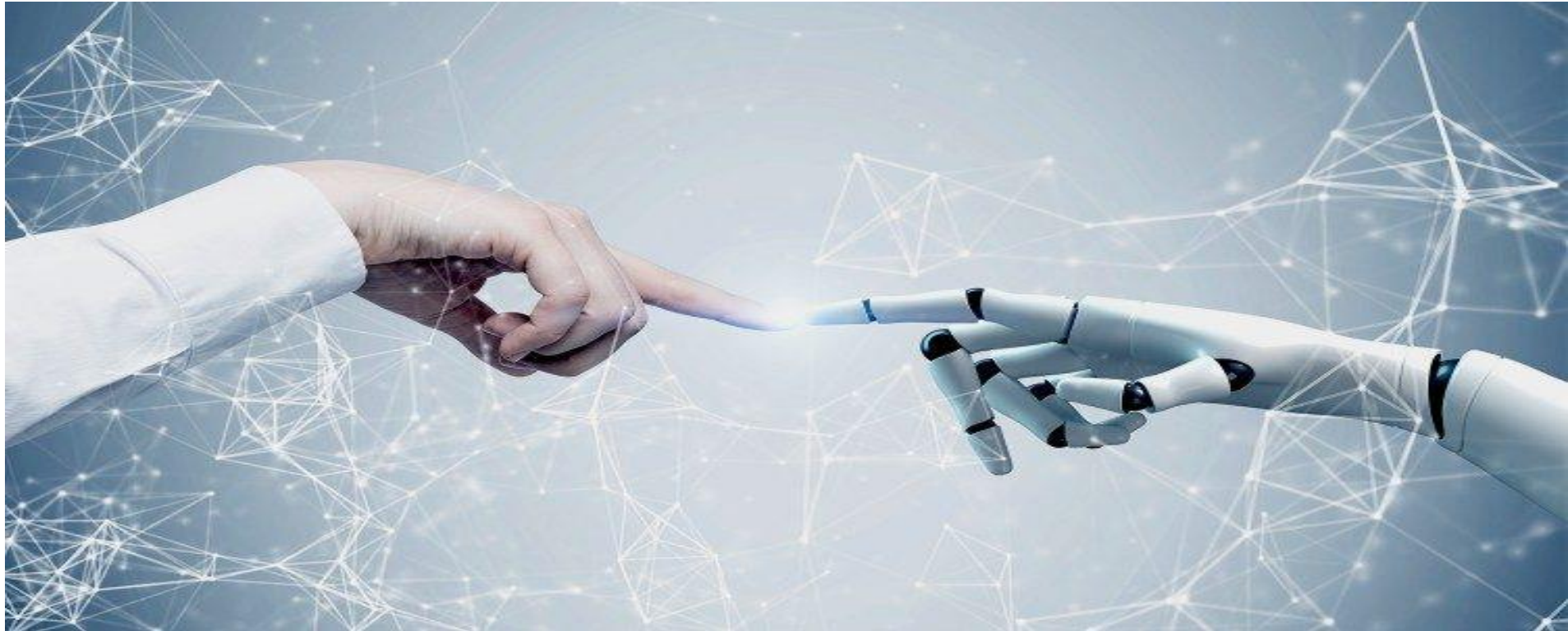


# MPO/MTP SOLUTION FOR DATA CENTER



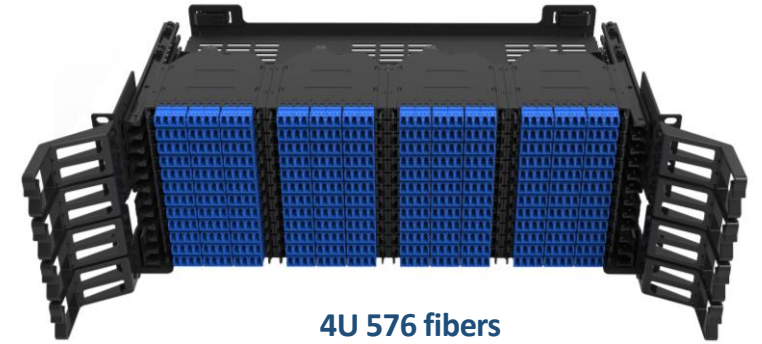
**CONNECT TOGETHER, GROW TOGETHER**



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with you

VERATECK is proud to carry total optical network solution products arranged from FTTH, FTTA, Data Center, Optical Transceiver. With a market proven experiences to serving customers in the worldwide industry, we have been bring the total solutions and services to the future world by integrating data, voice and video to build the most innovative and reliable networks for world's Telco Carriers, ISP's Government and enterprise market.

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4U 576 fibers

**Ultra High Density Patch Panel**



4U 576 fibers



2U 288 fibers



MPO/MTP Cable



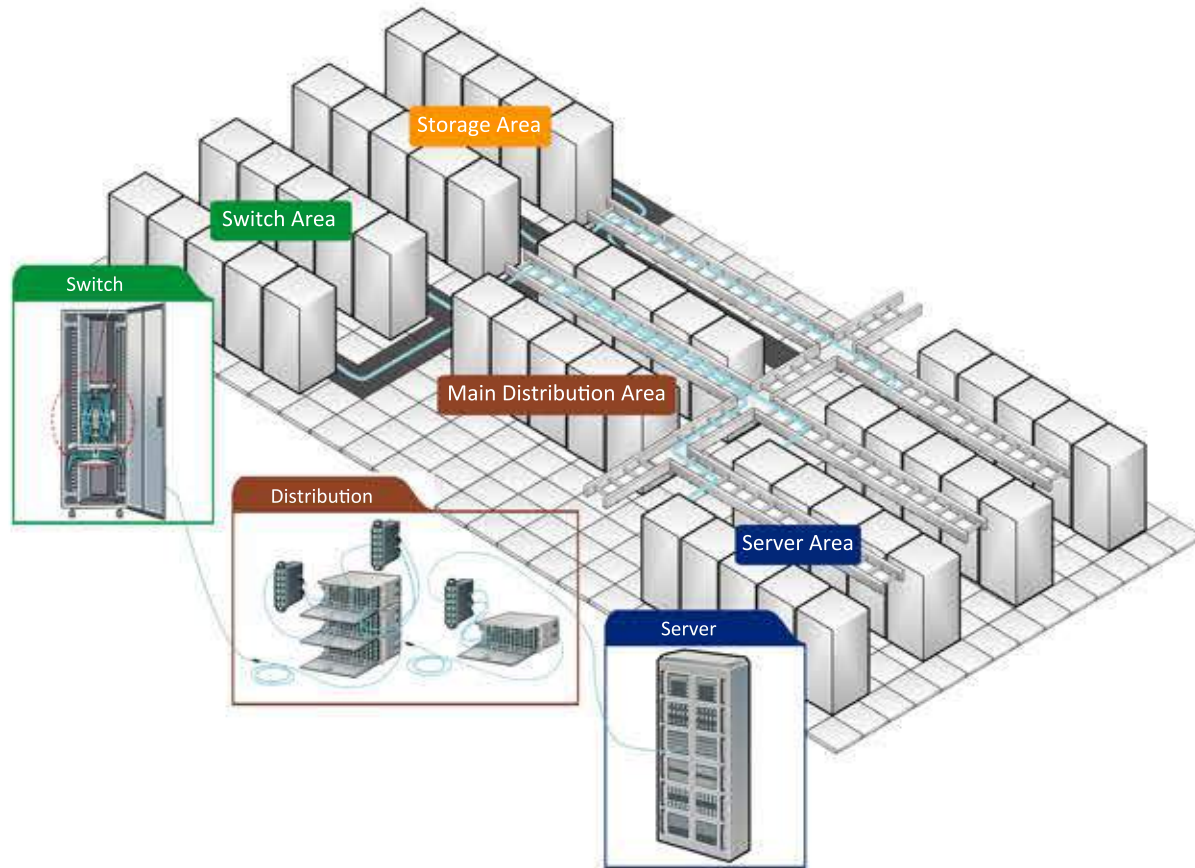
MPO/MTP Cassette



# Data center Structure

## Design Considerstions for 40G/100G Ethernet Networks

Data center designers have always strived to make the data center network reliable, manageable, flexible and scalable. Furthermore the standards have provided a framework to achieve these goals through structured cabling. Structured cabling as defined by ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers, has been a valuable tool that data center designers have used as a guide in the past, and this standard will continue to add value as we transition into higher 40G and 100G data rates.



