



# **NVIDIA MMS4X00-NS400 400Gb/s Single-port OSFP Single Mode DR4 Transceivers Product Specifications**

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# Introduction

The NVIDIA MMS4X00-NS400 is an InfiniBand (IB) and Ethernet (ETH) 400Gb/s, Single-port, OSFP, DR4 single mode parallel transceiver using a single, 4-channel MPO-12/APC optical connector. The Datacenter Reach 4-channel (DR4) design uses 100G-PAM4 modulation and has a maximum fiber reach of 100-meters and assumes two optical patch panels in the link. It has identical design and internals as the QSFP112 version with different connector shells.

The transceiver firmware supports both InfiniBand and Ethernet and is automatically enabled depending on the protocol of the connected switch. The OSFP shell has a flat-top and utilizes the riding heat sink (cooling fins) on the ConnectX-7 connector cage.

When linked to 1:2 splitter fiber cable split end has only 2 channels and will activate only 2-channels in the 400G transceiver automatically creating a 200G speed and reducing power consumption.

Single mode optics is denoted by a yellow-colored pull tab and optical fiber. Green plastic shell on the MPO-12/APC optical connector denotes Angled Polish Connector (APC) and is not compatible with the aqua colored Ultra-flat Polished Connectors (UPC).

NVIDIA's Single-port and Twin-port transceiver combinations guarantee optimal operation in NVIDIA end-to-end InfiniBand systems and a rigorous production tested to ensure the best out-of-the-box installation experience, performance, and durability.

Flat Top Transceiver



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

## Key Features

- IB and ETH support
- 400G DR4 single mode transceiver
- 4-channels of 100G-PAM4 electrical and optical modulation
- OSFP connector shell
- 1310nm EML single mode laser
- Single MPO-12/APC optical connector
- 100m max reach
- 9W max (4-channels)
- 5W max (2-channels)
- Single 3.3V power supply
- Class 1 laser safety
- Hot pluggable, RoHS compliant
- Adaptive Tx input equalizer
- [OSFPmsa.org](https://www.osfpmsa.org) compliant
- CMIS 4.0 compliant
- Case temperature range of 0°C to +70°C

## Applications

- Used in ConnectX-7/OSFP adapters linked to Twin-port transceivers in 2x400G IB/EN switches

# Overview

## Transceiver Connectivity Scenarios

The transceiver is used for connecting 400G and 200Gb/s ConnectX-7/OSFP-based, PCIe-bus network cards. Typically, the transceiver is linked to a single 800Gb/s Twin-port 2x400G OSFP transceiver (MMS4X00-NS) in a Quantum-2 InfiniBand or Spectrum-4 Ethernet switch. The 400Gb/s transceiver has two speeds depending on the number of fibers attached:

1. 400Gb/s mode: Using 4-channels and straight 100-meter crossover fiber cables (MFP7E30), the transceiver draws 9 Watts maximum or 9 Watts typical. In this case, the Twin-port 2x400G transceiver supports 400G transceivers in two ConnectX-7/OSFP.
2. 200Gb/s mode: Using 2-channels and 1:2 splitter fiber cables (MFP7E40), the transceiver operates at 200Gb/s NDR200 rate and draws 5 Watts maximum. It automatically reduces power from 9 Watts as only 2 channels are activated. This case creates links to four 200Gb/s ConnectX-7/OSFP cards.



- QSFP112 are not for use in switches. BlueField-3 only accepts QSFP112s
- Both fibers in the Twin-port 2x400G transceiver linked to the QSFP112s must be the same type - straight or splitter and cannot be mixed

## Use cases

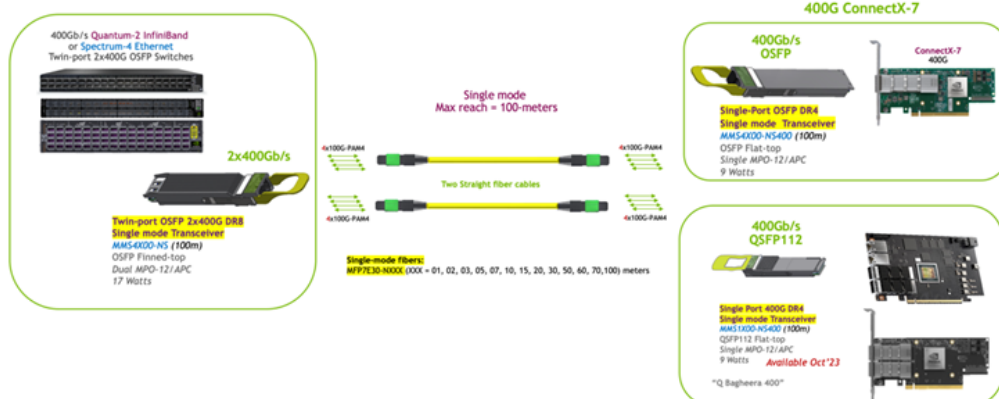
1. Switch-to-two 400G ConnectX-7/OSFP

A Twin port QSFP transceiver using two, straight fiber cables can support up to two ConnectX-7 adapters. Each of the two, 4-channel fiber cables (MFP7E30) can link to the 400G OSFP MMS4X00-NS400 transceiver up to 100-meters.

