



# **MCA7J70-Nxxx 800Gb/s Twin-port OSFP to 4x200Gb/s OSFP ACC Splitter Product Specifications**

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# Introduction

NVIDIA® MCA7J70 is an 800Gb/s twin-port OSFP (Octal Small Form-factor Pluggable) to 2x400Gb/s OSFP passive Active Copper Cable (ACC) dual breakout (aka splitter) cable. The ACC uses 8-channels of 100G-PAM4 modulation and has lengths of 4 and 5 meters. It has identical design and internals as the QSFP112 version, only with different connector shells.

The ACC firmware supports both InfiniBand and Ethernet and is automatically enabled depending on the protocol of the switch attached to. The 8-channel, twin-port, OSFP end uses a finned top form-factor for use in Quantum-2 and Spectrum-4 switch cages. The four 200G ends support 2-channels of 100G-PAM4 (400G) use a flat top OSFP for use in ConnectX-7 adapters using riding heat sinks on the connector cage. For use in liquid-cooled systems, a twin-port OSFP version is available with a flat top (designated -FLT in the part number).

ACC cables are the second lowest-cost, low-latency, low-power consuming, high-speed links next to passive DACs due to their simplicity of design and minimal components. The “active” term refers to the passive copper cable with an equalizer integrated circuit to extend the length to 4 and 5-meters while maintaining low-latency and low-power at 1.5 Watts and 0.6 Watts. Thin 30AWG is used for 4m lengths and thicker 26AWG for 5m. Each end includes an EEPROM which provides product identification and characteristics to the host system.

Main use is linking an 800Gb/s Quantum-2 switch or Spectrum-4 switch to OSFP-based 200Gb/s ConnectX-7 PCIe network adapter cards.

NVIDIA’s cable solutions provide power-efficient connectivity enabling higher port bandwidth, density and configurability at a low cost and reduced power requirement in the data centers. Rigorous cable production testing ensures best out-of-the-box installation experience, performance, and durability.



⚠ Images are for illustration purposes only. Product labels, colors, and lengths may vary.

## Key Features

- Up to 800Gb/s split to four 200Gb/s data rates
- Based on 100G-PAM4 modulation
- 1.5 Watts switch end; 0.3 Watts per HCA ends
- 4 and 5 meter lengths
- Operating case temperature 0-70°C
- Single 3.3V supply voltage
- Hot pluggable
- RoHS compliant
- LSZH (Low Smoke Zero Halogen) jacket
- LF (Lead Free) HF (Halogen Free) PCB
- IBTA IB HDR based
- [OSFPmsa.org](https://www.OSFPmsa.org) based
- CMIS Based I<sup>2</sup>C management interface (OSFP end)

## Applications

- InfiniBand Quantum-2 or Spectrum-4 Ethernet switch-to-four 200Gb/s ConnectX-7 OSFP adapters

# Pin Descriptions

The device is OSFP MSA Specification for OSFP Octal Small Form Factor Pluggable Module Rev. 1.12 compliant, see [www.osfpmsa.org](http://www.osfpmsa.org).

