Product Specification

1~3m 800G OSFP Finned Top to 4× 200G OSFP Finned Top InfiniBand NDR Passive Direct Attach Copper Breakout Cable

PN: O800-4O-NDR-C



Features

- Supports InfiniBand NDR to 4 × NDR200 breakout connectivity
- Supports 800G to 4 × 200G breakout
- 8 × 106.25 Gb/s PAM4 electrical lanes
- 2 × 106.25 Gb/s PAM4 lanes per 200G branch
- 26 AWG, 28 AWG and 30 AWG cable options
- Available in 1–3 m lengths
- Passive twinax copper cable design
- Hot-pluggable OSFP interfaces
- Low power dissipation of <0.1 W
- Commercial operating temperature range: 0°C to +70°C

Compliance

- InfiniBand Architecture Specification (IBTA), NDR / NDR200
- OSFP MSA
- CMIS Rev. 5.1
- IEEE 802.3ck-2022
- RoHS compliant

Applications

- InfiniBand NDR / NDR200
- AI/ML clusters
- High-Performance Computing (HPC)
- GPU computing networks
- Cloud data centers
- NDR breakout links

Description

The O800-4O-NDR-C is a high-performance Passive Direct Attach Copper (DAC) breakout cable designed for InfiniBand NDR and NDR200 interconnections in AI, high-performance computing, and data center environments. It connects one 800G OSFP Finned Top interface to four independent 200G OSFP Finned Top interfaces, enabling 800G-to-4×200G breakout connectivity for InfiniBand NDR-based networks.

The 800G OSFP interface utilizes eight 106.25 Gb/s PAM4 electrical lanes, with two lanes allocated to each 200G branch. Each branch provides up to 200 Gb/s of data capacity and can support compatible InfiniBand NDR200 interfaces.

Featuring a passive twinaxial copper architecture without active signal-conditioning components in the high-speed data path, the cable provides low-latency and near-zero-power short-reach connectivity. It is available in 26 AWG, 28 AWG and 30 AWG configurations and in lengths from 1 m to 3 m for high-density interconnections in AI/ML clusters, HPC systems, and cloud data centers.

The 1-to-4 breakout architecture enables a single eight-lane 800G OSFP interface to connect directly to four independent two-lane 200G OSFP interfaces. The same 100G-PAM4 electrical architecture also supports compatible Ethernet applications.

The cable is designed in accordance with InfiniBand NDR and NDR200 requirements, OSFP MSA, CMIS Rev. 5.1, IEEE 802.3ck-2022, and RoHS requirements.

Product performance Specifications

1、Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	TS	-40		+85	°C
Supply Voltage	VCC	-0.5	3.3	4.0	V

2、Recommended Operating Conditions

Parameter	Symbol	Min	Typ.	Max	Unit
Operating Case Temperature	TC	0		+70	°C
Relative Humidity	RH	5		85	%

3、General Product Specifications

Parameter	Specification	Condition

Product Type	Passive Direct Attach Copper (DAC) Breakout Cable	
Connector Configuration	1 × 800G OSFP Finned Top to 4 × 200G OSFP Finned Top	1-to-4 breakout
Supported Network Protocol	InfiniBand NDR / NDR200 / Ethernet	
InfiniBand Head-End Interface	NDR	
Branch Interface	NDR200	4 × 200 Gb/s
Aggregate Data Rate	800 Gb/s	4 × 200 Gb/s
Raw Electrical Line Rate	850 Gb/s	8 × 106.25 Gb/s
Electrical Signaling	PAM4	
Data Rate per Lane	106.25 Gb/s	
Electrical Lane Configuration	8 Tx + 8 Rx at 800G end; 2 Tx + 2 Rx per 200G branch	
Host Electrical Interface	8-lane 100G-PAM4 to 4 × 2-lane 100G-PAM4	
Cable Length	1 m, 2 m, 3 m	
Cable Gauge	26 AWG, 28 AWG, 30 AWG	
Cable Type	Passive Twinaxial Copper	
Hot Pluggable	Supported	
Management Interface	I²C with EEPROM identification	

4、Breakout Lane Architecture

Parameter	Specification
nfiniBand Interface	NDR / NDR200
Breakout Architecture	1 × 800G to 4 × 200G
800G OSFP End	8 × 106.25 Gb/s PAM4 lanes
200G Branch 1	2 × 106.25 Gb/s PAM4 lanes
200G Branch 2	2 × 106.25 Gb/s PAM4 lanes
200G Branch 3	2 × 106.25 Gb/s PAM4 lanes
200G Branch 4	2 × 106.25 Gb/s PAM4 lanes
Branch Data Rate	200 Gb/s each
Branch InfiniBand Mode	NDR200
Modulation Format	PAM4
Signal Conditioning	Passive

