Korea Optic Technology is certified
according to TL 9000 and ISO 14000

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MTP MANAGEMENT SOLUTIONS

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KOT
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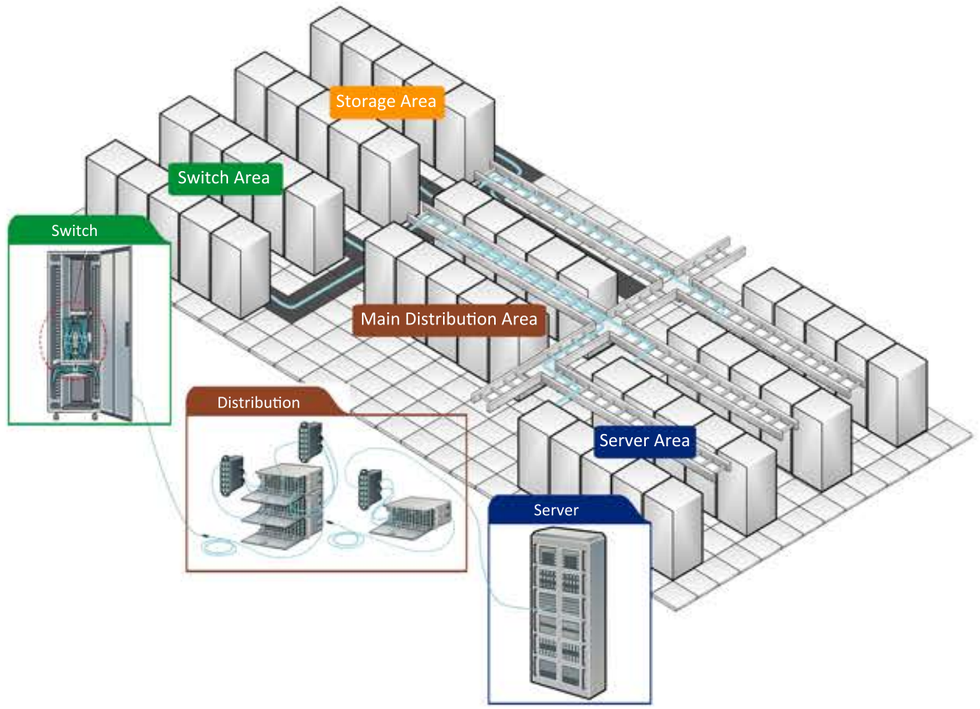
Data center Structure

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: MTP Connector

- MTP connector technology used at electornics 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 MTP 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

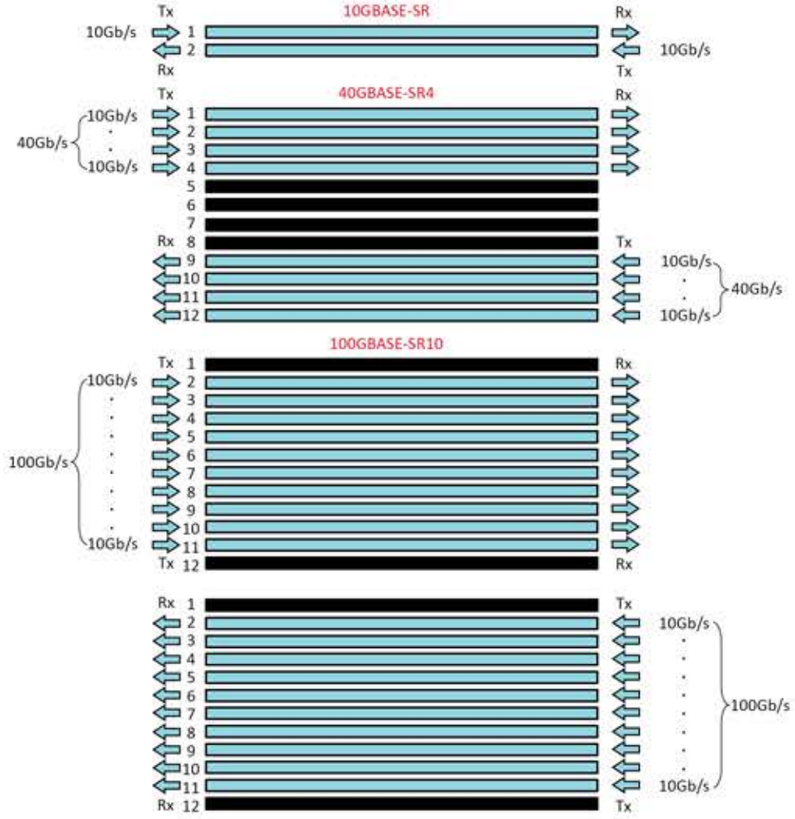
Active Equipment Interfaces

Fiber connectivity in higher-speed active equipment is being condensed and simpliÀed 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).