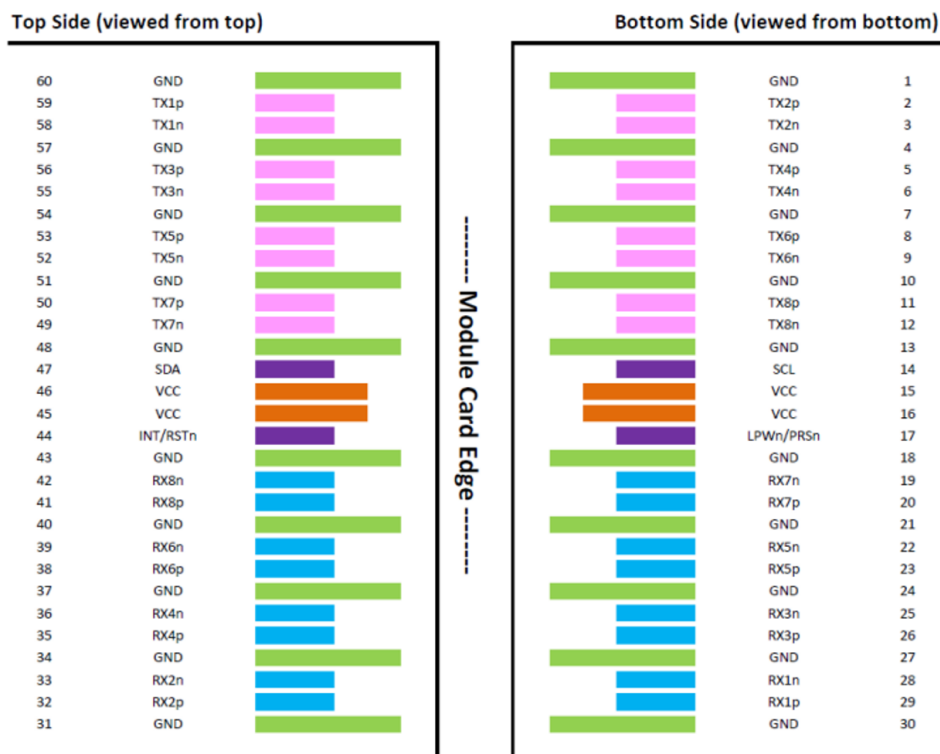
The pin assignment for the interface is shown below.

## OSFP Pin Description

Pin	Symbol	Description	Pin	Symbol	Description
1	GND	Ground	31	GND	Ground
2	Tx2p	Transmitter Non-Inverted Data Input	32	Rx2p	Receiver Non-Inverted Data Output
3	Tx2n	Transmitter Inverted Data Input	33	Rx2n	Receiver Inverted Data Output
4	GND	Ground	34	GND	Grounds
5	Tx4p	Transmitter Non-Inverted Data Input	35	Rx4p	Receiver Non-Inverted Data Output
6	Tx4n	Transmitter Inverted Data Input	36	Rx4n	Receiver Inverted Data Output
7	GND	Ground	37	GND	Ground
8	Tx6p	Transmitter Non-Inverted Data Input	38	Rx6p	Receiver Non-Inverted Data Output
9	Tx6n	Transmitter Inverted Data Input	39	Rx6n	Receiver Inverted Data Output
10	GND	Ground	40	GND	Ground
11	Tx8p	Transmitter Non-Inverted Data Input	41	Rx8p	Receiver Non-Inverted Data Output
12	Tx8n	Transmitter Inverted Data Input	42	Rx8n	Receiver Inverted Data Output
13	GND	Ground	43	GND	Ground
14	SCL	2-wire serial interface clock	44	INT / RSTn	Module Interrupt / Module Reset
15	VCC	+3.3V Power	45	VCC	+3.3V Power
16	VCC	+3.3V Power	46	VCC	+3.3V Power
17	LPWn / PRSn	Low-Power Mode / Module Present	47	SDA	2-wire Serial interface data
18	GND	Ground	48	GND	Ground
19	Rx7n	Receiver Inverted Data Output	49	Tx7n	Transmitter Inverted Data Input
20	Rx7p	Receiver Non-Inverted Data Output	50	Tx7p	Transmitter Non-Inverted Data Input
21	GND	Ground	51	GND	Ground
22	Rx5n	Receiver Inverted Data Output	52	Tx5n	Transmitter Inverted Data Input
23	Rx5p	Receiver Non-Inverted Data Output	53	Tx5p	Transmitter Non-Inverted Data Input

Pin	Symbol	Description	Pin	Symbol	Description
24	GND	Ground	54	GND	Ground
25	Rx3n	Receiver Inverted Data Output	55	Tx3n	Transmitter Inverted Data Input
26	Rx3p	Receiver Non-Inverted Data Output	56	Tx3p	Transmitter Non-Inverted Data Input
27	GND	Ground	57	GND	Ground
28	Rx1n	Receiver Inverted Data Output	58	Tx1n	Transmitter Inverted Data Input
29	Rx1p	Receiver Non-Inverted Data Output	59	Tx1p	Transmitter Non-Inverted Data Input
30	GND	Ground	60	GND	Ground

## OSFP Module Pad Layout



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# Specifications

## Absolute Maximum Specifications

Absolute maximum ratings are those beyond which damage to the device may occur.