- ConnectX-7 adapters are offered on both OSFP and QSFP112
- BlueField-3 adapters only accept QSFP112 devices

### 400G IB/EN SWITCH-TO- 2 CONNECTX-7 AND BLUEFIELD-3

2x400G -to- 400G Links



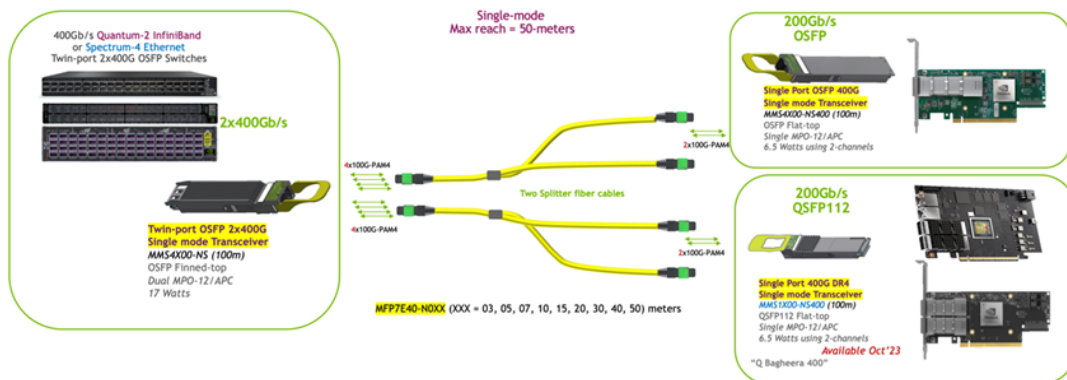
## 2. Switch-to-two 200G ConnectX-7/OSFP

A Twin port OSFP transceiver using two, 1:2 fiber splitter cables can support up any combination of four ConnectX-7/OSFPs. Each of the two, 4-channel 1:2 fiber splitter cables (MFP7E40) can link to a 400G OSFP MMS1X00-NS400 transceiver up to 50-meters.

The two-fiber channel ends only activate two of the lanes in the 400G transceiver creating a 200G device and automatically reduces the power consumption of only the 400G transceivers from 8 Watts typical to 5.5 Watts typical. Twin port OSFP power consumption remains at 17 Watts.

## 400G IB/EN SWITCH-TO- 4 CONNECTX-7 AND BLUEFIELD-3

### 2x400G to Four 200G Links



**⚠ OSFP is not for use in BlueField-3 DPUs.**

# Pin Description

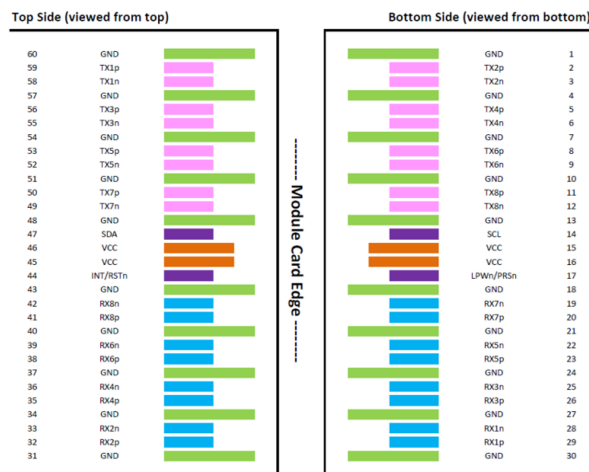
The device is OSFP MSA Specification for OSFP Octal Small Form Factor Pluggable Module Rev. 1.12 compliant, see [www.osfpmsa.org](http://www.osfpmsa.org).

## 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 |
| 24  | GND         | Ground                              | 54  | GND        | Ground                              |

| Pin | Symbol | Description                       | Pin | Symbol | Description                         |
|-----|--------|-----------------------------------|-----|--------|-------------------------------------|
| 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



The Active Optical Cable (AOC) pin assignment is SFF-8679 compliant.

## Control Signals (OSFP)

This device supports CMIS 4.0 (check for update, e.g. to CMIS 5) compliant management interface and OSFP MSA compliant form factor and interfaces. This implies that the control signals shown in the pad layout are implemented with the following functions:

| Name      | Function       | Description                                                                                                                                                                               |
|-----------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LPWn/PRSn | Input/output   | Multi-level signal for low power control from host to module and module presence indication from module to host. This signal requires the circuit as described in the OSFP Specification. |
| INT/RSTn  | Input, /output | Multi-level signal for interrupt request from module to host and reset control from host to module. This signal requires the circuit as described in the OSFP Specification.              |

| Name | Function | Description                                                            |
|------|----------|------------------------------------------------------------------------|
| SCL  | BiDir    | 2-wire serial clock signal. Requires pull-up resistor to 3.3V on host. |
| SDA  | Bidir    | 2-wire serial data signal. Requires pull-up resistor to 3.3V on host.  |

## Diagnostics and Other Features

The transceiver has a microcontroller with functions for monitoring supply voltage, temperature, laser bias current, optical transmit and receive levels with associated warning and alarm thresholds that can be read by the switch software and viewed remotely.