Connector A	OSFP Finned Top
Connector B1–B4	OSFP Flat Top

5、Power Supply and Management Interface

Parameter	Symbol	Min	Typ.	Max	Unit
Power Dissipation	PD			<0.1	W
Management Interface			I²C		
Module Identification			EEPROM		
Management Specification			CMIS 5.1		

6、High-Speed Signal Integrity Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Condition
Differential Insertion Loss at 26.56 GHz	SDD21	11.0		19.75	dB	At 26.56 GHz
Minimum Cable Assembly Effective Return Loss	ERL	8.25			dB	

7、Frequency-Dependent Signal Integrity Limits

Parameter	Symbol	Frequency Range (GHz)	Requirement	Unit
Differential-to-Common-Mode Return Loss	RLcd(f)	0.05 ≤ f < 26.56	RLcd(f) ≥ 22 − 10(f/26.56)	dB
		26.56 ≤ f ≤ 40	RLcd(f) ≥ 15 − 3(f/26.56)	dB
Differential-to-Common-Mode Conversion Loss Difference	SCD21 − SDD21	0.05 ≤ f < 12.89	SCD21 − SDD21 ≥ 10	dB
		12.89 ≤ f ≤ 40	SCD21 − SDD21 ≥ 14 − 0.3108f	dB

8、Cable Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Differential Impedance	Zdiff	95	100	105	Ω
Mutual Capacitance	Cm		14		pF/ft
Propagation Delay	tp		1.35		ns/ft

Propagation Delay	tp		4.43		ns/m

9、Cable Electrical and Physical Characteristics by AWG

Parameter	26 AWG	28 AWG	30 AWG	Unit
Intra-Pair Skew	120 ps / 8.5 m maximum	120 ps / 7 m maximum	50 ps / 5.5 m maximum	ps / reference length
Inter-Pair Skew	500 ps / 8.5 m maximum	500 ps / 7 m maximum	350 ps / 5.5 m maximum	ps / reference length
Conductor DC Resistance at 20°C	0.041	0.065	0.103	Ω/ft
Outer Cable Diameter	5.2	4.7	4.2	mm

10、Cable Construction

Parameter	Specification
Cable Architecture	16 differential pairs total (8 Tx + 8 Rx), with 2 Tx + 2 Rx assigned to each 200G branch
Conductor Material	Solid silver-plated copper
Conductor Gauge	26 AWG, 28 AWG, 30 AWG
Pair Drain Wire	28 AWG for 26 AWG cable; 30 AWG for 28 AWG and 30 AWG cable
Insulation Material	Foam polyolefin
Overall Cable Shield	Aluminum/polyester tape and tinned copper braid
Foil Coverage	125%
Braid Specification	38 AWG; 85% coverage

11、Mechanical Performance

Parameter	Symbol	Min	Typ.	Max	Unit
OSFP Mating Force				40	N
OSFP Unmating Force				30	N
Latch Retention Force		125			N
Bulk Cable Retention in Module		90			N
Mechanical Durability		50			Cycles
Minimum Bend Radius, Single Bend				5 × Cable OD	
Minimum Bend Radius, Repeated				10 × Cable OD	