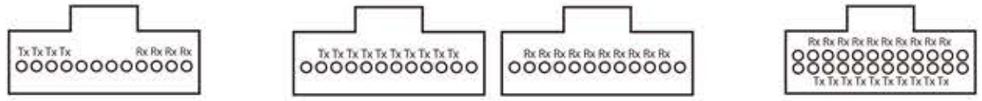
MTP/MPO is the designated interface for multimode 40/100G, and it's backward compatible with legacy 1G/10G applications as well. Its small, high-density form factor is ideal with higher-speed Ethernet equipment.

Parallel Optics

40G and 100G Ethernet employ parallel optics. Data is transmitted and received simultaneously on MTP 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 MTP Interface



40G 12-fiber
MTP connector

100G 2x12-fiber
MTP connector

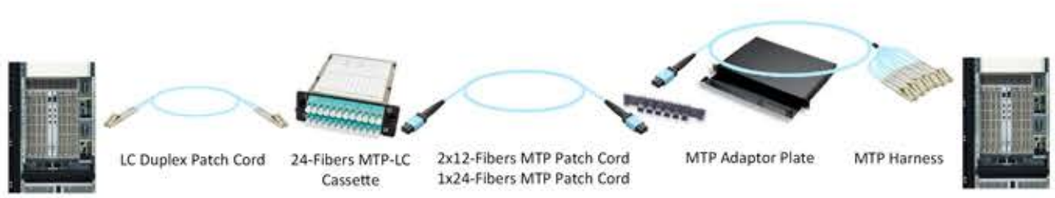
100G 24-fiber
MTP connector

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

Data Center Structure

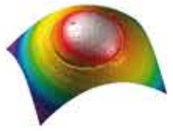
Fiber Optic Patch Cord

LC Patch cord

Features
- Guaranteed performance specifications
- Various connector type available
- Low insertion loss and reture 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 reproducibe quality and long term performance. Interferometric ferrule endface inspection is mandatory for controlled and matered manufacturing processes. Upon request a Quality Cotrol Report can be issued for easch 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

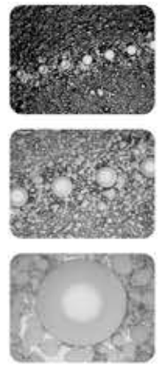
Ordering Information

- Housing Color
- Adaptor type

MTP Patch cord

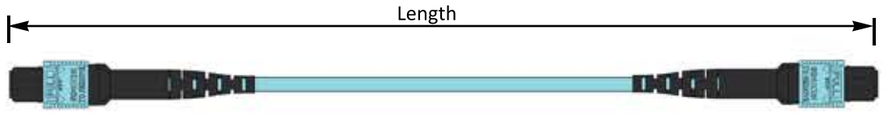
Features
- Optical fiber patchcords
- Plug and play system
- 10G,40G,100G Ethernet
- OM3,OM4 and SM performance
- Fast and simple installation
- IEC 61754-7, TIA 604-5
- Telcordia GR-1435 approval test

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
Retrun 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	

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



Ordering Information

41 – F – F – M – 12 – 2 – 10 – B

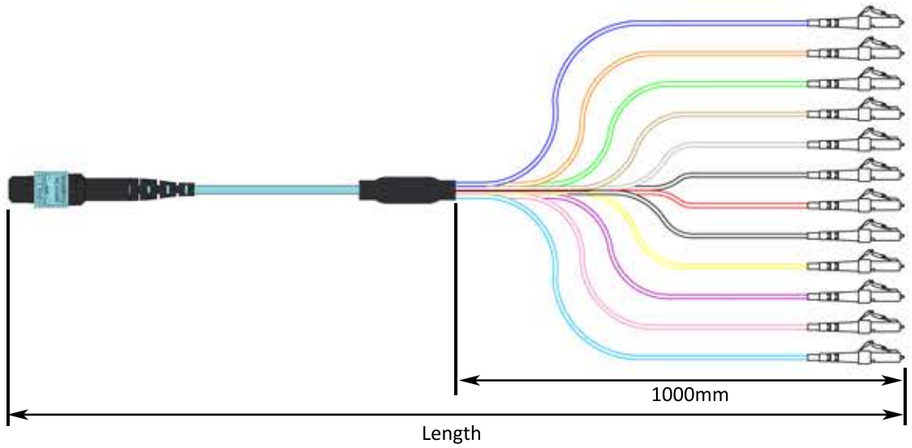
- MTP: M - Male(Pinned), F -Female (Non-Pinned)
- MTP: M - Male(Pinned), F -Female (Non-Pinned)
- MTP Ferrule: S - SM Standard; SP - SM Low Loss; M - MM Standard; MP - MM Low Loss
- Fiber Holes: 12 - 12fibers, 24 - 24fibers
- Fiber: 1 - SM, 2 - OM3, 3 - OM4
- Length (m): 1 - 1m, 3 - 3m, 5 - 5m, 100 - 100m
- Polarity (TIA-568): A - Type A, B - Type B