The transceiver supports the OSFP MSA specification and has the following key features:

Physical layer link optimization:

- Adaptive Tx input equalization
- Programmable Rx output amplitude
- Programmable Rx output pre-cursor
- Programmable Rx output post-cursor

Digital Diagnostic Monitoring (DDM):

- Rx receive optical power monitor for each lane
- Tx transmit optical power monitor for each lane
- Tx bias current monitor for each lane
- Supply voltage monitor
- Transceiver case temperature monitor
- Warning and Alarm thresholds for each DDM function (not user programmable)

Page 13h and 14h Module Diagnostics

- Host side and line side loopback
- PRBS generator and checker on host and line interfaces

Interrupt indications:

- Tx & Rx LOS indication
- Tx & Rx LOL indication
- Tx fault indication

Other CMIS 4.0 functions

- FW upgrade supported via CDB commands.



# Specifications

## Absolute Maximum Specifications

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

Prolonged operation between the operational specifications and absolute maximum ratings is not intended and may cause permanent device degradation.

| Parameter                          | Symbol          | Min  | Max                  | Units |
|------------------------------------|-----------------|------|----------------------|-------|
| Storage Temperature                | T <sub>S</sub>  | -40  | 85                   | °C    |
| Operating Case Temperature         | T <sub>OP</sub> | 0    | 70                   | °C    |
| Supply Voltage                     | V <sub>CC</sub> | -0.5 | 3.6                  | V     |
| Relative Humidity (non-condensing) | RH - Option 1   | 5    | 95                   | %     |
| Control Input Voltage              | V <sub>I</sub>  | -0.3 | V <sub>CC</sub> +0.5 | V     |



Module temperature per DDMI readout of up to 80°C is allowed

## Recommended Operating Conditions and Power Supply Requirements

| Parameter                                        | Symbol          | Min   | Typ    | Max   | Units |
|--------------------------------------------------|-----------------|-------|--------|-------|-------|
| Power Supply Voltage                             | V <sub>CC</sub> | 3.135 | 3.3    | 3.465 | V     |
| Instantaneous peak current at hot plug (400G)    | ICC_IP          | -     | -      | 3600  | mA    |
| Sustained peak current at hot plug (400G)        | ICC_SP          | -     | -      | 3000  | mA    |
| Maximum Power consumption (400G)                 | PD              | -     | -      | 9     | W     |
| Maximum Power consumption, Low Power Mode (400G) | PDLP            | -     | -      | tbd   | W     |
| Instantaneous peak current at hot plug (200G)    | ICC_IP          | -     | -      | 2200  | mA    |
| Sustained peak current at hot plug (200G)        | ICC_SP          | -     | -      | 1840  | mA    |
| Maximum Power consumption (200G)                 | PD              | -     | -      | 5.5   | W     |
| Maximum Power consumption, Low Power Mode (200G) | PDLP            | -     | -      | 1.5   | W     |
| Signaling Rate per Lane                          | SRL             | -     | 53.125 | -     | GBd   |
| Two Wire Serial Interface Clock Rate             | -               | -     | -      | 400   | kHz   |

| Parameter                                   | Symbol | Min | Typ | Max | Units |
|---------------------------------------------|--------|-----|-----|-----|-------|
| Power Supply Noise Tolerance (10Hz - 10MHz) | -      | -   | -   | 66  | mV    |
| Rx Differential Data Output Load            | -      | -   | 100 | -   | Ohm   |
| Operating Distance                          | -      | 2   | -   | 100 | m     |

## Electrical Specifications

| Parameter                                  | Min  | Typ | Max  | Units |
|--------------------------------------------|------|-----|------|-------|
| <b>Receiver (Module Input)</b>             |      |     |      |       |
| AC common-mode output Voltage (RMS)        | -    | -   | 25   | mV    |
| Differential output Voltage (Long mode)    | -    | -   | 845  | mV    |
| Differential output Voltage (Short mode)   | -    | -   | 600  | mV    |
| Near-end Eye height, differential          | 70   | -   | -    | mV    |
| Far-end Eye height, differential           | 30   | -   | -    | mV    |
| Far end pre-cursor ratio                   | -4.5 | -   | 2.5  | %     |
| Differential Termination Mismatch          | -    | -   | 10   | %     |
| Transition Time (min, 20% to 80%)          | 9.5  | -   | -    | ps    |
| DC common mode Voltage                     | -350 | -   | 2850 | mV    |
| <b>Transmitter (Module Input)</b>          |      |     |      |       |
| Differential pk-pk input Voltage tolerance | 750  | -   | -    | mV    |
| Differential termination mismatch          | -    | -   | 10   | %     |
| Single-ended voltage tolerance range       | -0.4 | -   | 3.3  | V     |
| DC common mode Voltage                     | -350 | -   | 2850 | mV    |

Notes:

Amplitude customization beyond these specs is dependent on validation in customer system.

