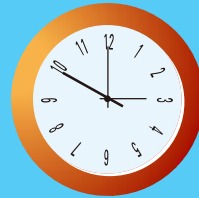
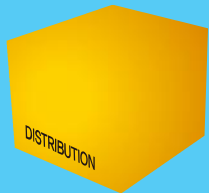


## Fast Lead Time

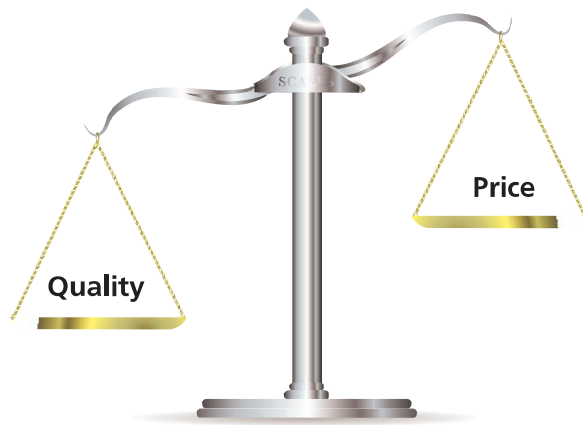
Linkway offer one week lead time for fiber patch cord, from order releasing to goods received by customers, you are free of stock pressure, get better cash flow.



# FIBER OPTIC SYSTEM

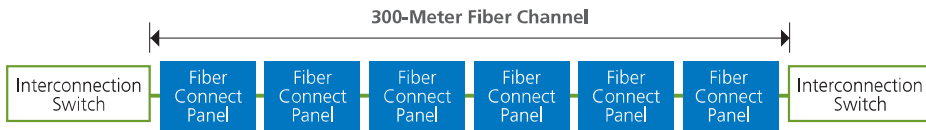
## Competitive Price

Compare with same quality competitors, JE offer absolutely competitive prices to our customers.



Fiber Optic Loss Budgets Calculation	01
Owl-Eyed Identification System	03
MPO Trunk Cable Assembly	04
MPO to LC Harness Assembly	06
UniBoot LC MicroCable Assembly	07
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FIBER CABLE	11
Fiber Patch Panel	13
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# Fiber Optic Loss Budgets Calculation



## 10G LC OM3 300Mtr Channel with 6 Connections

Total Optimized MM Connector Loss:  $6 \times 0.15\text{dB/connector} = 0.90 \text{ dB}$   
 OM3 Cable Loss:  $300 \text{ m} \times 3.5\text{dB/km} = 1.05 \text{ dB}$   
**Total**  $1.95 \text{ dB} < \text{Max. } 2.6\text{dB}^*$

\*Per IEEE802.3ae, a 10GBASE Channel over OM3 fiber has a Max. 300Mtr with Max. loss 2.6dB

## 10G LC OS2 300Mtr Channel with 6 Connections

Total Optimized SM Connector Loss:  $6 \times 0.15\text{dB/connector} = 0.90 \text{ dB}$   
 OS2 Cable Loss:  $300 \text{ m} \times 0.35\text{dB/km} = 0.105 \text{ dB}$   
**Total**  $1.005 \text{ dB} < \text{Max. } 1.6\text{dB}^{**}$

\*\*Per IEEE802.3ae, a 10GBASE Channel over OS2 fiber has a Max. 300Mtr with Max. loss 1.6dB



## 40G MTP OM3 100Mtr Channel with 4 Connections

Total Optimized MM Connector Loss:  $4 \times 0.35\text{dB/connector} = 1.40 \text{ dB}$   
 OM3 Cable Loss:  $100 \text{ m} \times 2.2\text{dB/km} = 0.22 \text{ dB}$   
**Total**  $1.62 \text{ dB} < \text{Max. } 1.9 \text{ dB}^*$

\*Per IEEE802.3ba, a 40GBASE Channel over OM3 fiber has a Max. 100Mtr with Max. loss 1.9dB

## 100G MTP OM4 150Mtr Channel with 3 Connections

Total optimized Connector Loss:  $3 \times 0.35\text{dB/connector} = 1.05 \text{ dB}$   
 OM4 Cable Loss:  $150 \text{ m} \times 2.2\text{dB/km} = 0.33 \text{ dB}$   
**Total**  $1.38 \text{ dB} < \text{Max. } 1.5 \text{ dB}^{**}$