### New Transceiver Interface: MPO Connector

- MPO connector technology used at electronics interface
- There is a growing need for high speed switch-to-switch and switch-to-server connections
- The used fo 12-fiber pre-terminated cabling with MPO connectivity
- Migration from 10G to 100G is also easily accomplished using two 12-fiber cable assemblies

### 40G/100G Standard Provisions

- The transmission media for 40G
  - 40 GBASE-SR4 (Parallel optics) 10G on four fibers per direction
    - 100m on OM3 fiber
    - 150m on OM4 fiber
  - 40 GBASE-LR4(CWDM) 4x10G 1300nm wavelength region
    - 10km on single-mode fiber
- The transmission media for 100G
  - 100 GBASE-SR10 (Parallel optics) 10G on 10 fibers per direction
    - 100m on OM3 fiber
    - 150m on OM4 fiber
  - 100 GBASE-LR4(DWDM) 4x25G 1300nm wavelength region
    - 10km on single-mode fiber
  - 100 GBASE-ER4(DWDM) 4x25G 1300nm wavelength region
    - 40km on single-mode fiber



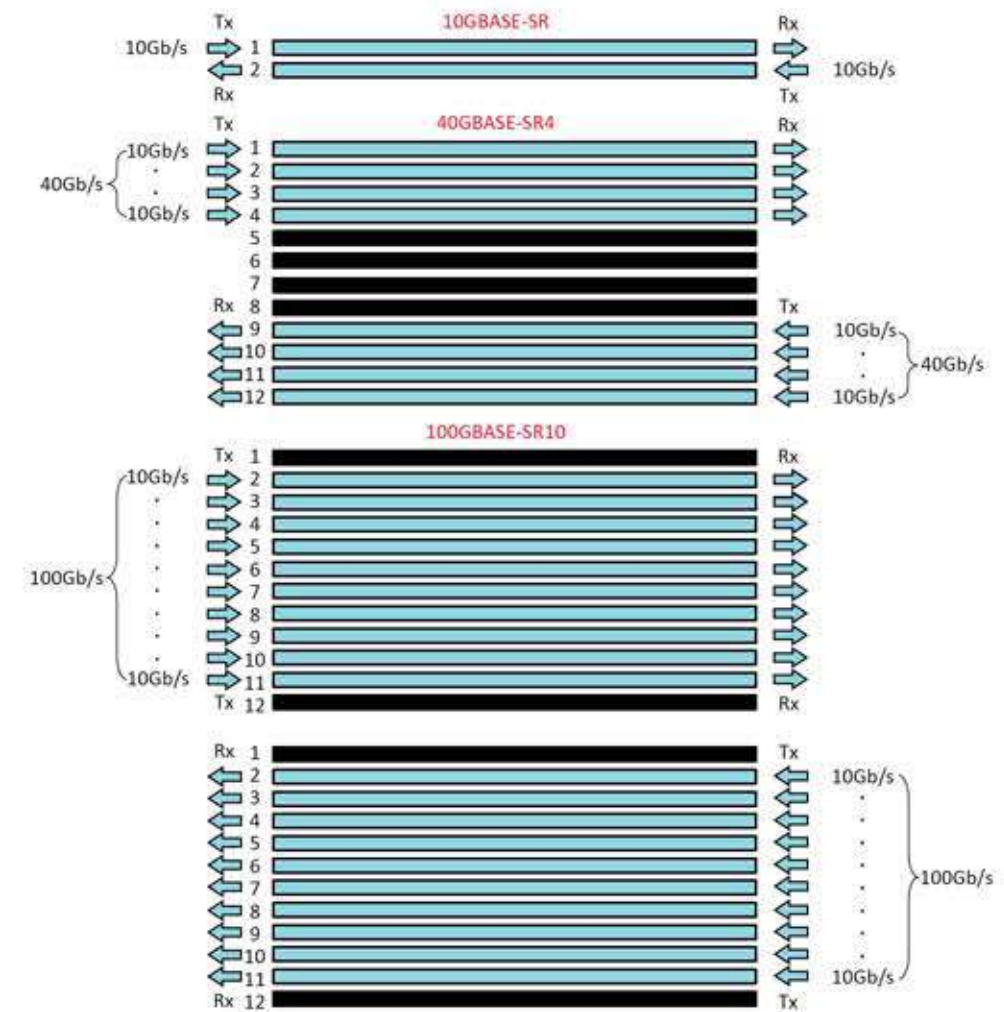
### Active Equipment Interfaces

Fiber connectivity in higher-speed active equipment is being condensed and simplified with plug-and-play, hot-swap transceiver miniaturization. 1G and 10G networks commonly utilize the GBIC (Gigabit interface converter). For 8G Fibre Channel SAN and OTU2, as well as some 10G, the transceiver is the SFP+ (small form-factor pluggable plus). Interfaces for 40G and 100G active equipment include QSFP (quad small form-factor pluggable), CFP and CXP (100G form-factor pluggable).

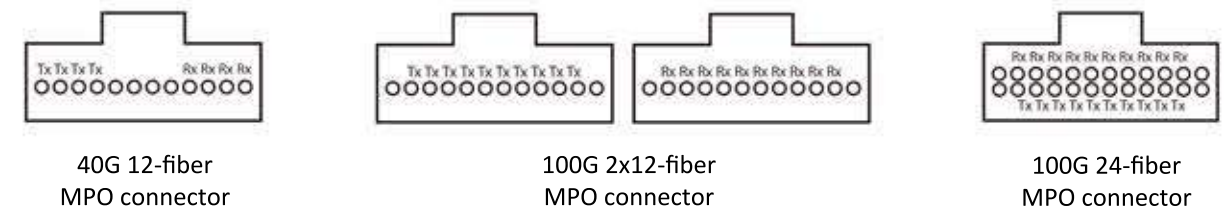
MTP/MPO is the designated interface for multimode 40/100G, and it's backward compatible with legacy 1G/10G applications as well. Its small, high-density form factor is ideal with higher-speed Ethernet equipment.

### Parallel Optics

40G and 100G Ethernet employ parallel optics. Data is transmitted and received simultaneously on MPO interfaces through 10G simplex transmission over each individual strand of the array cable. Current IEEE channel/lane assignments for active equipment interfaces determine the transmission methodology.



### 40G/100G MPO Interface



# Pre-terminated Cabling

## 10G/40G/100G Channel Configuration

The use of pre-terminated optical fiber cabling can facilitate the migration path from 10G Ethernet to 40G and 100G Ethernet for Switch-to-Server connectivity or Switch-to-Switch connectivity

### 1G / 10G Channel Configuration



### 40G Channel Configuration



### 100G Channel Configuration





## Fiber Optic Patch Cord

### LC Patch cord



#### Features

- Guaranteed performance specifications
- Various connector type available
- Low insertion loss and return loss
- IEC 61754-20, TIA 604-10-A
- Fiber type:  
SM G.657A, MM(62.5 OM1),  
MM(50 OM2), MM(50 OM3), MM(OM4)
- Simplex or Duplex
- IEC 60874, 61300, 61753-\*\*\* test
- Telcordia GR-326 approval test

#### Ordering Information

- Fiber type
- Simplex or Duplex
- Connector boot type
- Cable O.D size
- Polishing UPC or APC



#### Endface geometry

Tight endface geometry tolerances guarantees the customer a reliable and reproducible quality and long term performance. Interferometric ferrule endface inspection is mandatory for controlled and mated manufacturing processes. Upon request a Quality Control Report can be issued for each assembled connector

### LC Adaptor



#### Features

- Guaranteed performance specifications
- Alignment Sleeve Zirconia
- Durability 1000 mating cycles
- Housing Color UPC(Blue), APC(Green), MM(Beige), OM3(Aqua)
- IEC 61274-\*\*\* test

#### Ordering Information

- Housing Color
- Adaptor type

### MPO/MTP Patch cord



#### Features

- Optical fiber patchcords
- Plug and play system
- 10G,40G,100G Ethernet
- OM3,OM4 and SM performance
- Fast and simple installation
- IEC 61754-7, TIA 604-5
- Telcordia GR-1435 approval test

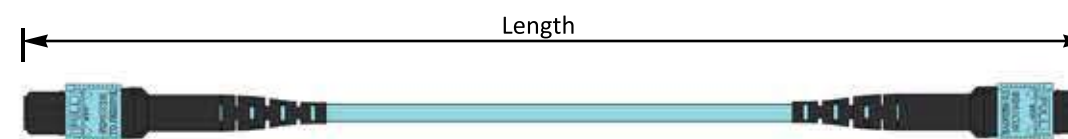
#### Properties

- Up to 12,24 fibers per assembly
- Cable for indoor use low smoke zero halogen
- Diameter 3.0 or 3.6mm
- MTP Patchcord standard :  
MTP(Non-pinned)-MTP(Non-pinned)  
Polarity Method Type A or B