## Electrical Specification for Low Speed Signal

| Parameter                 | Symbol | Min     | Max     | Units |
|---------------------------|--------|---------|---------|-------|
| Module output SCL and SDA | VOL    | 0       | 0.4     | V     |
|                           | VOH    | VCC-0.5 | VCC+0.3 | V     |
| Module Input SCL and SDA  | VIL    | -0.3    | VCC*0.3 | V     |
|                           | VIH    | VCC*0.7 | VCC+0.5 | V     |

## Optical Specifications

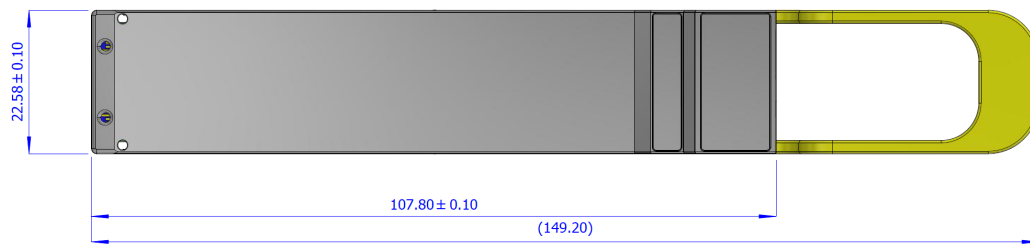
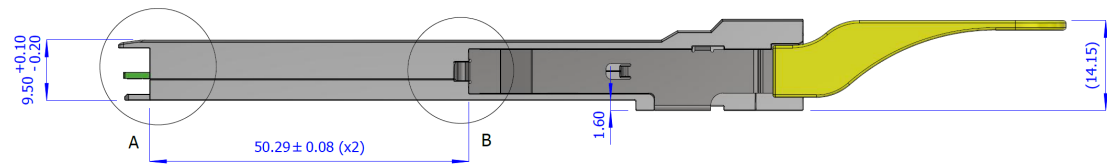
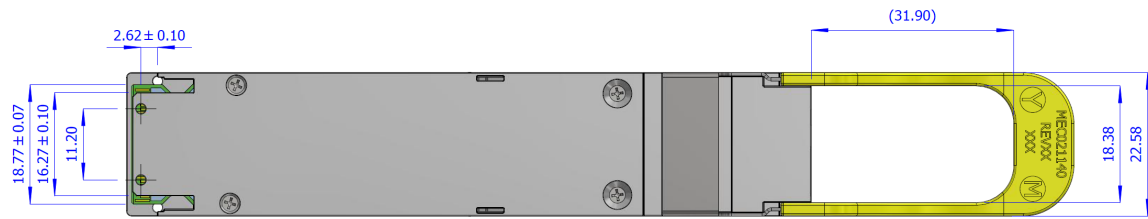
| Parameter          | Symbol      | Min    | Typ  | Max    | Unit | Notes |
|--------------------|-------------|--------|------|--------|------|-------|
| <b>Transmitter</b> |             |        |      |        |      |       |
| Wavelength         | $\lambda_C$ | 1304.5 | 1311 | 1317.5 | nm   |       |

| Parameter                                                          | Symbol      | Min    | Typ  | Max    | Unit  | Notes |
|--------------------------------------------------------------------|-------------|--------|------|--------|-------|-------|
| Side Mode Suppression Ratio                                        | SMSR        | 30     | -    | -      | dB    |       |
| Average Launch Power, each lane                                    | AOPL        | -1.0   | -    | 3.0    | dBm   | 1     |
| Outer Optical Modulation Amplitude (OMOuter), each lane            | TOMA        | -1.0   | -    | 3.0    | dBm   | 2     |
| Launch Power in OMOuter minus TDECQ, each lane                     | TOMA-TDECQ  | -2.2   | -    | -      | dBm   |       |
| Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane | TDECQ       | -      | -    | 3.4    | dB    |       |
| Average Launch Power of OFF Transmitter, each lane                 | TOFF        | -      | -    | -15    | dBm   |       |
| Extinction Ratio, each lane                                        | ER          | 3.5    | 5.0  | 7.0    | dB    |       |
| RIN <sub>21.4OMA</sub>                                             | RIN         | -      | -    | -136   | dB/Hz |       |
| Optical Return Loss Tolerance                                      | ORL         | -      | -    | 21.4   | dB    |       |
| Transmitter Reflectance                                            | TR          | -      | -    | -26    | dB    | 3     |
| Receiver                                                           |             |        |      |        |       |       |
| Wavelength                                                         | $\lambda_C$ | 1304.5 | 1311 | 1317.5 | nm    |       |
| Damage Threshold, each lane                                        | AOPD        | 5      | -    | -      | dBm   |       |
| Average Receive Power, each lane                                   | AOPR        | -5.9   | -    | 4.0    | dBm   |       |
| Receive Power (OMOuter), each lane                                 | OMA-R       | -      | -    | 4.2    | dBm   |       |
| Receiver Reflectance                                               | RR          | -      | -    | -26    | dB    |       |
| Receiver Sensitivity (OMOuter), each lane                          | SOMA        | -      | -    | -4.4   | dBm   | 4     |
| Stressed Receiver Sensitivity (OMOuter), each lane                 | SRS         | -      | -    | -1.9   | dBm   | 5     |
| Conditions of stressed receiver sensitivity test                   |             |        |      |        |       |       |
| Stressed eye closure for PAM4 (SECQ)                               |             |        | 3.4  |        | dB    |       |
| OMOuter of each aggressor lane                                     |             |        | 4.2  |        | dBm   |       |