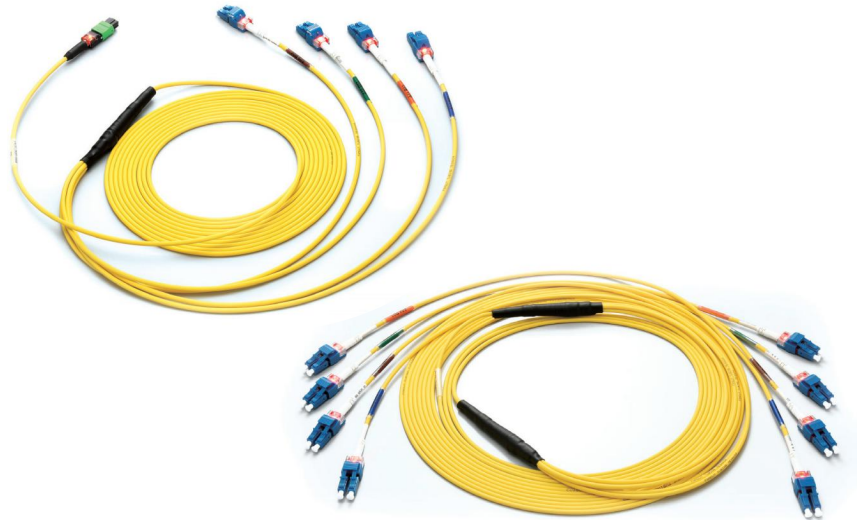
\*\*Per IEEE802.3ba, a 100GBASE Channel over OM4 fiber has a Max. 150Mtr with Max. loss 1.5dB

Max. Transmission Distance	SMF OS2	BIMMF OM3	BIMMF OM4	BIMMF OM5
10 GbE	10KM @ 1310nm	300M @ 850nm	550M @ 850nm	550M @ 850nm
40/100 GbE	10KM @ 1310nm	100M @ 850nm	150M @ 850nm	190M @ 850nm
100G-SR4	N/A	70M @ 850nm	100M @ 850nm	100M @ 850nm

## USCONEC Certification



## Owl-Eyed Identification System

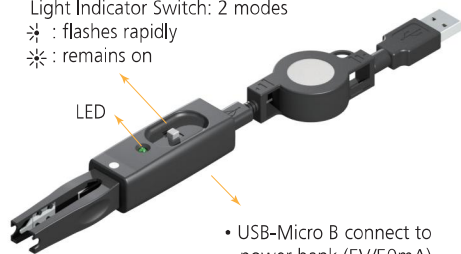


- LED-light is clearly visible, easily identify the termination point to the other
- Patented tracing design makes trouble shooting easy, saves time and cost
- Power source supports up to 150 meter distance of patch lead
- LED Connector available in ST, FC, SC, LC, MPO and MTP®
- Tracing can done on connected circuits without interfering the transmission performance.
- Eases decommissioning of connected, disconnected as well as one side unplugged assemblies.

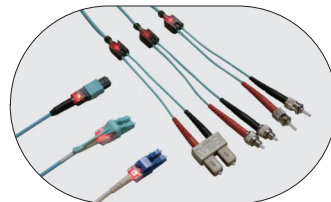
### Power Source

Light Indicator Switch: 2 modes

- ✧ : flashes rapidly
- ✧ : remains on



- USB-Micro B connect to power bank (5V/50mA)
- Max. cable extension 70cm



## MTP®/MPO Trunk Cable Assembly

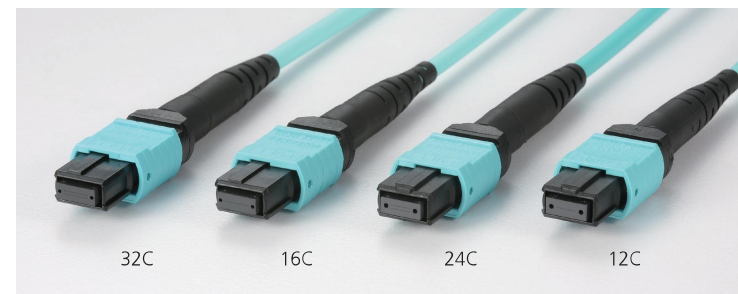


- Polarity A, B, C and customized are welcome
- 100% factory terminated and tested
- 8, 12, 24, 36, 48 cores... up to 144 cores are available
- Options with OM3, OM4, OM5 bend-insensitive fiber and OS2 G.657A
- Flexible micro cable reduced weight and carriage costs
- Parallel optic transmission over 40G / 100G / 400G Ethernet
- "Plug and Play" solution eliminates in-filed termination, reduces installation cost and time

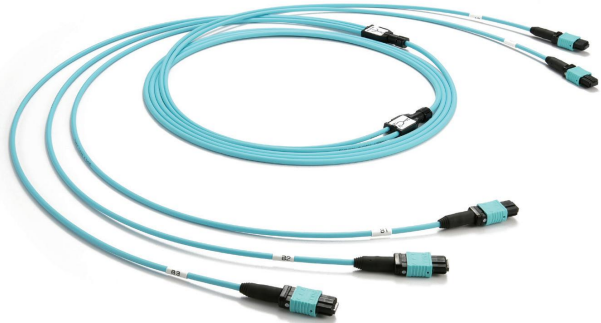
### Transmission Performance

MTP® / MPO mated pair	BIMMF OM3/OM4/OM5		OS2 G.657A	
	Standard Loss	Low Loss	Standard Loss	Low Loss
Insertion Loss	< 0.50 dB	< 0.35 dB	< 0.75 dB	< 0.35 dB
Return Loss	> 20 dB	> 25 dB	> 60 dB	> 60 dB