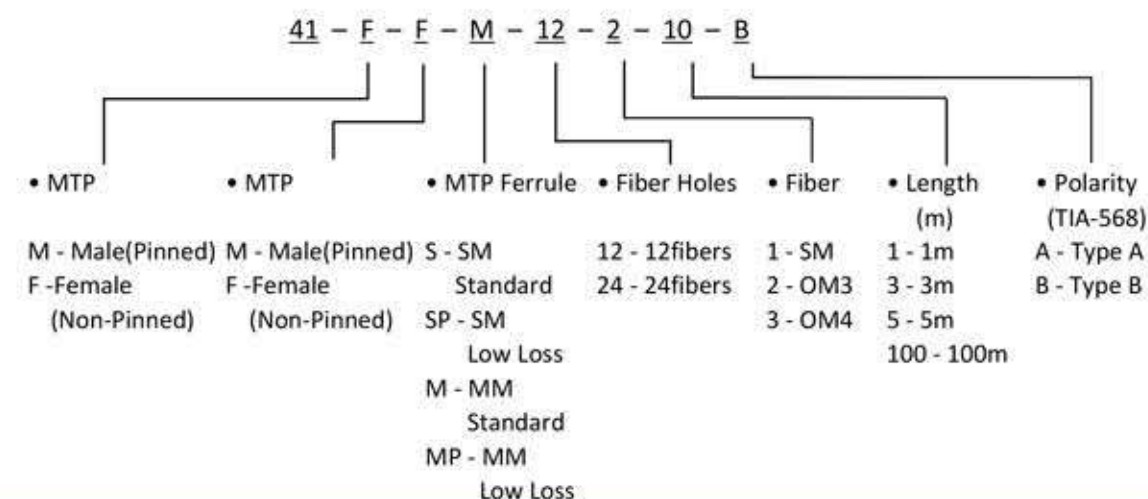


Parameter	SM Standard		SM Super Low loss		MM Standard		MM Super Low loss	
	Typical	Max	Typical	Max	Typical	Max	Typical	Max
Insertion Loss(dB)	0.25	0.70	0.10	0.35	0.20	0.60	0.10	0.35
Return Loss(dB)	60 (8" Polish)		60 (8" Polish)		25		25	
Operating Temperature	-40 to +75°C							
Ferrule type available	4,8,12,24		8,12		4,8,12,24		8,12	

MPO/MTP Patch cords are the linking cables between optical distribution racks and equipment racks such as servers or switches. All of patch cords are terminated on to round cable as opposed to flat ribbon type which makes cable routing and handling for easier.



#### Ordering Information



# MPO/MTP Harness Assemblies

## MPO/MTP Harness

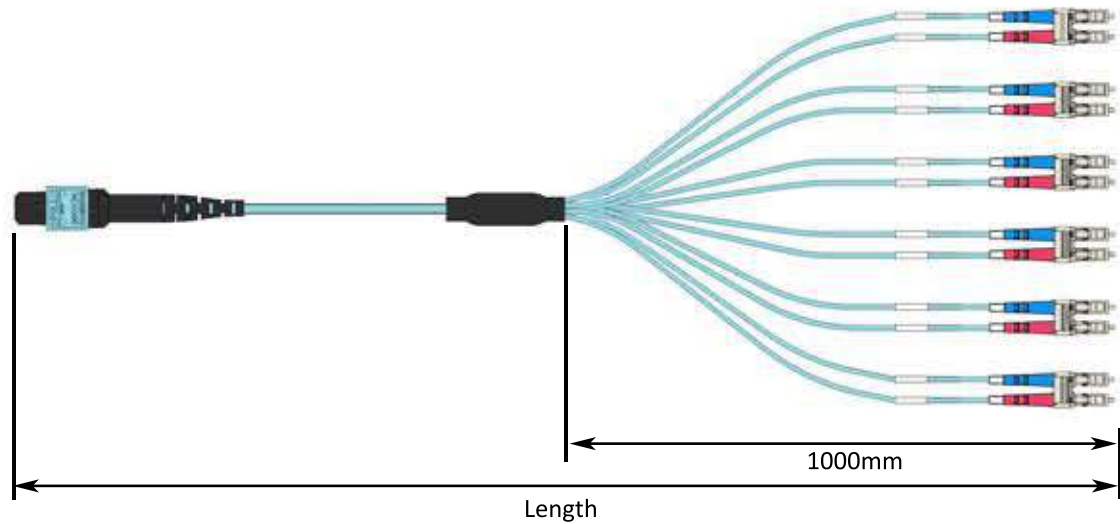


### Features

- Guaranteed performance specifications
- Various connector type available
- Low insertion loss and return loss
- LC Spec IEC 61754-20, TIA 604-10-A
- MTP Spec IEC 61754-7, TIA 604-5
- Fiber type:  
SM, MM(62.5 OM1),  
MM(50 OM2), MM(50 OM3), MM(OM4)
- LC connector Simplex or Duplex
- Telcordia GR-326 approval test

### Properties

- Up to 8,12,24 fibers per assembly
- Cable for indoor use low smoke zero halogen
- Diameter 3.0 or 3.6mm
- MTP Harness standard  
MTP(Non-pinned)-LC(Duplex)



### Ordering Information

42 - F - M - LC - S - 12 - 2 - 5

• MTP	• MTP Ferrule	• Breakout Connector	• Connector Type	• Fiber Holes	• Fiber	• Length (m)
M - Male(Pinned)	S - SM	LC - LC	S - Simplex	8 - 8 fibers	1 - SM	2 - 2m
F - Female (Non-Pinned)	Standard	SC - SC	D - Duplex	12 - 12fibers	2 - OM3	3 - 3m
	SP - SM			24 - 24fibers	3 - OM4	5 - 5m
	Low Loss					
	M - MM					
	Standard					
	MP - MM					
	Low Loss					

## MPO/MTP QSFP or CXP+ to SFP+ Harness



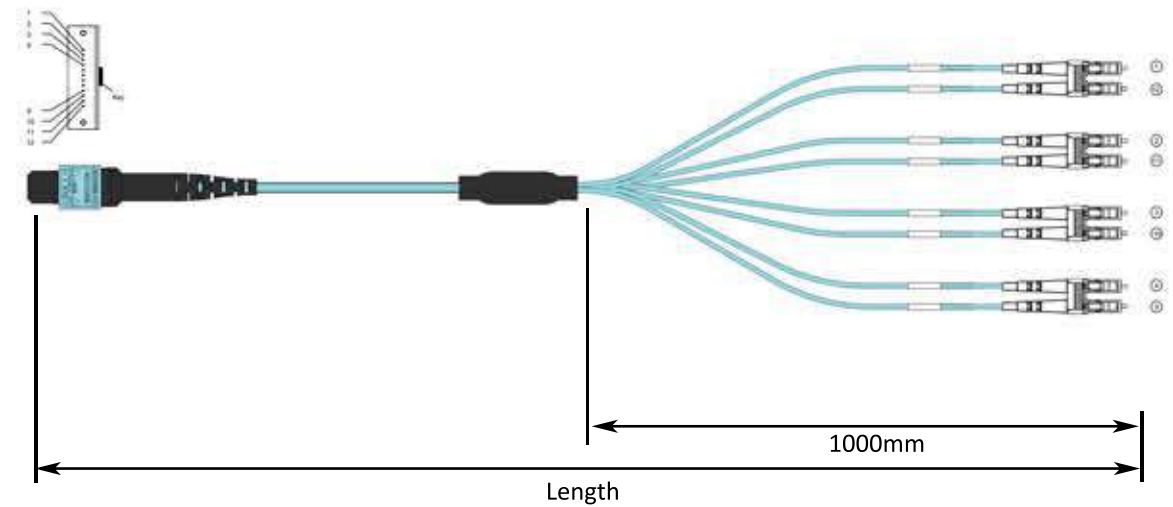
MPO/MTP QSFP+ or CXP to SFP+ harness is a 1x4 or 1x10 MTP to LC duplex harness for connection to electronics with LC-style ports and for use in aggregation of 10G ports to a 40G, 100G port. These can be ordered as a TIA -568 Type A or Type B component to maintain transmit -to -receive connectivity.

