NVIDIA MFP7E10-Nxxx Optical Multimode Fiber Cable Product Specifications

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Introduction

The NVIDIA MFP7E10-Nxxx MPO-12/APC-to-MPO12/APC (8 fibers) passive optical Multimode cable, is designed for linking InfiniBand and Ethernet multimode twin-port OSFP and single-port OSFP and QSFP112 transceivers together.

The Multiple Push On, 12 fiber, Angled Polished Connectors (MPO-12/APC) uses 8 active fibers to transmit light, and 4 inactive fibers as strength members. The APC end has a 8-degree polished angle to deflect internal optical back reflections from entering the transceiver and distorting the signal quality.

Twin-port OSFP 800Gb/s transceivers support two 4-channel fibers which are linked to other twin-port OSFP, single port OSFP or QSFP112 400Gb/s transceivers.

The fibers are “crossover”, Type-B cables that enable directly attaching two transceivers together and aligning the transmit laser fiber on pin 1 to “crosses over” and align with pin 12 of the opposite fiber end transceiver photodetector.

Typical usecase is linking twin port OSFP switches to each other, and to ConnectX-7® network adapters and/or BlueField-3® Data Processing Units (DPUs) in compute and storage servers.

Rigorous cable production testing ensures best out-of-the-box installation experience, performance, and durability. Mellanox optical solutions provide short, medium, and long reach scalability for all topologies, utilizing innovative optical technologies to enable high signal integrity and reliability.

> ⚠ **Warning**
>
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Key Features

- Flexible round outer jacket for easy installation
- Push-pull latching for quick release
- Female-to-Female connectors
- 50/125 µm Multimode fibers
- 50m max reach
- Telcordia GR-1435 compliant
- IEC Standard Connectors:
    - MPO: IEC 61754-7 and ANSI/TIA/EIA 604-5-199
- OFNR/LSZH (low smoke zero halogen) jacket
- Supports InfiniBand, Ethernet and NVLink protocols

Applications

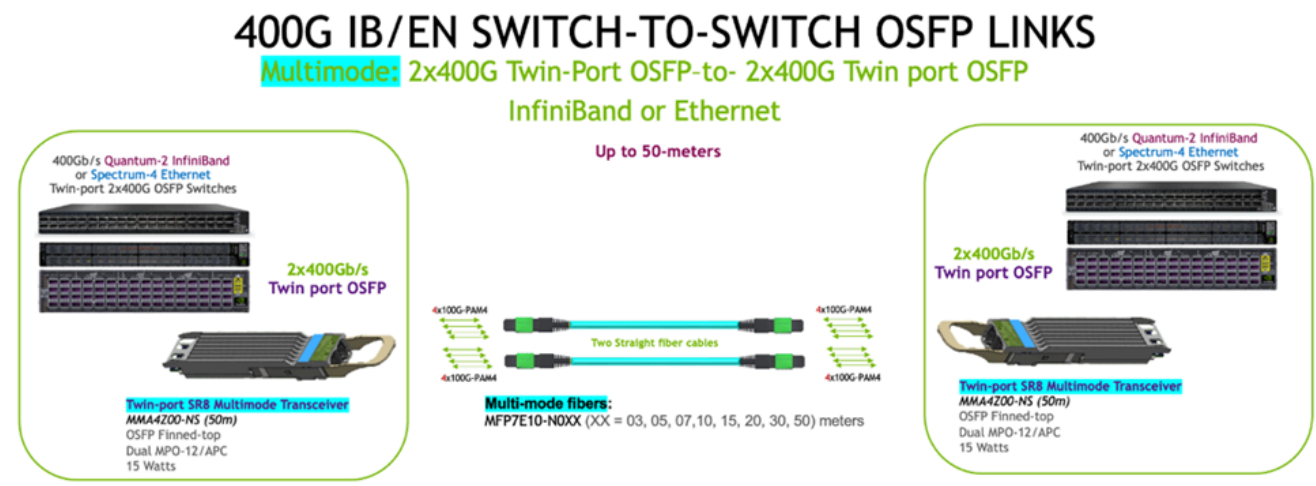
- Optical short-reach high speed links in data centers
- Data processing and storage systems

