenuation	Attenuation characteristics (passive copper cables only)
210	1	MediaLaneInformation	Supported near end media lanes (all modules)
211	1	Cable Assembly Information	Far end modules information (cable assemblies only)
212	1	MediaInterfaceTechnology	Information on media side device or cable technology
213-220	8		Reserved
221	1		Custom
222	1	PageChecksum	Page Checksum over bytes 128-221
223-255	33		Custom

Mechanical Dimension



Note:

- Diameter: 3mm
- Minimum bend radius:30 mm
- Cable color:Aqua
- When L≤1m, the tolerance is +70/-0 mm
- When 1 m<L<7 m, the tolerance is +100/-0 mm
- When L≥7 m,the tolerance is +2%L/-0

Handling and Safety Precautions:

- ESD Precautions: Follow standard ESD handling procedures when handling or installing the AOC.
- Bend Radius: Do not bend the cable below the specified minimum bend radius of 30 mm.
- Cable Handling: Avoid excessive pulling, twisting, crushing, or other mechanical stress on the cable.
- Installation and Removal: Use the pull tab or release mechanism when removing the AOC. Do not pull directly on the cable.
- Connector Protection: Keep the electrical connector contacts clean and protected from dust and contamination when not installed.
- Optical and Laser Safety: The optical fibers and optical engines are permanently integrated within the AOC assembly. Do not disassemble, modify, or attempt to service the internal optical components.

Ordering Information

PN	Description
O800-NDR-A1	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,1m
O800-NDR-A5	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,5m
O800-NDR-A10	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,10m
O800-NDR-A15	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,15m
O800-NDR-A20	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,20m
O800-NDR-A30	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,30m
O800-NDR-A50	800G OSFP Finned Top to 800G OSFP Finned Top InfiniBand NDR Active Optical Cable,50m

Note: Other cable lengths from 1m to 50m are available upon request.