Bending					
OSFP Mating Force				40	N

Pin-out Definition

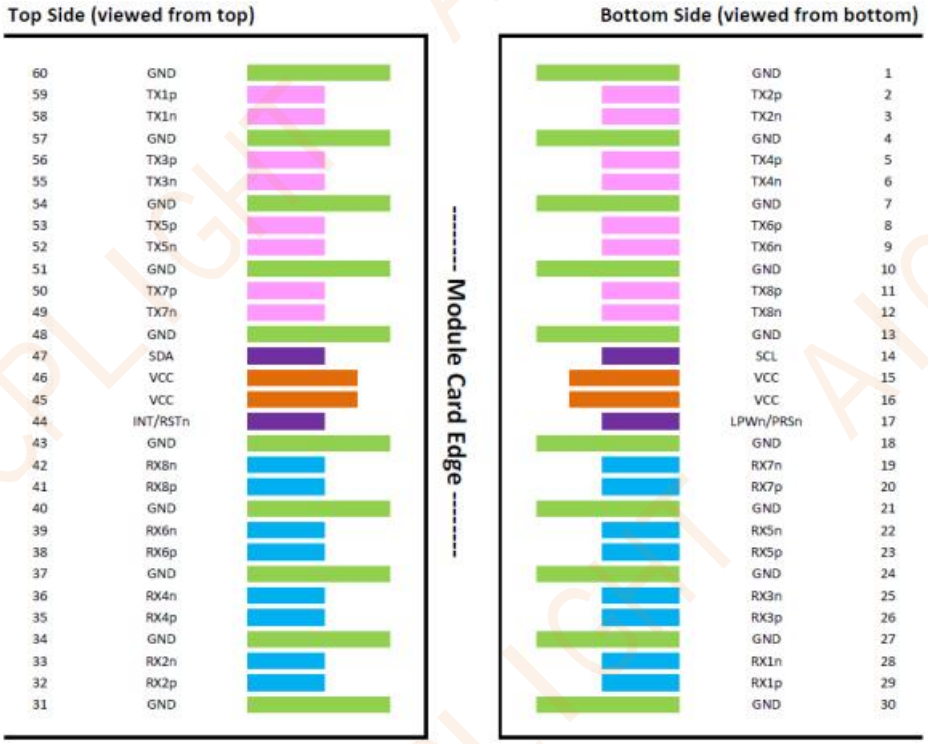


Figure4:Pin view

Pin Function Definitions

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

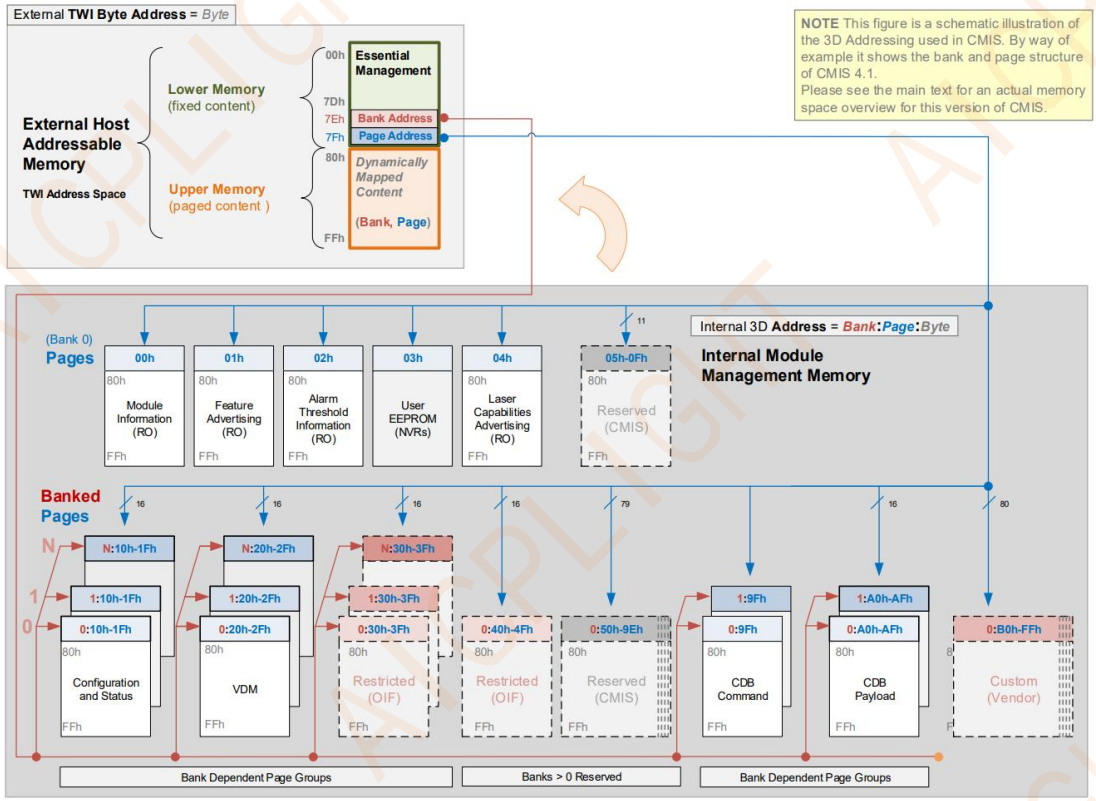
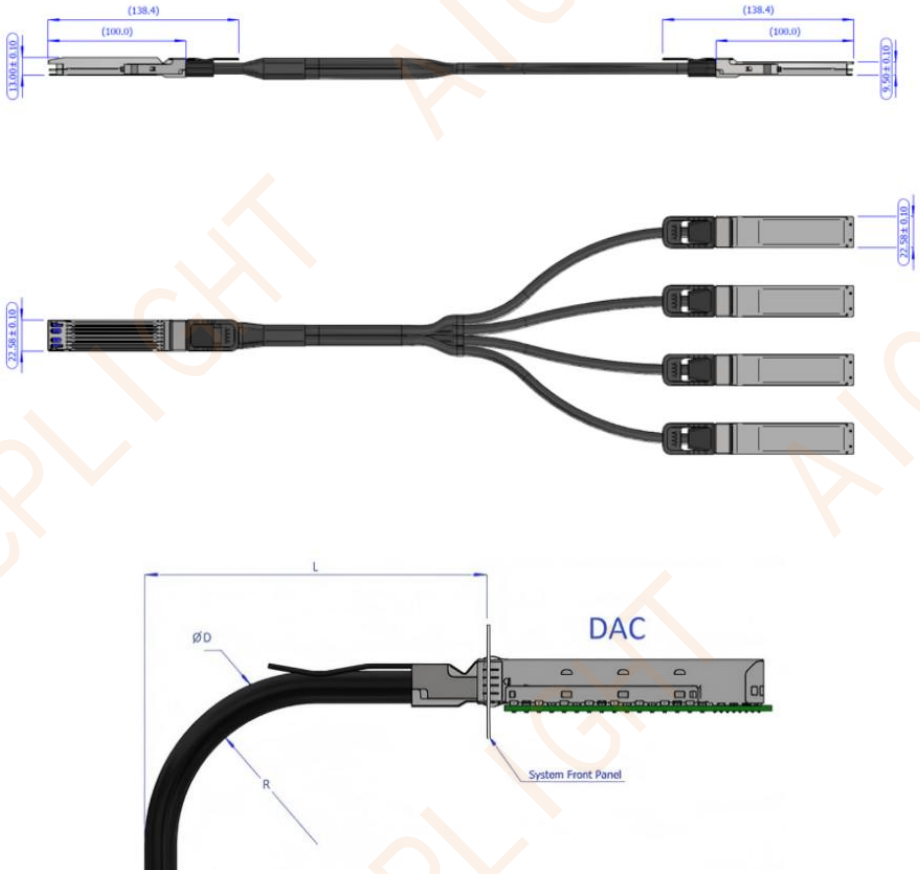