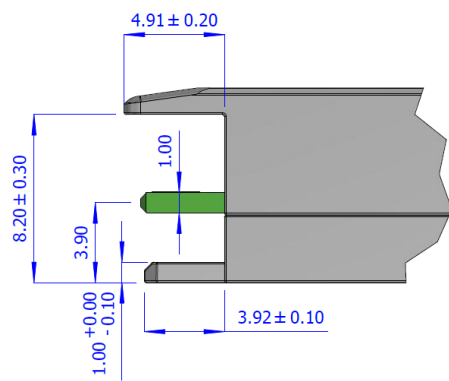
#### Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength.
2. Even if TDECQ < 1.4dB, OMOuter (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. Receiver sensitivity (OMOuter), each lane (max) is informative and is defined for a transmitter with SECQ of 0.9 dB.
5. Measured with conformance test signal at TP3 for the BER = 2.4x10<sup>-4</sup>

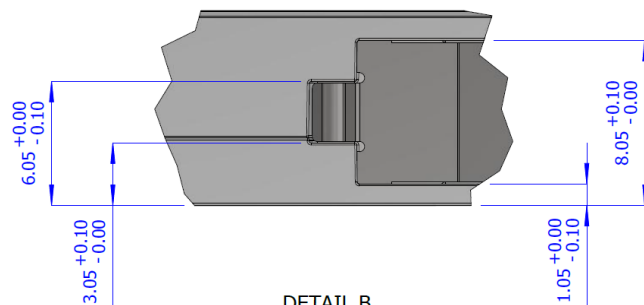
## Mechanical Specifications



Enlarged view of detail A and B:

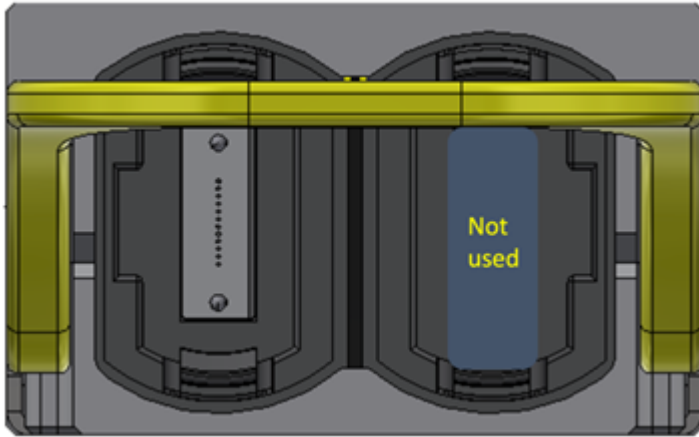


DETAIL A

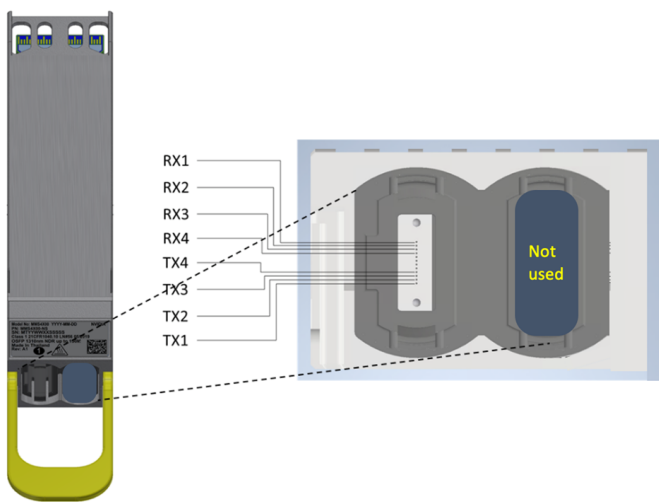


DETAIL B

MPO/APC end view:



This is the 'head end'. The connectors in the 'tails' have same layout but only 2 transmit and 2 receive fibers with the middle 8 positions empty.



Module port labeling and lane routing. Txn/Rxn refers to the OSFP pin description

Single mode optics are denoted by a yellow-colored pull tab and yellow-colored optical fiber. The green plastic shell on the MPO-12/APC optical connector denotes Angled Polish Connector.

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

## New Form-factors

The OSFP body has a flat-top to cool the NDR 9-Watt (400 Gb/s) or 6-Watt (200 Gb/s) transceiver in the ConnectX-7 HCA. Unlike the Twin-port transceiver, the heat sink is contained on the ConnectX-7 connector cage and there is no cooling package top difference for linking to either air or liquid-cooled systems.

OSFP is longer and wider than the traditionally used QSFP28/EDR or QSFP56/HDR form-factors.

## Labels

### Back shell Label

The label applied on the transceiver's back-shell is illustrated below. Note that the Images are for illustration purposes only. Labels look and placement may vary.