### Features

- Harnesses connectivity from 12 to 8 fibers
- Higher return on investment and reduced capitalization and installation costs

### Properties

- Up to 8,12,24 fibers per assembly
- Cable for indoor use low smoke zero halogen
- Diameter 3.0 or 3.6mm
- MTP 40G Harness standard  
MTP(Non-pinned)-LC(Duplex) :8-fibers
- MTP 100G Harness standard  
MTP(Non-pinned)-LC(Duplex) :20-fibers



### Ordering Information

43 - F - M - 8 - 2 - 5

• MTP	• MTP Ferrule	• Fiber Holes	• Fiber	• Length (m)
M - Male(Pinned)	M - MM	8 - 8 fibers	2 - OM3	2 - 2m
F - Female (Non-Pinned)	Standard	20 - 20fibers	3 - OM4	3 - 3m
	MP - MM			5 - 5m
	Low Loss			



# MPO/MTP Trunk Cable Assemblies

## MPO/MTP Trunks



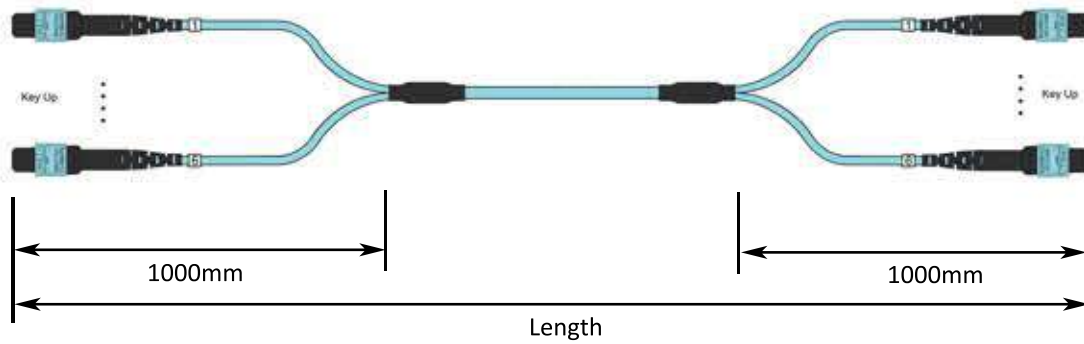
MPO/MTP trunk cable assemblies consist of sub-unitized Micro distribution fiber optic cable in fiber counts ranging from 24-72. This reduced diameter, high performance cable is comprised of multiple 12-fiber sub-unit tubes, each containing twelve 250um colored fibers enclosed by a high performance LSZH jacket.

**Features**

- Self contained fiber management
- Low loss MTP connectors
- Reduced O.D. Micro Trunk cable
- Unsurpassed port density

**Properties**

- 24,48,72 fibers per assembly
- Cable for indoor use LSZH
- Sub-unit diameter 3.0 mm
- MTP Trunk standard:
  - MTP(Non-pinned)-MTP(Non-pined)
- MTP Extender Trunk standard:
  - MTP(Non-pined)-MTP(Pined)



## MPO/MTP Compact Trunks



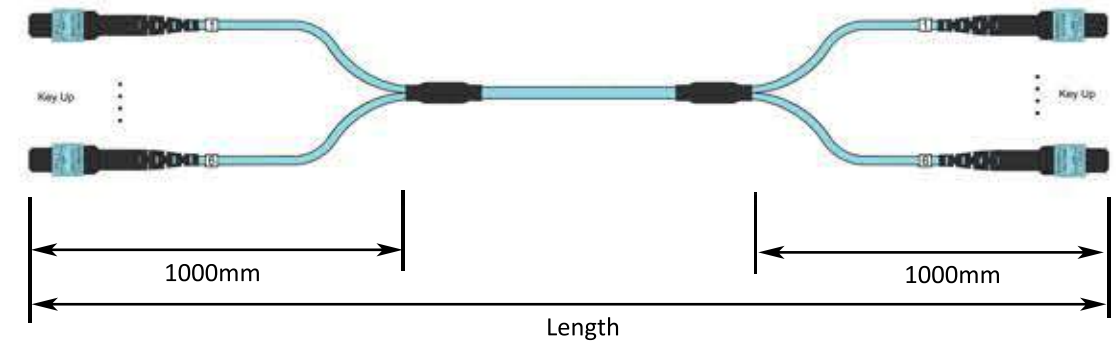
Sub-unitized Micro trunk cable assemblies provide high performance for premise installations where space is a premium. The small diameter, sub-unitized design offers twelve 250um colored fibers per tube, with aramid strength members enclosed by a LSZH jacket, enabling high density architecture.

**Features**

- Sub-unitized design, with 12x250um colored fibers per tube
- Small diameter provides superior bend performance
- One meter standard breakout

**Properties**

- 24,48,72,96,144 fibers per assembly
- Cable for indoor use LSZH
- Sub-unit legs diameter 3.0 mm
- MTP Trunk standard:
  - MTP(Non-pined)-MTP(Non-pined)
- MTP Extender Trunk standard:
  - MTP(Non-pined)-MTP(Pined)



**Ordering Information**

**530 - F - F - M - 72 - 2 - 30 - B**

• MTP	• MTP	• MTP Ferrule	• Fiber Holes	• Fiber	• Length (m)	• Polarity (TIA-568)
M - Male(Pinned)	M - Male(Pinned)	S - SM	24 - 24fibers	1 - SM	1 - 1m	A - Type A
F - Female	F - Female	Standard	36 - 36fibers	2 - OM3	3 - 3m	B - Type B
(Non-Pinned)	(Non-Pinned)	SP - SM	48 - 48fibers	3 - OM4	5 - 5m	
		Low Loss	72 - 72fibers		...	
		M - MM			100 - 100m	
		Standard				
		MP - MM				
		Low Loss				

**Ordering Information**

**540 - F - F - M - 96 - 2 - 30 - B**

• MTP	• MTP	• MTP Ferrule	• Fiber Holes	• Fiber	• Length (m)	• Polarity (TIA-568)
M - Male(Pinned)	M - Male(Pinned)	S - SM	24 - 24fibers	1 - SM	1 - 1m	A - Type A
F - Female	F - Female	Standard	36 - 36fibers	2 - OM3	3 - 3m	B - Type B
(Non-Pinned)	(Non-Pinned)	SP - SM	48 - 48fibers	3 - OM4	5 - 5m	
		Low Loss	72 - 72fibers		...	
		M - MM	96 - 96fibers		100 - 100m	
		Standard	144 - 144fibers			
		MP - MM				
		Low Loss				

# MPO/MTP Trunk Cable Assemblies

## MPO/MTP Array Harnesses



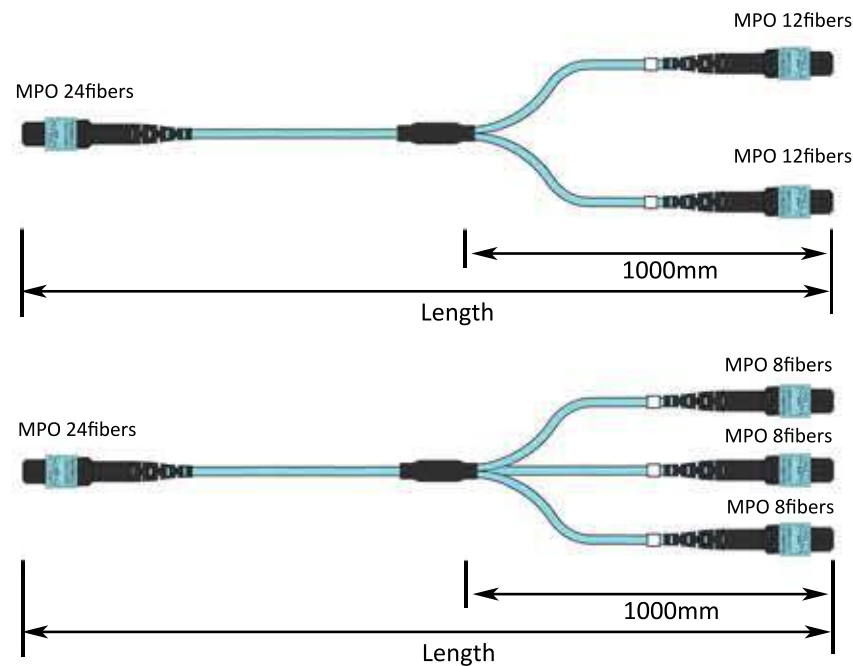
MPO/MTP Array Harnesses are preterminated and can be used with brackets in place of MPO/MTPcassettes. Available in multimode OM3 and OM4, harnesses are designed to cross connect from structured cabling directly into active transceivers with MPO/MTP interface. harnesses are offered with 8,12 or 24fibers MTPs, depending on application.