MTP Harness Assemblies

MTP Harness

Features
- Guaranteed performance specifications
- Various connector type available
- Low insertion loss and reture 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

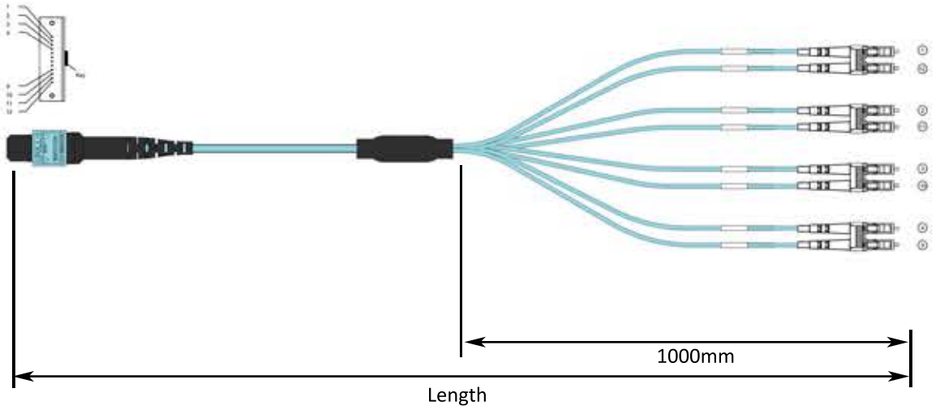
• MTP	• MTP Ferrule	• Breakout Connector	• Connector Type	• Fiber Holes	• Fiber	• Length (m)
M - Male(Pinned)	S - SM Standard	LC - LC	S - Simplex	8 - 8 fibers	1 - SM	2 - 2m
F -Female (Non-Pinned)	SP - SM Low Loss	SC - SC	D - Duplex	12 - 12fibers	2 - OM3	3 - 3m
	M - MM Standard			24 - 24fibers	3 - OM4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

MTP QSFP or CXP+ to SFP+ Harness

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 compo-nent 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 Standard	8 - 8 fibers	2 - OM3	2 - 2m
F -Female (Non-Pinned)	MP - MM Low Loss	20 - 20fibers	3 - OM4	3 - 3m
				5 - 5m

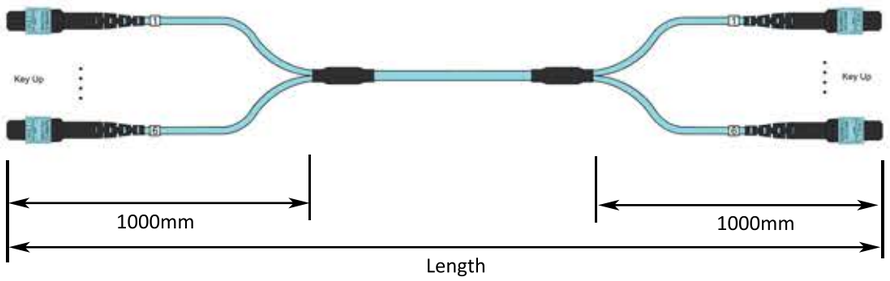
MTP Trunk Cable Assemblies

MTP Trunks

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 ahigh 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)



Ordering Information

530 – F – F – M – 72 – 2 – 30 – B

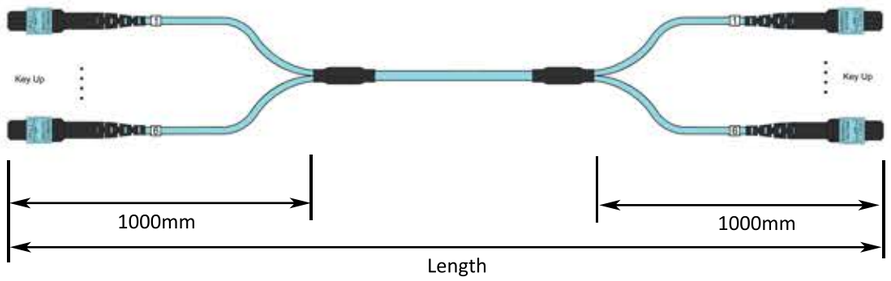
• MTP	• MTP	• MTP Ferrule	• Fiber Holes	• Fiber	• Length (m)	• Polarity (TIA-568)
M - Male(Pinned) F -Female (Non-Pinned)	M - Male(Pinned) F -Female (Non-Pinned)	S - SM Standard SP - SM Low Loss M - MM Standard MP - MM Low Loss	24 - 24fibers 36 - 36fibers 48 - 48fibers 72 - 72fibers	1 - SM 2 - OM3 3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