Transceiver Label (Illustration)



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

### Transceiver Back-Shell Label Serial Number Legend

| Symbol                | Meaning                                                                 | Notes                                                              |
|-----------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------|
| MT                    | Manufacturer name                                                       | 2 digits (alphanumeric)                                            |
| YY                    | Year of manufacturing                                                   | 2 last digits of the year (numeric)                                |
| WW                    | Week of manufacturing                                                   | 2 digits (numeric)                                                 |
| JC<br><i>or</i><br>DM | Manufacturer Site:<br>JC - Option 1 (China)<br>DM - Option 2 (Malaysia) | Two characters                                                     |
| SSSSS                 | Serial number                                                           | 5 digits (decimal numeric) for serial number, starting from 00001. |

## Regulatory Compliance

The transceiver is a Class 1 laser product. It is certified per the following standards:

| Feature           | Agency   | Standard                             |
|-------------------|----------|--------------------------------------|
| Laser Eye Safety  | FDA/CDRH | CDRH 21 CFR 1040 and Laser Notice 50 |
| Electrical Safety | CB       | IEC 62368                            |

| Feature           | Agency | Standard                    |
|-------------------|--------|-----------------------------|
| Electrical Safety | UL/CSA | UL 62368 and CAN/CSAN 62368 |

## Connector and Cabling Details

### MPO-12/APC Optical Connector

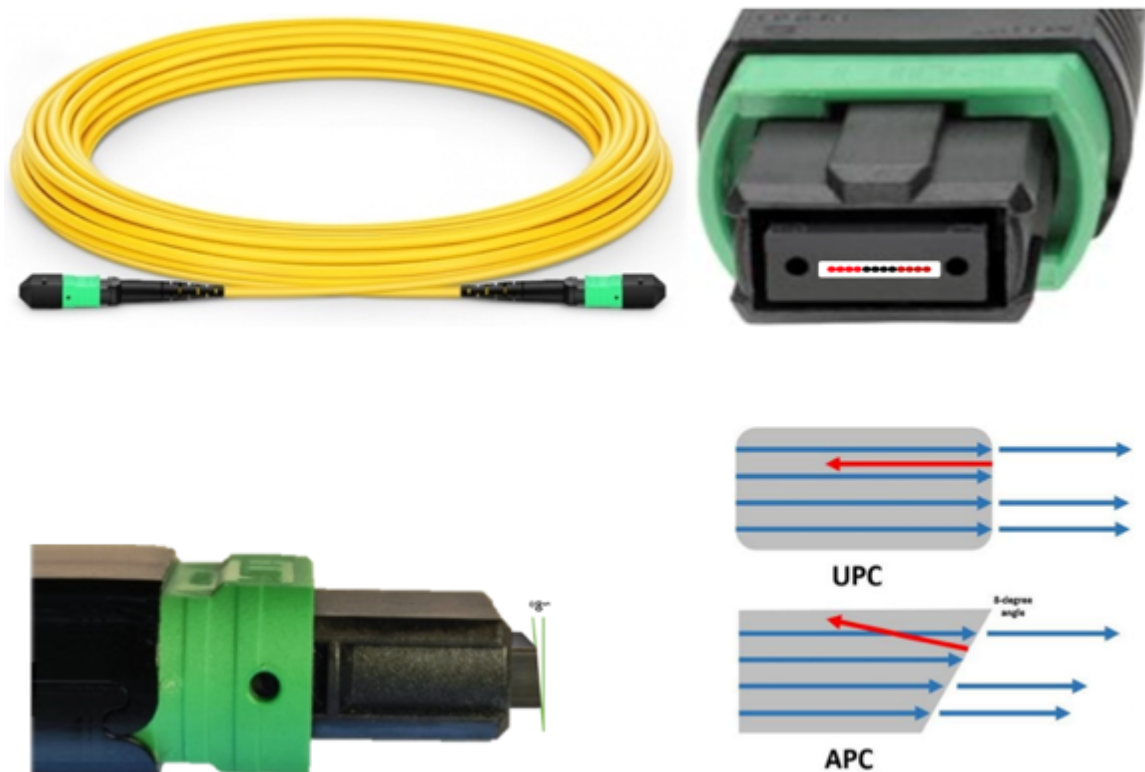
The Twin-port NDR transceiver has a unique NVIDIA patented design enabling two, multiple-push-on/angled-polished-connector 12-fiber (MPO-12/APC) optical connectors per single OSFP form-factor by turning the optical connectors vertically in the twin-port transceiver end. This enables it to host two NDR transceivers inside, each with its own MPO-12/APC optical connector operating independently that can link to another Twin-port transceiver or to a single-port 400Gb/s NDR transceiver. The MPO-12 has a 12-fiber ribbon but only 8-fibers are used - four transmit and four receive fibers for the 4-channels 100G-PAM4.

- The APC design minimizes back reflections and signal interference by diverting back reflected light from the fiber face to be absorbed into the fiber cladding.
- A positioning key on top of the connector together with the alignment pins define the fiber position numbering scheme to align pin 1 in the optical connector to pin 1 in the transceiver also called “polarity”
- Transceivers have alignment pins for precise positioning of the cable connector against the optical beams. The fiber cable has alignment holes matching the transceiver’s pins.
- Important to note that transceivers have pins. Optical connectors have holes used with transceivers have holes. Optical connectors with pins are not compatible with transceivers and used in trunk cabling to connect two fiber cables together.