### Features

- Plug and Play system
- Pre-terminated MTP to MTP connector harnesses are used in conjunction with MTP Plate

### Properties

- Used in two x 12fibers to one x 24fibers
- three x 8fibers to one x 24fibers
- Connecting directly into 40G or 100G transceivers
- MTP Array Harness standard
- MTP(Non-pinned)-MTP(Non-pinned)



# MPO/MTP Termination

## MPO/MTP Cassettes



Plug & Play Cassette provide the interface between the MTP Connector on the trunk and the LC or SC pathcords that will then connect directly to the electronics. Up to four Plug&Play cassettes can be installed quickly into the Plug&Play patch panel with push rivets. with these four cassettes a high density of 96 LC within 1U can be achieved.

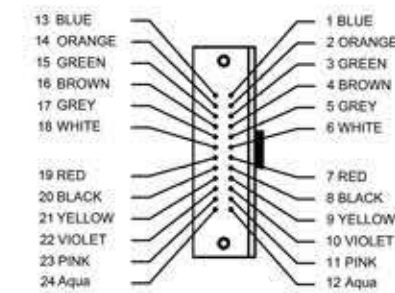
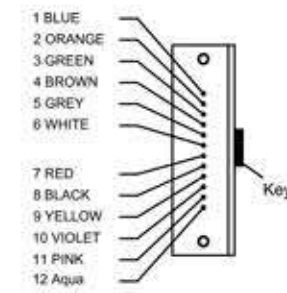


### Features

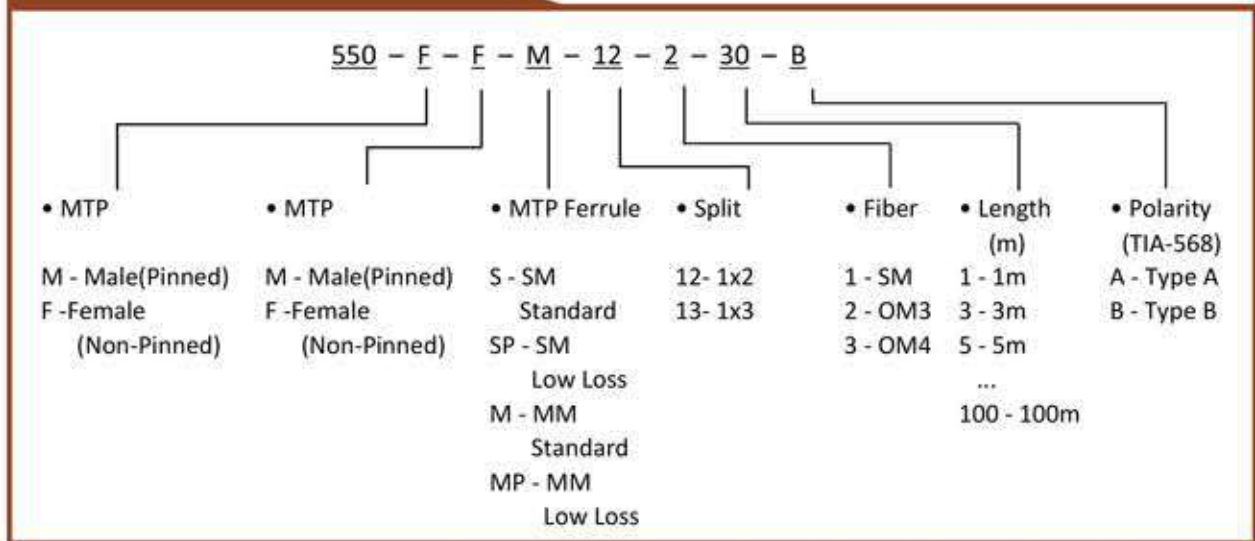
- All cassettes use either 24 fibers or 12 fibers low loss MPO connectors
- Available SM, OM3, OM4
- High density four cassettes fit into 1U

### Properties

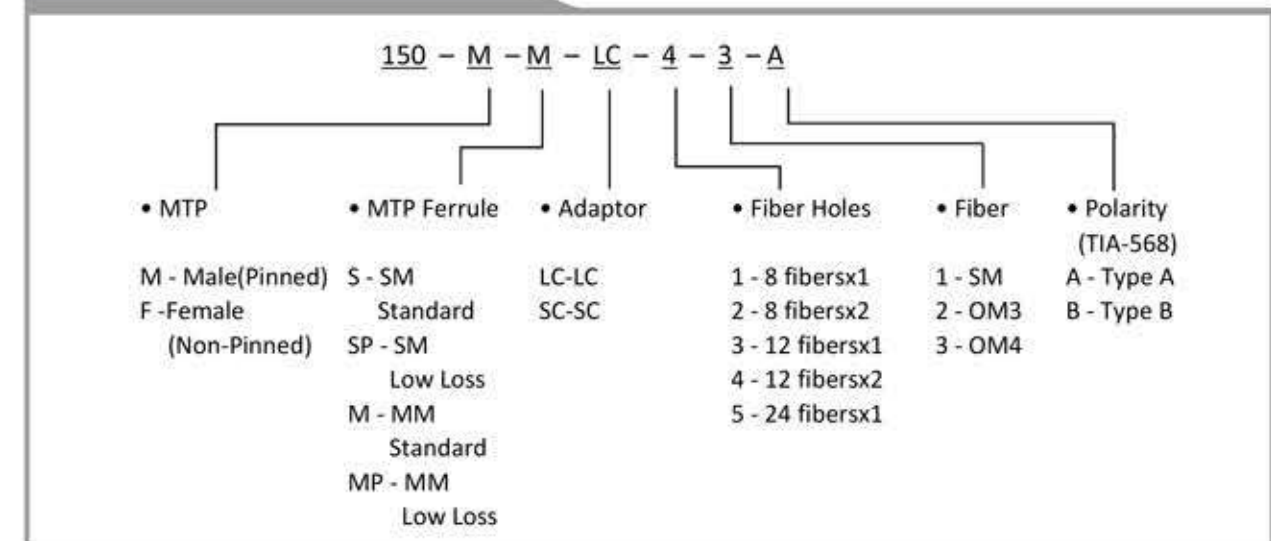
- Option MTP 12fibers x 1
- MTP 12fibers x 2
- MTP 24fibers x 1
- MTP Cassette standard : MTP(pinned)-LC Method A



### Ordering Information



### Ordering Information





## MPO/MTP Termination

### MPO/MTP Plate



MTP Adaptor plate provide a simple interface to connect turnk harnesses to turnks standard turnks to extender trunks or can facilitate the use of 40G and 100G electornics.

- Features
- Plug and Play system
  - Pre-terminated MTP to MTP connector harnesses are used in conjunction

#### Ordering Information

- Select Adaptor count
  - 3 MTP adaptors (P/N: 151-0001)
  - 6 MTP adaptors (P/N: 151-0002)
  - The others avabile

### MPO/MTP Mount Bracket



MTP Adaptor plate provide a simple interface to connect turnk harnesses to turnks standard turnks to extender trunks or can facilitate the use of 40G and 100G electornics.

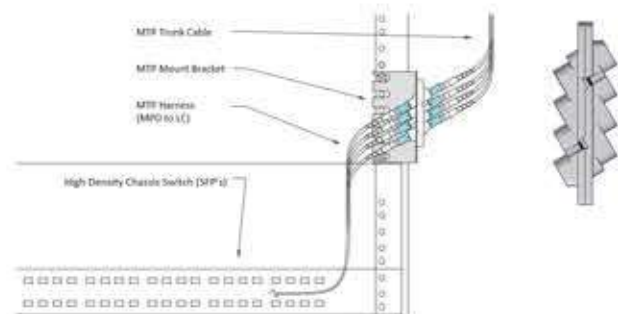
- Features
- Plug and Play system
  - Pre-terminated MTP to MTP connector harnesses are used in conjunction

#### Ordering Information

- Select Adaptor count
  - 4 MTP adaptors (P/N: 151-1001)
  - 8 MTP adaptors (P/N: 151-1002)
  - 12 MTP adaptors (P/N: 151-1003)



MTP Quad Adaptor  
30 degree Angled



## MPO/MTP Termination

### MPO/MTP Patch Panel



MTP Patch Panel is designed for use as a rack mount interconnect point where termination and connectivity. The panel design is based on 1U,2U and 4U with three mounting positions that can accomodate adaptor plates, MTP cassettes.