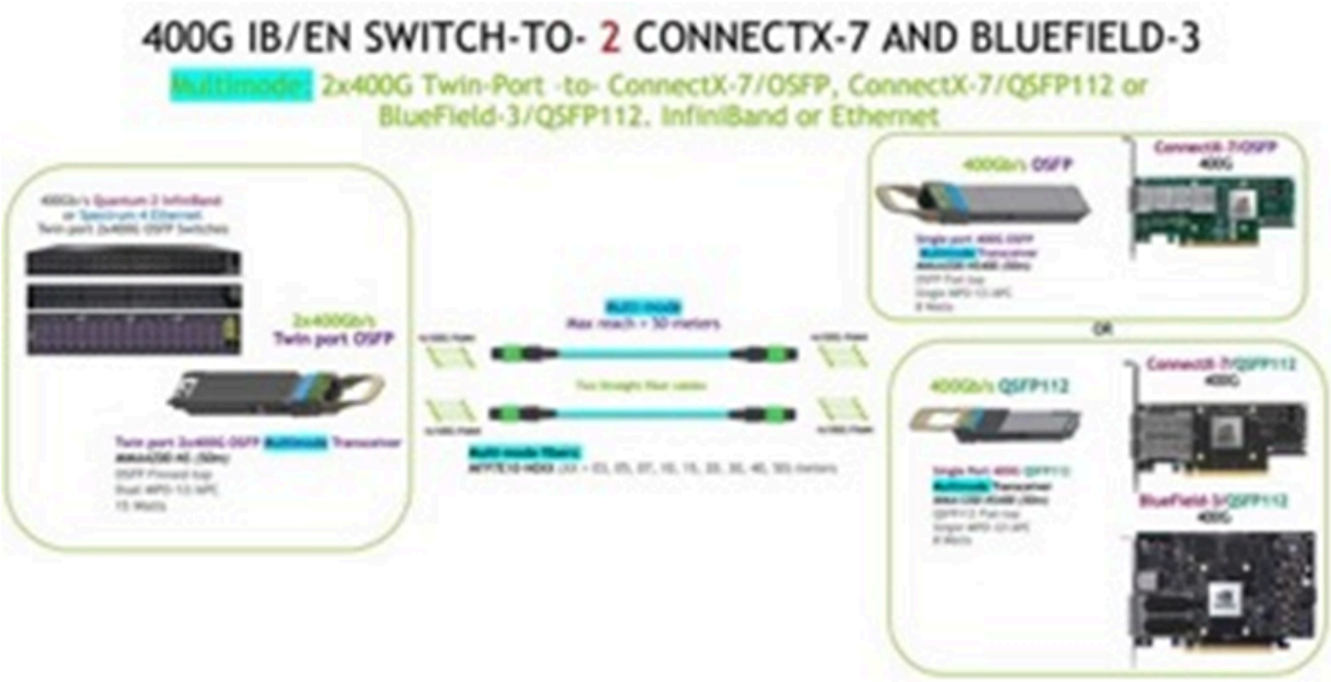
Application

The MFP7E10 Fiber Cable is intended for interconnection of 2 switch together or a switch to 2 network adapters. The cable mates with pluggable optical 400GbE/NDR transceivers such as Nvidia's MMA4Z00-NS twin port OSFP DR8 transceiver for InfiniBand and Ethernet systems in the switch end and MMA4Z00-NS400 (OSFP) or MMA1Z00-NS400 (QSFP112) in ConnectX-7 network adapters and BlueField-3 DPUs.

- Twin port OSFP transceivers must use the same fiber type in both MPO-12/APC ports (straight or 1:2 splitter) and cannot be mixed.
- 50-meter specification assumes two optical patch panels in the link with total of 4 optical connector junctions
- Multimode fibers use an industry standard Aqua fiber jacket color
- Jacket is Low-Smoke, Zero-Halogen (LSZH) type to reduce toxic smoke in event of a fire.
- The connector has an NVIDIA green connector shell denoting MPO-12/APC. The MPO-12/UPC typically a blue shell for Ultra-flat Polish Connectors.
- MPO-12/APC connectors cannot be used with MPO-12/UPC Ultra-flat Polished Connectors which are typically used in 4x25G-NRZ (100G) and 4x50G-PAM4 (200G) transceivers as the fiber polishes are different and will not mate.
- The split ends can support either OSFP and/or QSFP112 transceivers at the same time depending on the adapter type.

MFP7E10-Nxxx in switch-switch and switch-adapter links:





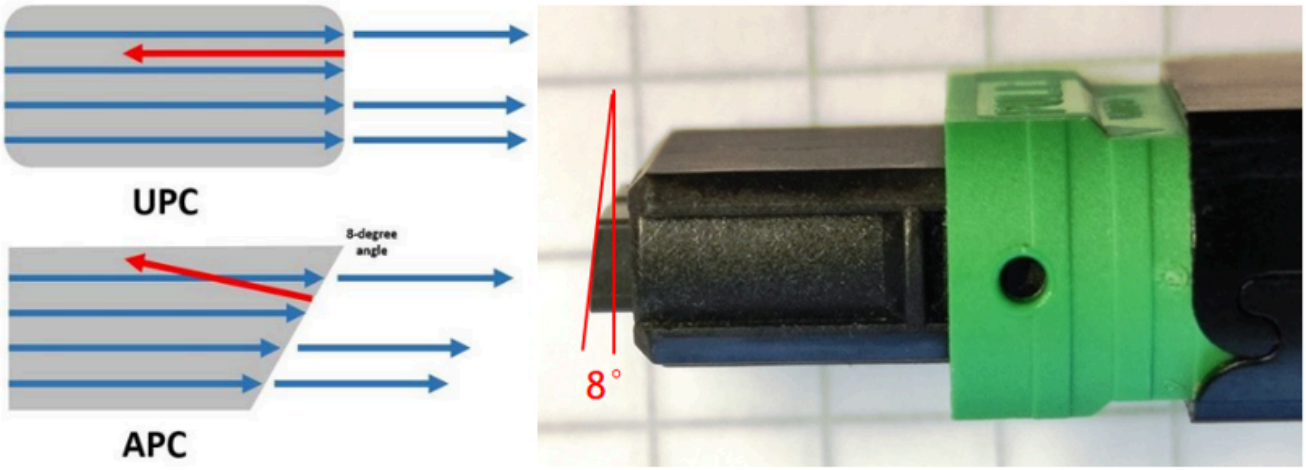
Connector Details

The MFP7E10-Nxxx fiber cables have 8 individual fibers, 4 in each direction. A positioning key together with the alignment pins define the fiber position numbering scheme.

The MPO connectors are the angle-polished (APC) type which provide minimal reflection of the optical signal for optimal signal integrity.

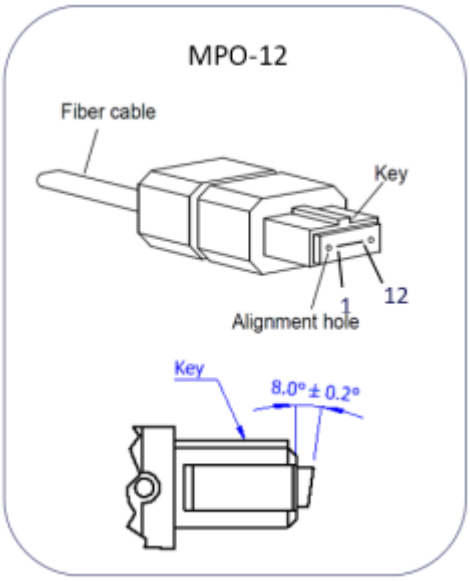
Multimode Fiber Cable with MPO/APC Connectors:

Detail of the MPO/APC Connector:

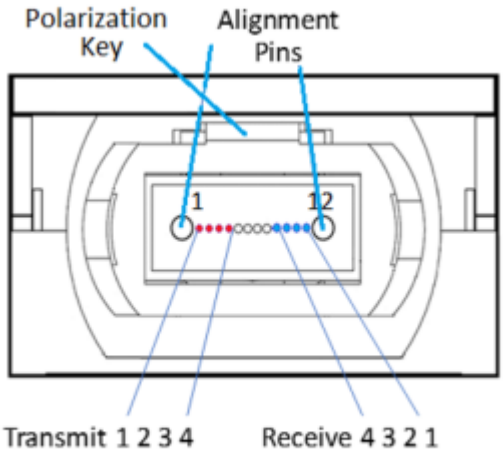


Transceivers have alignment pins for precise positioning of the cable connector against the optical beams. The fiber cable has alignment holes matching the transceiver's pins.

MPO Connector with Alignment Holes and Positioning Key:



Optical Receptacle and Lane Assignment (transceiver, front view):



Reference: IEC specification IEC 61754-7. [1]

Handling Precautions

The cable is shipped with dust caps which protect the connectors from contamination during shipment and installation. The caps should not be removed until the cable is plugged in at the time of installation. Prior to insertion of the fiber cable into the transceiver, always clean both the cable and the transceiver connector using optical connector cleaners to remove any contamination. Keep the cables away from any Liquids.

Fiber cables have no conductive parts and are not ESD sensitive. However, they plug into ESD sensitive transceivers. Due to that, standard ESD handling precautions must be observed during installation.

MPO Connector with Dust Cap

Optical Connector Cleaning Tool

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.

Environmental Specifications

This table shows the environmental specifications for the product.