Between the operational specifications and absolute maximum ratings, prolonged operation is not intended and permanent device degradation may occur.

Parameter	Min	Max	Max
Supply Voltage	-0.3	3.6	V
Data Input Voltage	-0.3	3.6	V
Control Input Voltage	-0.3	3.6	V

## Environmental Specifications

This table shows the environmental specifications for the product.

Parameter	Min	Max	Units
Storage Temperature	-40	85	°C

## Operational Specifications

This section shows the range of values for normal operation.

Parameter	Min	Typ	Max	Units
Supply Voltage (Vcc)	3.135	3.3	3.465	V
Power consumption (800G head end for the switch)	--	--	1.5	W
Power consumption (200G tails for the HCA)	--	--	0.3	W
Power Consumption	--	--	0.8	W
Operating Case Temperature	0		70	°C
Operating Relative Humidity	5		85	%

## Electrical Specifications

Parameter	Min	Typ	Max	Units	Note
Characteristic impedance	90	100	110	Ω	
Time propagation delay	--	--	4.5	ns/m	Informative

## OSFP Memory Map

Page 00 Addr.	Register Name	Value and Description			
0	SFF8024 Identifier	19h: OSFP form factor 8x pluggable transceiver			
1	CMIS Revision Compliance	50h: CMIS Rev 5.0			
2	Memory Model, MciMaxSpeed	80h: Flat memory (no paging), no CLEI, max 400 kHz TWI (I2C) frequency			
3	Global status	07h: Module Ready, Interrupt not asserted			
04 - 84	Lanes and flags	00h: No lane flags, no DDM flags			
85	Media Type	03h: Active Copper			
86 - 117		Application Descriptors (8 x 4 bytes) numbered 1...8			
Start Address	Application Descriptor	Host IF	Media IF	Host/Media Lane cnt	Host Lane Assignment
86 - 89	1	31h: InfiniBand NDR, 2 ports	01h: Copper Cable	22h: 4 host + 4 media	55h: Lane 1 and 5
90 - 93	2	2Ch: IB SDR (4x two ports)	01h	22h	55h
94 - 97	3	1Bh: Eth 800GBASE-CR8 (8x one port)	01h	22h	55h
98 - 101	4	18h: Eth 400GBASE-CR4 (4x two ports)	01h	11h	FFh
102 - 105	5	45h: 200GBASE-CR2 (four ports)	01h	22h	55h
106 - 109	6	16h: 100GBASE-CR1 (eight ports)	01h	11h	FFh
110 - 113	7	01h: 400GBASE-CR8 (one port)	01h	11h	FFh
114 - 117	8	FFh: 200GBASE-CR4 (two ports)	00h	00h	00h
118 - 121	Password Chg Entry				
122 - 125	Password Entry				
126	Bank Select Byte				
127	Page Select Byte				
128	SFF8024 Identifier	19h: OSFP form factor 8x pluggable transceiver (same as addr 00)			
129 - 144	VendorName	vendor name (ASCII), padded w spaces: 'NVIDIA'			
145	VendorOUI	Nvidia OUI: 48h, B0h, 2Dh			
148 - 163	VendorPN	Part number: 'MCA7J70-NXXX'			
164 - 165	VendorRev	Revision			
166 - 181	VendorSN	Serial number			
182 - 189	DateCode	Date code, (YYMMDD__)			
200	Power Class	00h: Power Class 1, 07h: max power in units of 0.25 W			
201	Max power consumption	04/01(multiplier x 0.25W)			