The MPO-12/APC optical connector is used in both the 100G-PAM4 based single mode and multimode fiber cables.

Single mode optics is denoted by a yellow-colored pull tab and yellow-colored optical fiber. Green plastic shell on the MPO-12/APC connector denotes Angled Polish Connector and is not compatible with Ultra-flat Polished Connectors (UPC) used with slower line rate transceivers.

MPO-12/APC Showing 4-Transmit and 4-Receive Fibers and Angled Polish Connector End face



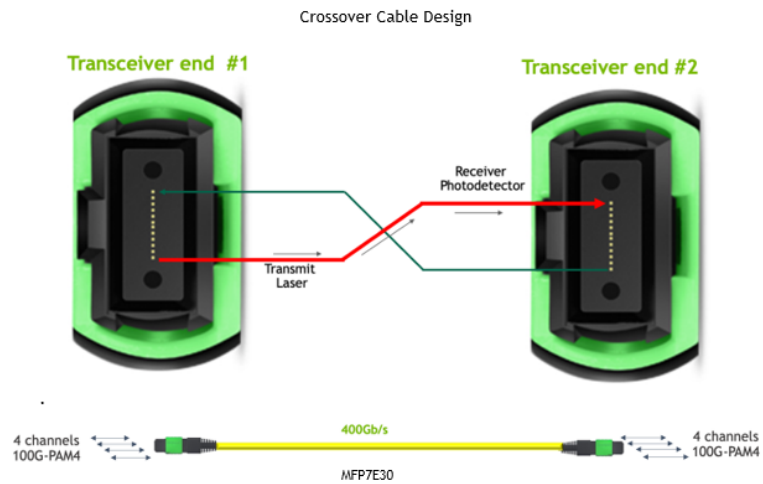
## NVIDIA Supplied Crossover Type-B Fiber Cables

Linking two transceivers directly together requires aligning the transceiver laser sources with the correct photo detectors in the receive transceiver. Transmit and receive fibers are switched inside the cable enabling two transceivers to be directly connected to each other. This is called a Type-B crossover fiber.

Each of the two 4-channel NDR ports in the Twin-port transceiver has its own 4-channel optical cable that can link to two single-port 400Gb/s transceiver. Two fiber cables are needed for each Twin-port transceiver. Fiber cables are crossover cable Type-B that aligns the transmit laser with the opposite transceiver's receiver photodetector allowing to directly connect two transceivers together to maintain minimum optical losses, lowest back reflections, longest reach and increased reliability without the use of optical patch panels.

NVIDIA supplies crossover, single mode fiber cables up to 100-meters. For length from 100-to-500-meters, a crossover fiber segment must be implemented in the link to align transmit lasers with receiver photodetectors. This can be implemented by building the fiber cable as a crossover cable, or adding a NVIDIA crossover cable in the link, or via an optical patch panel with a crossover segment.

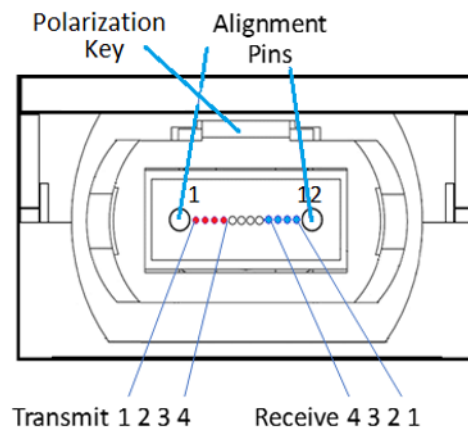
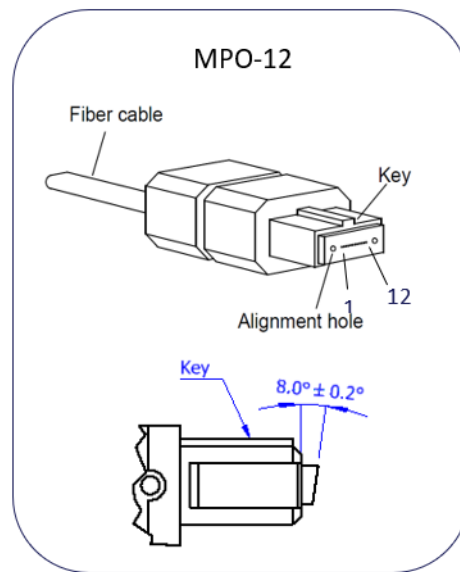




Note: Refer to the Recommended Fiber Cables table for more information.

Transceivers have alignment pins for precise positioning of the cable connector against the optical beams. The fiber cable has alignment holes matching the transceiver's pins.

## MPO Connector with Alignment Holes and Positioning Key



NDR transceiver: MPO Receptacle, Lane Assignment, and Positioning Key (front view)

Reference: IEC specification IEC 61754-7

## Handling and Cleaning

The transceiver can be damaged by exposure to current surges and over voltage events. Take care to restrict exposure to the conditions defined in Absolute Maximum Ratings. Observe normal handling precautions for electrostatic discharge-sensitive devices.