MTP Compact Trunks

Sub-unitized Micro turnk 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

540 – F – F – M – 96 – 2 – 30 – B

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

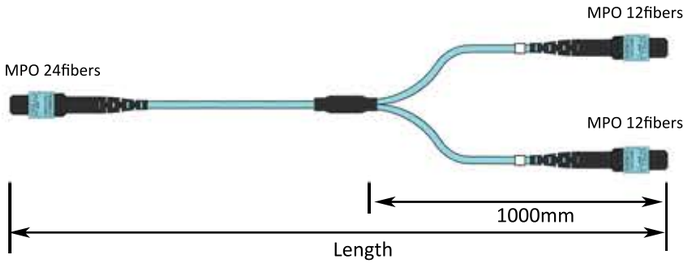
MTP Trunk Cable Assemblies

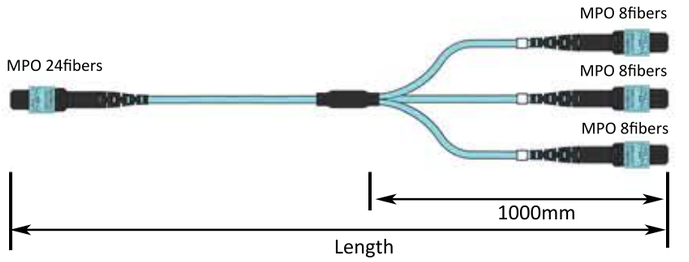
MTP Array Harnesses

MTP Array Harnesses are preterminated and can be used with brackets in place of MTP-cassettes. Available in multimode OM3 and OM4, harnesses are designed to cross connect from structured cabling directly into active transceivers with 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 12fibes 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)





Ordering Information

550 – F – F – M – 12 – 2 – 30 – B

• MTP	• MTP	• MTP Ferrule	• Split	• Fiber	• Length (m)	• Polarity (TIA-568)
M - Male(Pinned) F -Female (Non-Pinned)	M - Male(Pinned) F -Female (Non-Pinned)	S - SM Standard SP - SM Low Loss M - MM Standard MP - MM Low Loss	12- 1x2 13- 1x3	1 - SM 2 - OM3 3 - OM4	1 - 1m 3 - 3m 5 - 5m ... 100 - 100m	A - Type A B - Type B

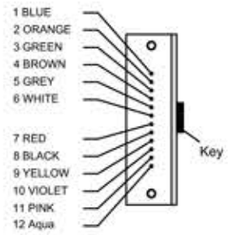
MTP Termination

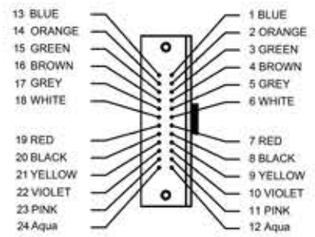
MTP Cassettes

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 conectors
- 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

150 – M – M – LC – 4 – 3 – A

• MTP	• MTP Ferrule	• Adaptor	• Fiber Holes	• Fiber	• Polarity (TIA-568)
M - Male(Pinned) F -Female (Non-Pinned)	S - SM Standard SP - SM Low Loss M - MM Standard MP - MM Low Loss	LC-LC SC-SC	1 - 8 fibersx1 2 - 8 fibersx2 3 - 12 fibersx1 4 - 12 fibersx2 5 - 24 fibersx1	1 - SM 2 - OM3 3 - OM4	A - Type A B - Type B

MTP Termination

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

MTP Mount Bracket

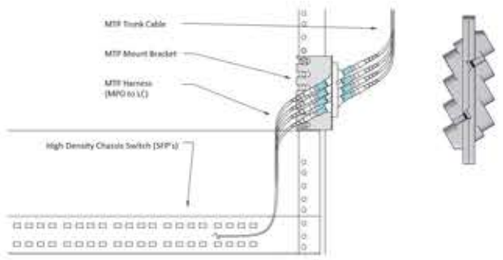
MTP Adaptor plate provide a simple interface to connect turnk harnesses to turnks standard turnks to extender trunks or can facilitate the use of 40G and 100G electornics.

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



MTP Termination

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 accommdate adaptor plates, MTP cassettes.

Features
- Most common connector styles and types available
- Compatible with industry standard euipment 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