Page 00 Addr.	Register Name	Value and Description
202	Link Length	Cable Length (m), 7-6: multiplier x value in bits 5-0 (00 = multiplier of .1 \ 01 = multiplier of 1\10 = multiplier of 10 \11 = multiplier of 100), e.g. 44h: 4 m
203	Connector Type	Connector Type (SFF-8024) 23h: No separable connector
204 - 207	Attenuation	Cable attenuation at 5, 7, 12.9, 25.8 GHz
210	Media Lane Info	00h: all near end lanes are implemented
211	Far End Config.	0Ch: 4x applications with 8x lanes each (aa,cc,ee,gg)
212	Media IF Technology	0Ah: Copper cable, unequalized
222	PageChecksum	Checksum of bytes 128-221 (low order 8 bits)
223 - 255	Custom Info	Custom data including traceability info

## Mechanical Specifications

Parameter	Value	Units
Diameter	30AWG: 5.7 ±0.03 26AWG: 7.1 ±0.03	mm
Length tolerance	length < 2 m	±25
	length ≥ 2 m	±50

## Minimum Bend Radius

OPN	Length (m)	AWG (mm)	Cable Diameter	Min bend radius R (mm)	Assembly Space L** Combined/Single End (mm)
MCP7Y70-H004	4.0	30AWG, 4x4pairs	5.7	57	117/111
MCP7Y70-H005	5.0	26AWG, 4x4pairs	7.1	71	134/127

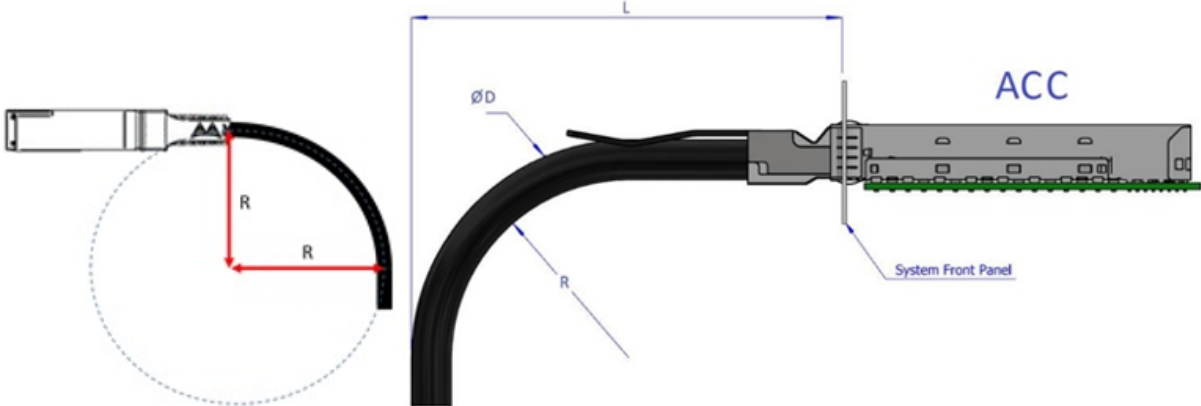
The minimum assembly bending radius (close to the connector) is 10x the cable's outer diameter. The repeated bend (far from the connector) is also 10x the cable's outer diameter. The single bend (far from the connector) is 5x the cable's outer diameter.

\*\*'Combined' end is the 'head' where the cables join together, inserted into the switch. 'Single' end is the 'tail' which plugs into the HCA/NIC in a server.

L = Assembly Space. Minimum value depends on the backshell (connector housing) dimensions = the space for the cable assembly behind the rack door.