- Features
- Most common connector styles and types available
  - Compatible with industry standard equipment frames
  - Modular design
  - Slide out tray with relief cut-outs for simplified connector access

- Properties
- Standard density: 3 mounting position
  - High density: 4 mounting position



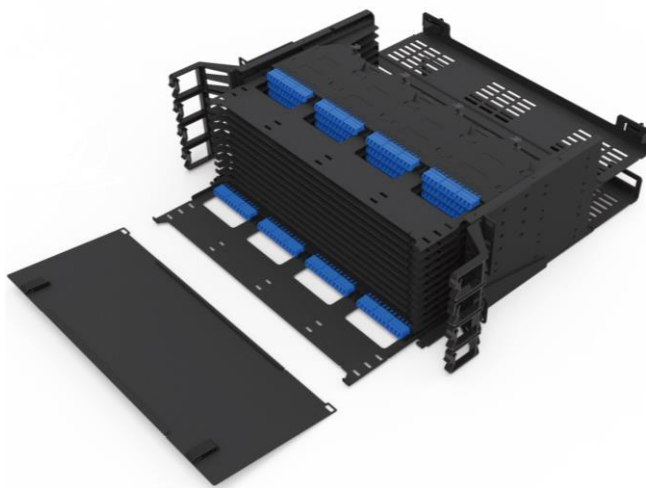
#### Ordering Information

	145 - P - 3 - 1	
• MTP Type	• Slot	• Height
P - MTP Plate	3 - 3 mounting Position	1 - 1U
C - MTP Cassette	4 - 4 mounting Position	2 - 2U
		4 - 4U

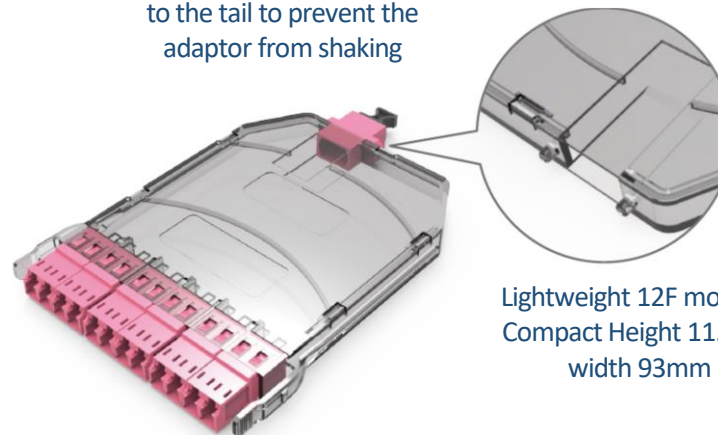
## Ultra High Density Patch Panel 4U 576 fibers

### PRODUCT FEATURES

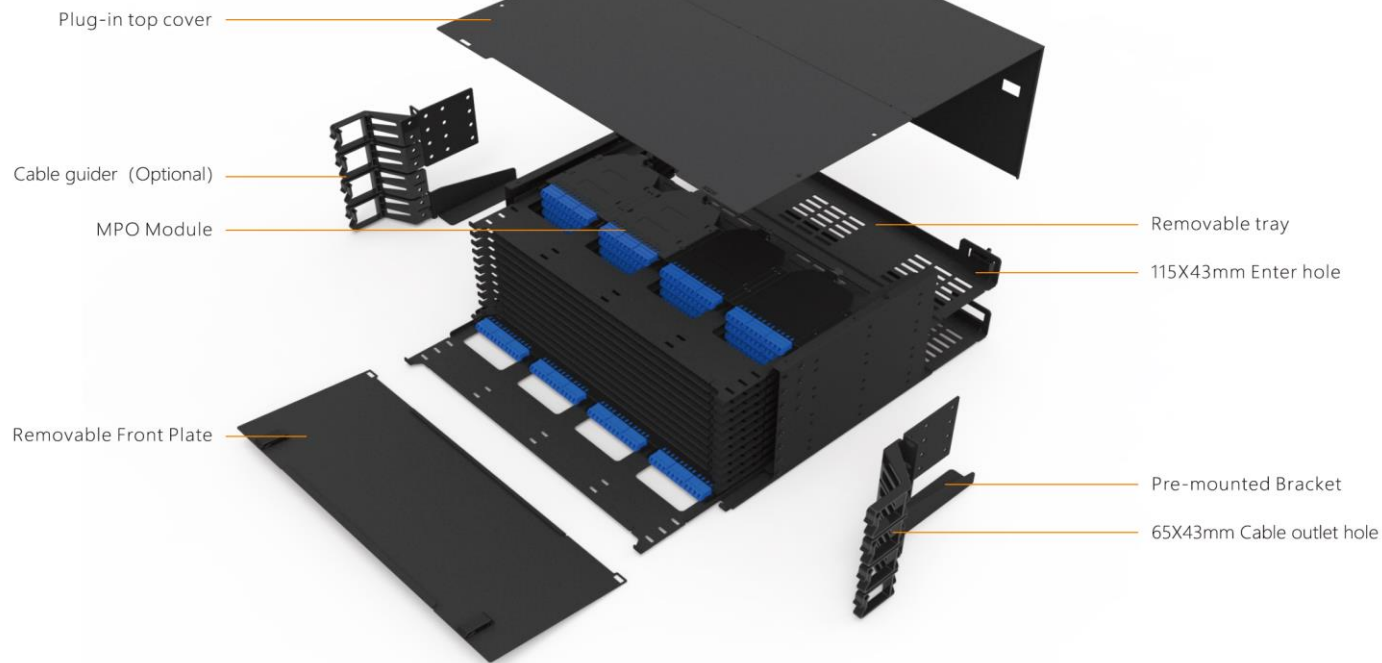
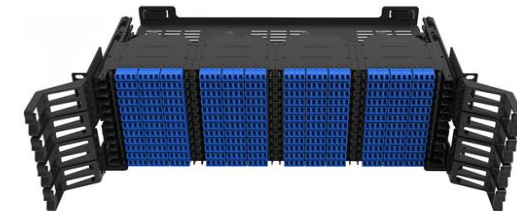
- Standard 19"
- 4U up to 576Fibers
- High-density application
- Double rail design, easy to assemble and manage
- Lightweight ABS material for MPO/MTP modules
- Customized color & Customer Wanted Logo
- High Quality metal sheet technology and fogging coating
- Attractive fiber management system and structure components



Protruding shoots are added to the tail to prevent the adaptor from shaking



Lightweight 12F module for special up & down DLC adaptor  
Compact Height 11.8mm/Ultra Light Weight 40 gram total  
width 93mm and easy for one-hand installation





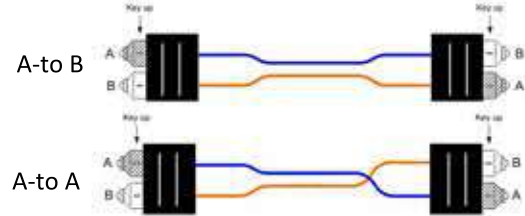
# Fundamental Knowledge

## Optical Fiber Transmission Performance

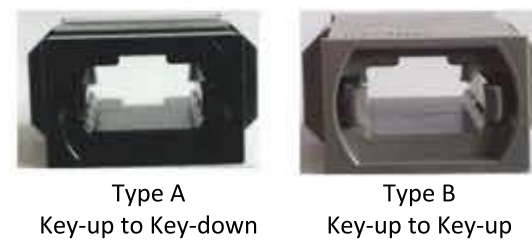
Optical Fiber Type	OM1		OM3		OM4		OS2	
	62.5um Multimode		50um Multimode		50um Multimode		9um Single-mode	
Wavelength	850nm	1310nm	850nm	1310nm	850nm	1310nm	1310nm	1550nm
Maximum Attenuation	2.6dB/Km	0.5dB/Km	2.3dB/Km	0.5dB/Km	2.4dB/Km	0.6dB/Km	0.4dB/Km	0.3dB/Km
Minimum Over filled Launch (OFL) Bandwidth	200 MHz·Km	500 MHz·Km	1500 MHz·Km	500 MHz·Km	3500 MHz·Km	500 MHz·Km	-	-
Minimum Effective Modal Bandwidth (EMB)	2200 MHz·Km	-	2000 MHz·Km	-	4700 MHz·Km	-	-	-
1Gigabit Ethernet Distance (100BASE-SX)	300m	500m	1000m	550m	1100m	550m	-	-
10Gigabit Ethernet Distance (10GBASE-SR)	-	-	300m	-	550m	-	-	-
40Gigabit Ethernet Distance (40GBASE-SR4)	-	-	100m	-	150m	-	-	-
100Gigabit Ethernet Distance (100GBASE-SR10)	-	-	100m	-	150m	-	-	-