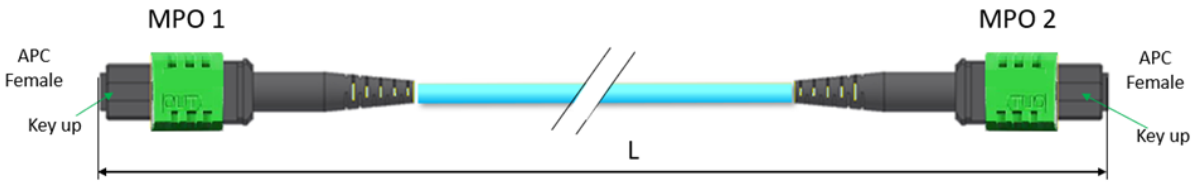
Parameter	Min	Max	Units
Storage temperature	-40	85	°C
Operating temperature	0	70	°C
Humidity	10	85	%RH

Mechanical and Optical Specifications

Table 2: Mechanical Specifications for MFP7E10-Nxxx

Parameter	Note	Value	Units
Tolerance on length,	Length < 5 m Length ⩾ 5 m	+0.1/-0 +2% x L/-0	m m
Number of Fibers		8	
Cable diameter		3 ± 0.2	mm
Minimum bending radius	Anywhere on the cable	30	mm
Cable Jacket		Aqua, LSZH-OFNR	
Fiber	Length ⩽ 30 m	Multimode OM3	m

Parameter	Note	Value	Units
	Length > 30 m	Multimode OM4	m
Topology	Crossed	Type B	
Connectors and connector end face	Low loss MPO	APC, female	
Insertion Loss, connector end face, IL	L=length {m}	⩽0.35+0.0004 x L	dB
Return Loss, connector end face, RL		⩾ 35	dB



Interconnection Scheme

The fiber which connects lane 1 from transceiver A, must end at lane 12 on transceiver B at the other end of the link. This calls for a crossed MPO cable, commonly referred to as Type B.

MPO1 MPO/APC Female	Connection	MPO2 MPO/APC Female
1	**---->**	12
2	**---->**	11
3	**---->**	10
4	**---->**	9
5	Not Connected	8
6	Not Connected	7
7	Not Connected	6
8	Not Connected	5
9	**<----**	4
10	**<----**	3
11	**<----**	2
12	**<----**	1

Labels

Below is an example of the labels that are wrapped on each cable end.

> ⚠ **Warning**
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Label Legend

Symbol	Meaning	Notes
YY	Year of manufacturing	2 digits
WW	Week of manufacturing	2 digits
XX	Manufacturer site	2 characters

Symbol	Meaning	Notes
ZZZZZ	Serial number	5 digits for serial number, starting from 00001. Reset at start of week to 00001.
Miscellaneous		
ZZ	HW and SW revision	2 alpha-numeric characters
YYYY	Year of manufacturing	4 digits
MM	Month of manufacturing	2 digits
DD	Day of manufacturing	2 digits
COO	Country of origin	E.g. China or Malaysia
XXm	Cable length	Meter
	Quick response code	Serial number (MTYYWWXXSSSSS)

Note: The serial number and barcode are for NVIDIA internal use only.

Regulatory Compliance and Classification

The laser module is classified as class I according to IEC 60825-1, IEC 60825-2 and 21 CFR 1040 (CDRH).

- Safety: CB, cTUVus, CE
- 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.

Ordering Information

Ordering Part Number	Description
MFP7E10-N003	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 3m
MFP7E10-N005	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 5m
MFP7E10-N007	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 7m
MFP7E10-N010	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 10m
MFP7E10-N015	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 15m
MFP7E10-N020	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 20m
MFP7E10-N025	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 25m
MFP7E10-N030	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 30m
MFP7E10-N035	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 35m
MFP7E10-N040	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 40m
MFP7E10-N050	NVIDIA passive fiber cable, MMF, MPO12 APC to MPO12 APC, 50m

For more information please contact your sales representative or send an Email to: networking-support@nvidia.com.

References

- IEC 61754-7: Fibre optic interconnecting devices and passive components - Part 7-1: Type MPO connector family - One fibre row https://webstore.iec.ch/publication/5847
- GR-1435: Generic Requirements for Multi-Fiber Optical Connectors, https://telecom-info.njdepot.ericsson.net/site-cgi/ido/docs.cgi?ID=SEARCH&DOCUMENT=GR-1435&
- Application Note Optical Cables-Connectors for NDR – available from NVIDIA NBU support.

For more documentation, please contact your sales representative or the Support team.

Document Revision History

Revision	Date	Description
1.2	May. 2023	Converted to HTML. Updated the Introduction, Applications and Ordering chapters.
1.1	Oct. 2022	Updated max reach from 30m to 50m. Updated template. Minor text edits.
1.0	Aug. 2021	Initial release; preliminary and subject to change.

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