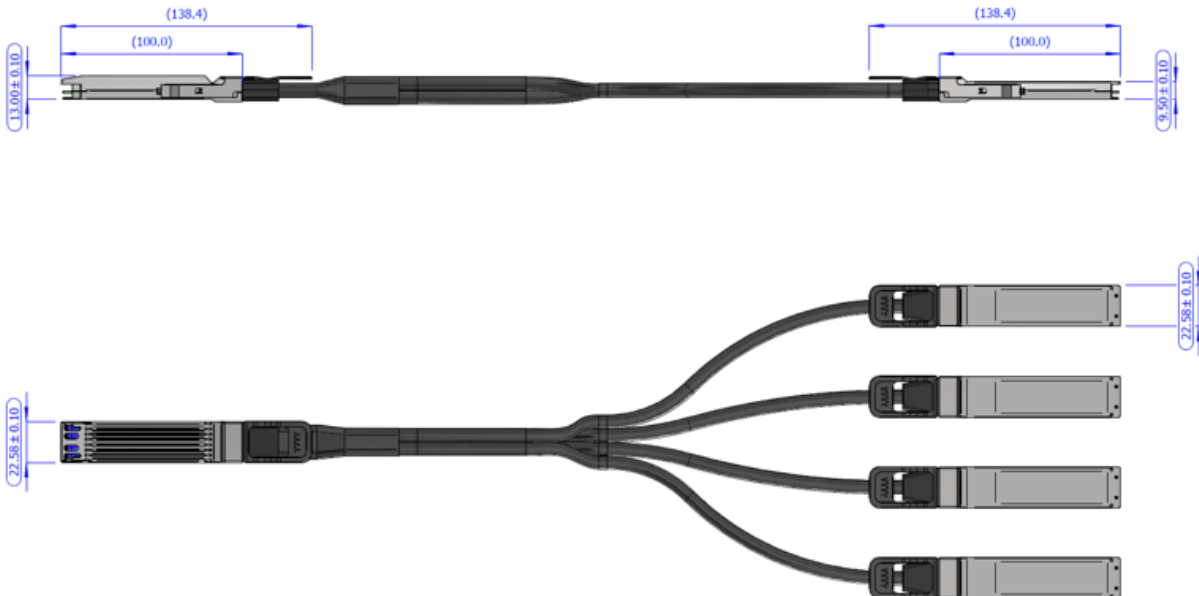


# Assembly Bending Radius

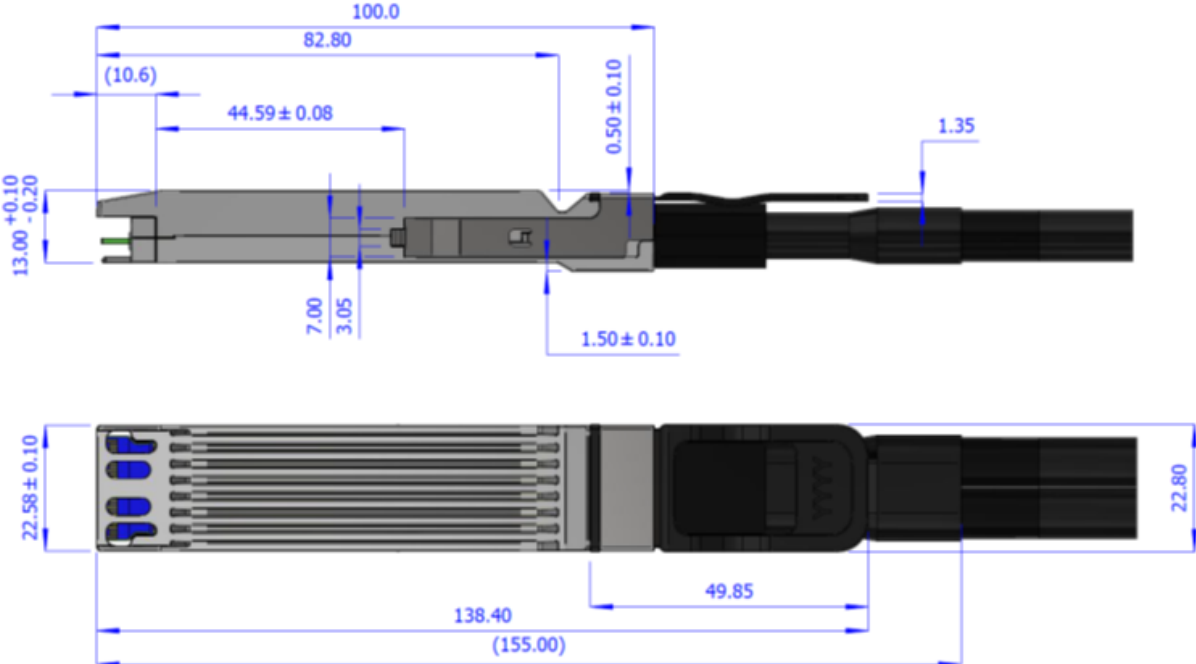


# Mechanical Drawings

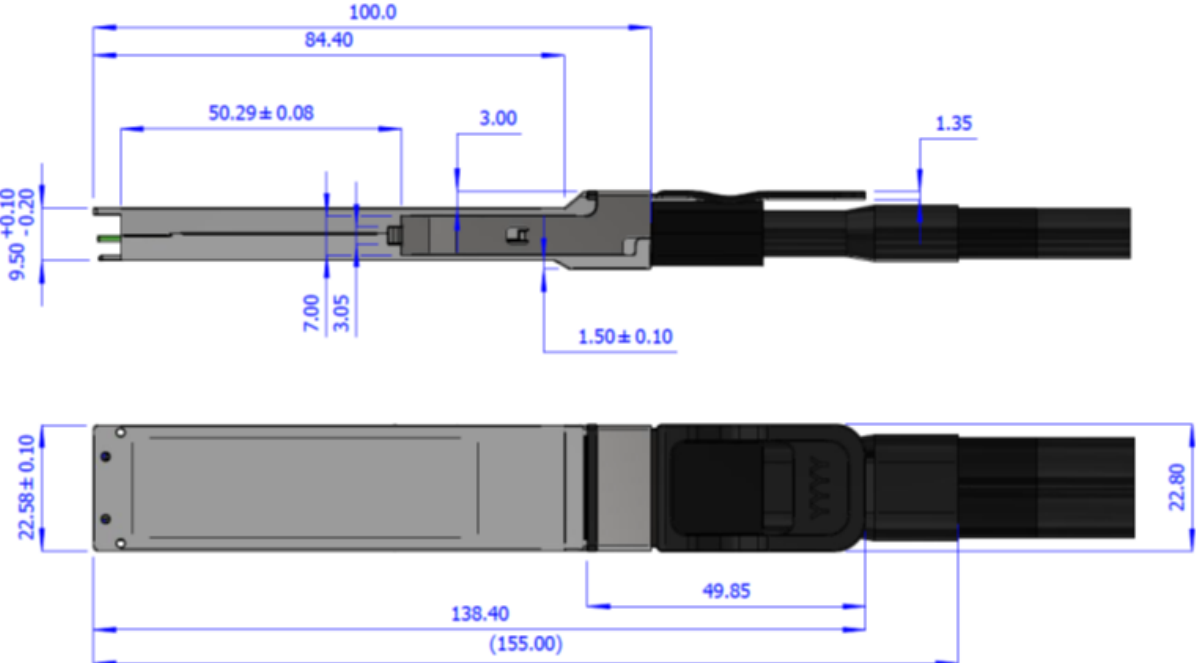
## Dimensions



### Finned Head Dimensions



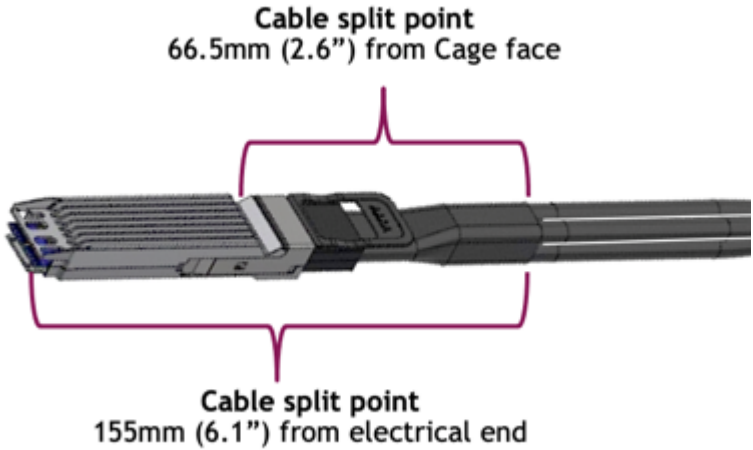
### Flat Ends Dimensions



## Cable Length Definition (specified in Ordering Information section)



## Cable Splitting Point



## Labels


### Backshell Label

The following label is applied on the cable’s backshell. Note that the images are for illustration purposes only. Labels look and placement may vary.