## Main Characteristics of TIA Polarity Methods

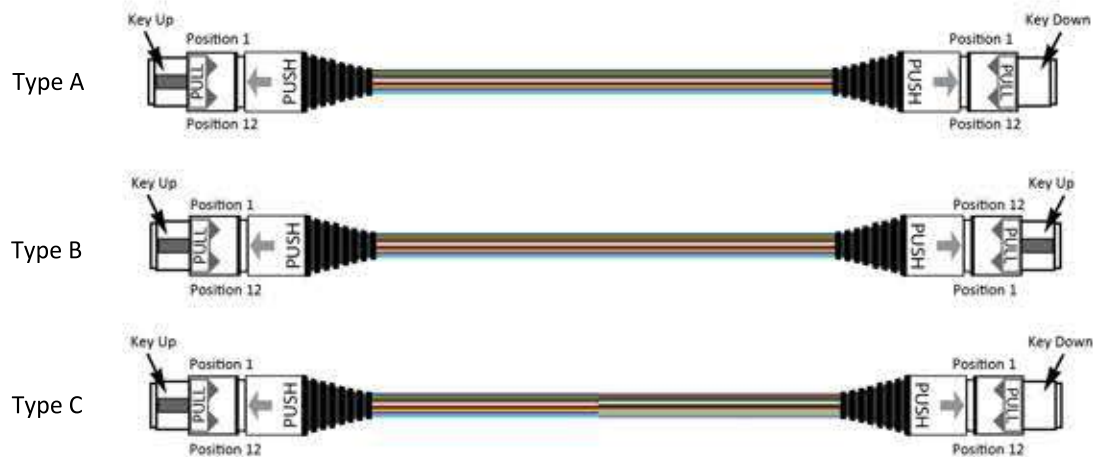
### 1) Duplex channels



### 2) Adaptor



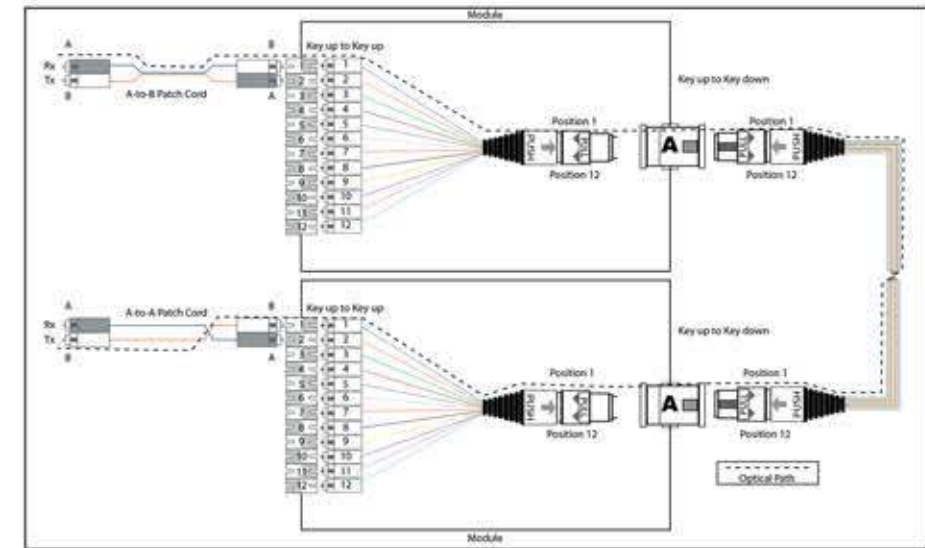
### 3) Parallel optics channels



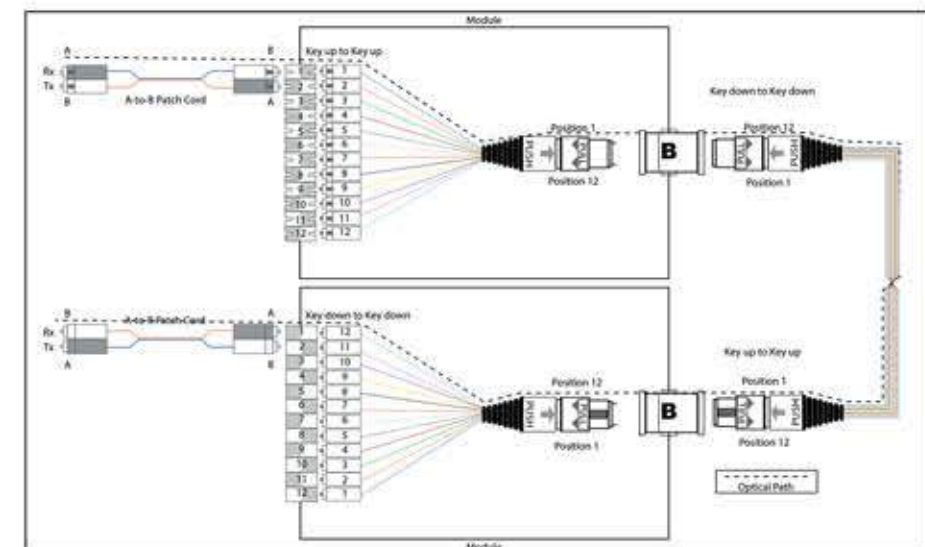
Fiber Position	Input End	Output End		
		Type A	Type B	Type C
1	Blue	Blue	Aqua	Orange
2	Orange	Orange	Pink	Blue
3	Green	Green	Voilet	Brown
4	Brown	Brown	Yellow	Green
5	Slate	Slate	Black	White
6	White	White	Red	Slate
7	Red	Red	White	Black
8	Black	Black	Slate	Red
9	Yellow	Yellow	Brown	Voilet
10	Voilet	Voilet	Green	Yellow
11	Pink	Pink	Orange	Aqua
12	Aqua	Aqua	Blue	Pink