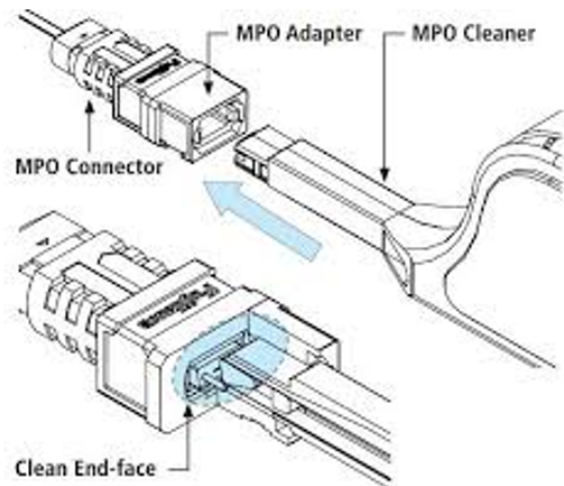
The transceiver is shipped with dust caps on both the electrical and the optical port. The cap on the optical port should always be in place when there is no fiber cable connected. The optical connector has a recessed connector surface which is exposed whenever it has no cable nor cap.

Important note 1: Keep both the fiber and transceiver dust caps.

Important note 2: Clean both transceiver receptacle and cable connector prior to insertion of the fiber cable, to prevent contamination from it.

The dust cap ensures that the optics remain clean during transportation. Standard cleaning tools and methods should be used during installation and service. Liquids must not be applied.

Important note 3: 80% of transceiver link problems are related to dirty optical connectors.



## Cable Management Guidelines

For more information and general interconnect management and installation, see [NVIDIA Cable Management Guidelines](#) and [FAQ Application Note](#).

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## Ordering Information

### Part Numbers and Description

| OPN           | Description                                                                               |
|---------------|-------------------------------------------------------------------------------------------|
| MMS4X00-NS400 | NVIDIA single port transceiver, 400Gbps, NDR, OSFP, MPO, 1310nm SMF, up to 100m, flat top |

# Recommended NVIDIA Supplied Crossover Fiber Cables Part Numbers

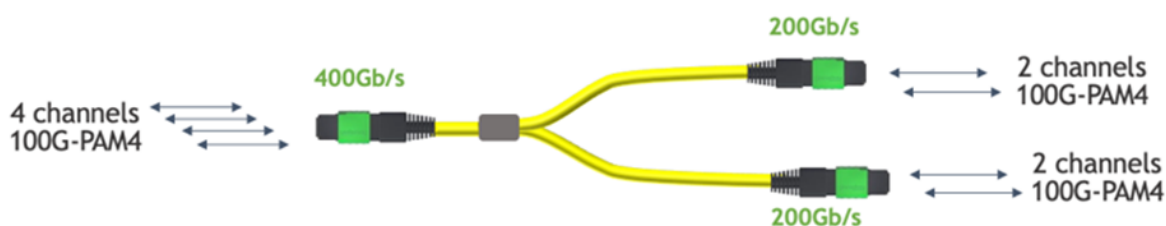


## Single-mode, Straight Crossover Fibers

| OPN          | 4-channel MPO/APC to 4-channel MPO/APC |
|--------------|----------------------------------------|
| MFP7E30-N001 | 1m                                     |
| MFP7E30-N002 | 2m                                     |
| MFP7E30-N003 | 3m                                     |
| MFP7E30-N005 | 5m                                     |
| MFP7E30-N007 | 7m                                     |
| MFP7E30-N010 | 10m                                    |
| MFP7E30-N015 | 15m                                    |
| MFP7E30-N020 | 20m                                    |
| MFP7E30-N030 | 30m                                    |
| MFP7E30-N050 | 50m                                    |
| MFP7E30-N060 | 60m                                    |
| MFP7E30-N070 | 70m                                    |
| MFP7E30-N100 | 100m                                   |



Lengths beyond 100-meters is not offered but available from third-party suppliers



## Single-mode, 1:2 Splitter Crossover Fibers

| OPN          | 4-channel MPO/APC to Two 2-channel MPO/APC |
|--------------|--------------------------------------------|
| MFP7E40-N003 | 3m                                         |
| MFP7E40-N005 | 5m                                         |
| MFP7E40-N007 | 7m                                         |
| MFP7E40-N010 | 10m                                        |
| MFP7E40-N015 | 15m                                        |
| MFP7E40-N020 | 20m                                        |

| OPN          | 4-channel MPO/APC to Two 2-channel MPO/APC |
|--------------|--------------------------------------------|
| MFP7E40-N030 | 30m                                        |
| MFP7E40-N050 | 50m                                        |

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## Document Revision History

| Rev | Date      | Description                                                                                                             |
|-----|-----------|-------------------------------------------------------------------------------------------------------------------------|
| 1.2 | Nov. 2023 | Updated mechanical drawings.                                                                                            |
| 1.1 | Apr. 2023 | <ul style="list-style-type: none"><li>▪ Updated the document for Ethernet support.</li><li>▪ Minor text edits</li></ul> |
| 1.0 | Dec. 2022 | Initial release.                                                                                                        |

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