OSFP switch end	OSFP split ends
<p>Model No: MCA7J70                      PN: MCA7J70-N004                      SN: MTTYWWXXSSSSS                      Rev: A2 Xm XXAWG Active                      YYYY-MM-DD 800Gb/s                      Made In COO <span style="float: right;">NVIDIA</span></p>	<p>Model No: MCA7J70                      PN: MCA7J70-N004                      SN: MTTYWWXXSSSSS                      Rev: A2 Xm XXAWG                      YYYY-MM-DD 200Gb/s                      Made In COO <span style="float: right;">NVIDIA</span></p>
<i>(sample illustrations)</i>	

Images are for illustration purposes only. Product labels, colors, and form may vary.

## Backshell Label Legend

Symbol	Meaning	Notes
PN - Part Number		
xx	Length	Meters
yy	Cable gauge	American wire gauge
SN - Serial Number		
MN	Manufacturer name	2 characters MT
YY	Year of manufacturing	2 digits
WW	Week of manufacturing	2 digits
MS	Manufacturer Site	2 characters
XXXXX	Serial number	5 digits for serial number. Reset at start of week to 00001.
Miscellaneous		
ZZ	HW and SW revision	2 alpha-numeric characters
Xm	Cable length	Meters
XXAWG	Cable gauge	American wire gauge
YYYY-MM-DD	Year-month-day	Year 4 digits, month 2 digits, day 2 digits
COO	Country of origin	E.g., China
	Quick response code	Serial number

## Cable Jacket Label (Middle of Cable)

The following label is applied on the cable's jacket. Note that the images are for illustration purposes only. Labels look and placement may vary.



*(sample illustration)*



The serial number and barcode are for NVIDIA internal use only. Images are for illustration purposes only. Product labels, colors, and form may vary.

## Regulatory Compliance and Classification

- Safety: CB, TUV, CE, EAC, UKCA
- EMC: CE, FCC, ICES, RCM, VCCI

Ask your NVIDIA FAE for a zip file of the certifications for this product.

## FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



## Cabling Information

### Handling Precautions and Electrostatic Discharge (ESD)

The cable is compatible with ESD levels in typical data center operating environments and certified in accordance with the standards listed in the Regulatory Compliance Section. The product is shipped with protective caps on its connectors to protect it until the time of installation. In normal handling and operation of high-speed cables and optical transceivers, ESD is of concern during insertion into the QSFP cage of the server/switch. Hence, standard ESD handling precautions must be observed. These include use of grounded wrist/shoe straps and ESD floor wherever a cable/transceiver is extracted/inserted. Electrostatic discharges to the exterior of the host equipment chassis after installation are subject to system level ESD requirements.

### Cable Management Guidelines

It is important to follow the instructions and information detailed [NVIDIA Cable Management Guidelines](#) and [FAQ Application Note](#) to insure proper and optimal installation of this cable and avoid physical damage.

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# Ordering Information

Ordering Part Number	Description
MCA7J70-N004	NVIDIA active copper splitter cable, IB twin port NDR 800Gb/s to 4x200Gb/s, OSFP to 4xOSFP, 4m
MCA7J70-N005	NVIDIA active copper splitter cable, IB twin port NDR 800Gb/s to 4x200Gb/s, OSFP to 4xOSFP, 5m

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# Document Revision History

Revision	Date	Description of Changes
1.4	Oct. 2023	Updated Cable Splitting Point image.
1.3	Jun. 2023	Added Cable Length Definition to the Mechanical Specifications section.
1.2	Apr. 2023	Formatted and published in HTML.
1.1	Oct. 2022	Updated the introduction. Minor text edits.
1.0	Dec. 2022	Initial release. Preliminary and subject to change.

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