## 4) Conectivity

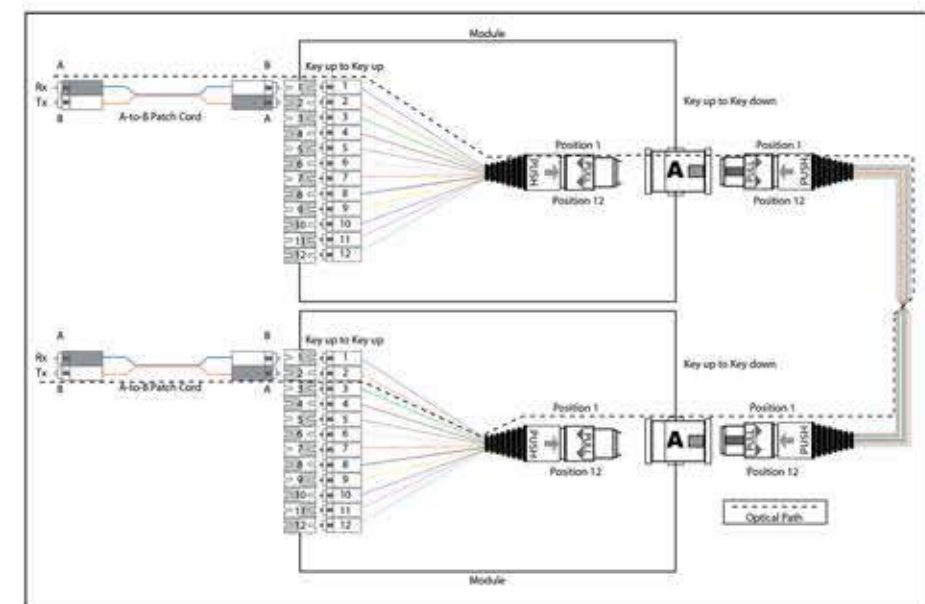
### Method A



### Method B



### Method C



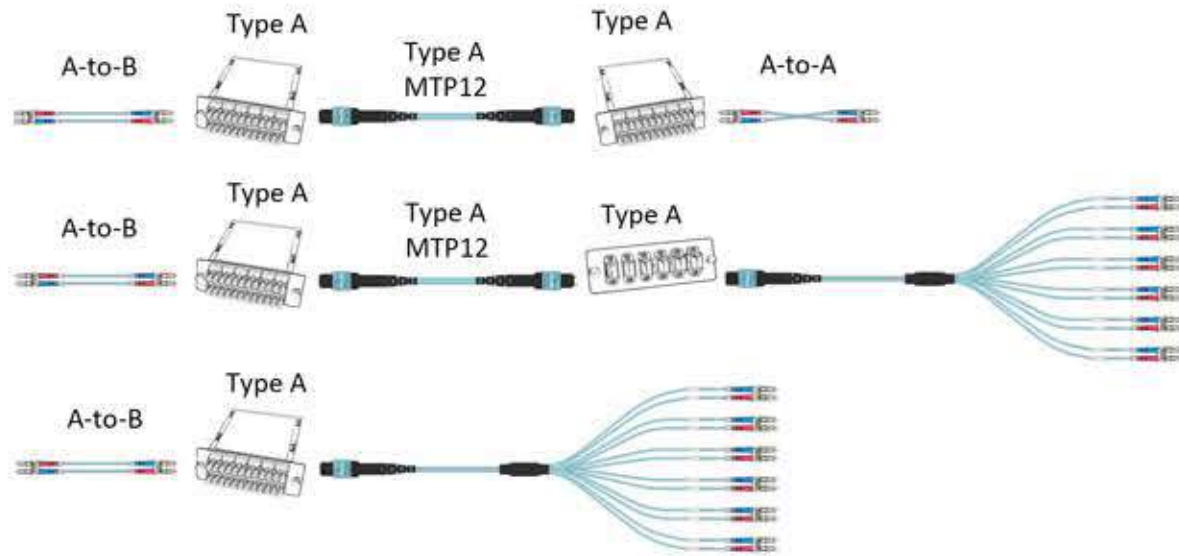
## Fundamental Knowledge

### Migration: from 10G to 100G

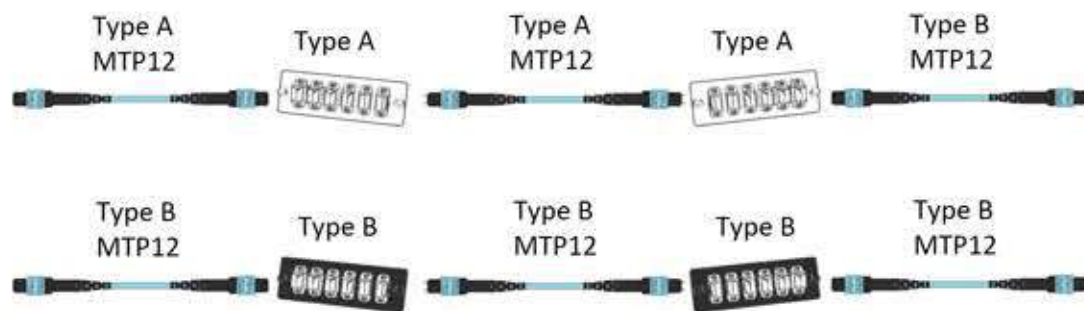
OM3 and OM4 FO cables put in a parallel optical connection, terminated with MPO/ MTP connectors – these are the ingredients for the future 40/100 GbE technologies in a structured cabling environment. This chapter describes how to carry out a successful migration from 10 GbE to 40/100 GbE and the major points to keep in mind. The complete rebuilding of a data center is certainly not an everyday event. When it is done, the operator has the option of relying immediately on the newest technologies and to lay the groundwork for higher band-widths. Gradually converting or expanding existing infrastructure to accommodate 100 Gb/s will be a common occurrence in the years ahead, indeed it will have to be. A useful approach involves successively replacing first existing passive components, then active components as they become available and reasonably affordable. The capacity expansion is usually done in three steps:

1. The capacity expansion in existing 10G environments
2. The capacity expansion from 10G to 40G
3. The capacity expansion from 40G to 100G

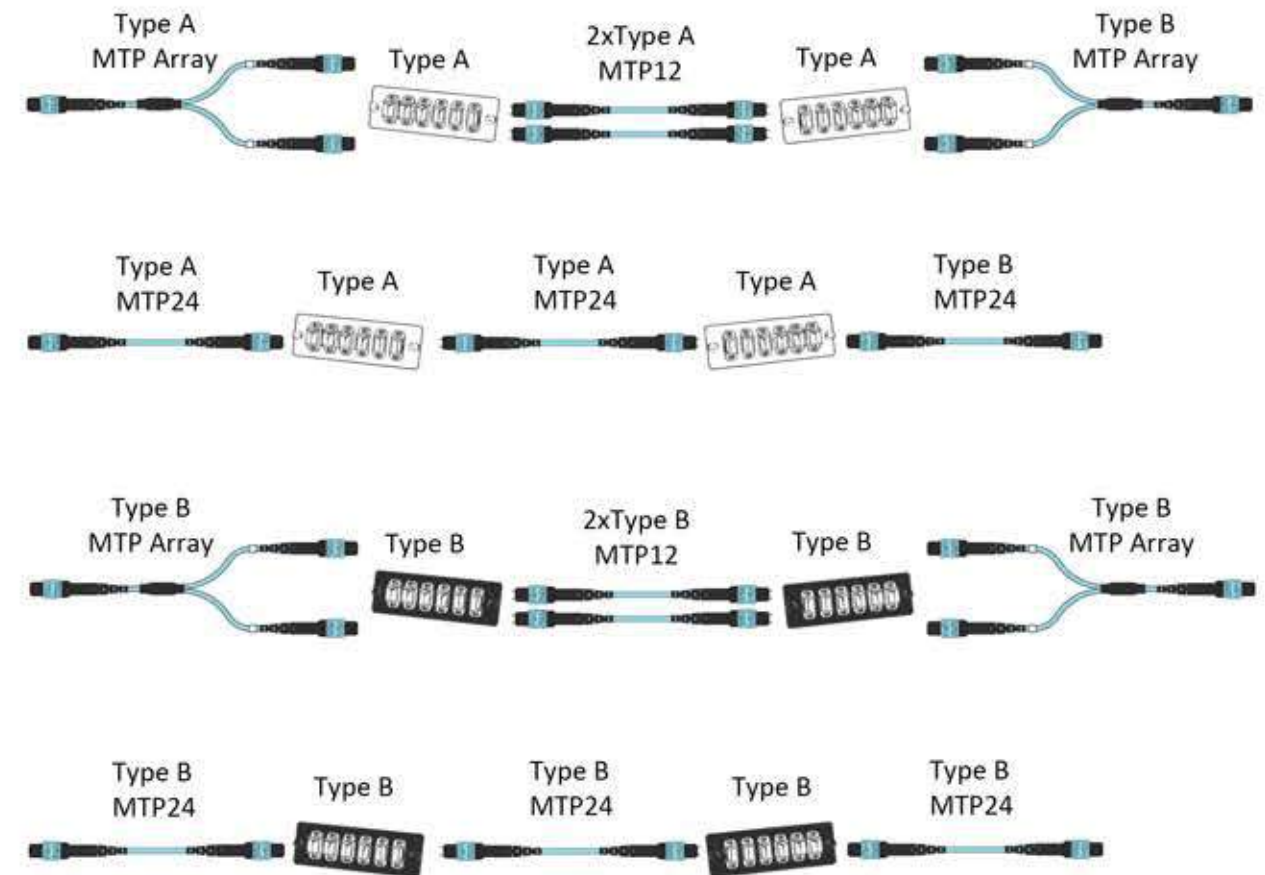
#### 1. The capacity expansion in existing 10G environments



#### 2. The capacity expansion from 10G to 40G



#### 3. The capacity expansion from 40G to 100G





VERATECK delivers turn-key innovative commercial and public safety coverage and capacity solutions that give network operators, facilities owners and neutral hosts an edge over the competition

Designed for even the most challenging indoor and outdoor environments, VERATECK's modular and integrated solutions are designed to reduce capital and operating expenses, speed rollout of services and help improve coverage, signal quality and capacity

FTTH (Fiber To The Home) Solution refers to fiber optic cable that replaces the standard copper wire of the local Telco. Fiber of this cable reaches the boundary of the living space, such as a box on the outside wall of a home.

FTTA (Fiber To The Antenna) Solution is the new generation of high-performance fiber-optic cables for high-speed data transfer from VERATECK. It secures your network connectivity today and in the future



FTTH, FTTA, MTP PRODUCT INFORMATION,  
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