Figure5: Memory map

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:

- All dimensions are in mm.
- Unless otherwise specified, dimensional tolerance is ±0.1 mm.
- Latch color: Black.
- Cable length tolerance: ±25 mm for L < 2 m and ±50 mm for L ≥ 2 m.

Handling and Safety Precautions:

- ESD Precautions: Follow standard ESD handling procedures when handling or installing the cable assembly, particularly at the connector ends.
- Bend Radius: Do not bend the cable below the specified minimum bend radius. Avoid sharp bends or repeated bending near the connector strain-relief area.
- Cable Handling: Avoid excessive pulling, twisting, crushing, kinking, or other mechanical stress that may damage the cable or affect signal integrity.
- Installation and Removal: Use the pull tab or release mechanism when inserting or removing the cable assembly. Do not pull directly on the cable.
- Connector Protection: Keep the electrical connector contacts clean and protected from dust, moisture, and contamination when not installed.
- Cable Assembly Protection: Do not disassemble, modify, splice, or attempt to repair the cable assembly or connector housing. Replace the cable if physical damage is observed.

Ordering Information

PN	Description
O800-4O-NDR-C1	800G OSFP Finned Top to 4× 200G OSFP Finned Top InfiniBand NDR Passive Direct Attach Copper Breakout Cable,1m
O800-4O-NDR-C1.5	800G OSFP Finned Top to 4× 200G OSFP Finned Top InfiniBand NDR Passive Direct Attach Copper Breakout Cable,1.5m
O800-4O-NDR-C2	800G OSFP Finned Top to 4× 200G OSFP Finned Top InfiniBand NDR Passive Direct Attach Copper Breakout Cable,2m
O800-4O-NDR-C3	800G OSFP Finned Top to 4× 200G OSFP Finned Top InfiniBand NDR Passive Direct Attach Copper Breakout Cable,3m