### Parallel Optic Transmission Over 40G / 100G / 400G Ethernet



## MTP®/MPO Y Cable Assembly



- Standard Polarity and customized are welcome
- 100% factory terminated and tested
- 1x24F to 2x12F / 1x24F to 3x8F / 2x12F to 3x8F are available
- Options with OM3, OM4, OM5 bend-insensitive fiber and OS2 G.657A
- Flexible micro cable reduced weight and carriage costs

### Transmission Performance

MTP® / MPO mated pair	BIMMF OM3/OM4/OM5		OS2 G.657A	
	Standard Loss	Low Loss	Standard Loss	Low Loss
Insertion Loss	< 0.50 dB	< 0.35 dB	< 0.75 dB	< 0.35 dB
Return Loss	> 20 dB	> 25 dB	> 60 dB	> 60 dB

1x24F to 2x12F

End A Position	Fiber Color	End B Position
1	Blue	1
2	Orange	2
3	Green	3
4	Brown	4
5	Gray	5
6	White	6
7	Red	7
8	Black	8
9	Yellow	9
10	Purple	10
11	Pink	11
12	Aqua	12
13	Blue	1
14	Orange	2
15	Green	3
16	Brown	4
17	Gray	5
18	White	6
19	Red	7
20	Black	8
21	Yellow	9
22	Purple	10
23	Pink	11
24	Aqua	12

1x24F to 3x8F

End A Position	Fiber Color	End B Position
1	Blue	1
2	Orange	2
3	Green	3
4	Brown	4
5	Gray	1
6	White	2
7	Red	3
8	Black	4
9	Yellow	1
10	Purple	2
11	Pink	3
12	Aqua	4
13	Blue	12
14	Orange	11
15	Green	10
16	Brown	9
17	Gray	12
18	White	11
19	Red	10
20	Black	9
21	Yellow	12
22	Purple	11
23	Pink	10
24	Aqua	9

2x12F to 3x8F

End A Position	Fiber Color	End B Position
1	Blue	12
2	Orange	11
3	Green	10
4	Brown	9
5	Gray	4
6	White	3
7	Red	2
8	Black	1
9	Yellow	12
10	Purple	11
11	Pink	10
12	Aqua	9
1	Blue	4
2	Orange	11
3	Green	10
4	Brown	9
5	Gray	12
6	White	11
7	Red	10
8	Black	9
9	Yellow	4
10	Purple	11
11	Pink	10
12	Aqua	9

## MTP®/MPO to LC Harness Assembly



- MTP®/ MPO is available for selection on 12C or 24C ferrule
- LC connector is available in uniboot and extractor
- Half tube count is easy for cable management, high density data center applications and blade services
- Following specifications are available -
  - 1x12F MTP® / MPO to 4xLC uniboot\*    - 1x24F MTP® / MPO to 10xLC uniboot\*\*
  - 1x12F MTP® / MPO to 6xLC uniboot    - 1x24F MTP® / MPO to 12xLC uniboot
- Options with MM OM3, OM4, OM5 bend insensitive fiber and SM G.657A
- 100% factory terminated and tested to ensure quality

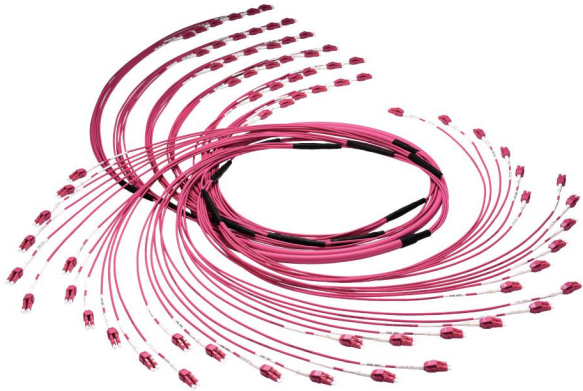
\*8F MTP®/ MPO to LC is for transition from 4x10G SFP+ to 1x40G QSFP+. Each fiber cable transmits 10Gbps for 10G to 40G migration.

\*\*24F MTP®/ MPO to LC migration path from 10x10G SFP+ to 1x100G CFP/CXP for 10G to 100G parallel transmission.

### Transmission Performance

Harness	BIMMF OM3/OM4/OM5			OS2 G.657A		
	Insertion Loss		Return Loss	Insertion Loss		Return Loss
	Standard Loss	Low Loss		Standard Loss	Low Loss	
LC	< 0.30 dB	< 0.15 dB	> 35 dB	< 0.20 dB	< 0.15 dB	> 55 dB
MTP® / MPO	< 0.50 dB	< 0.35 dB	> 20 dB	< 0.75 dB	< 0.35 dB	> 60 dB

## UniBoot LC MicroCable Assembly

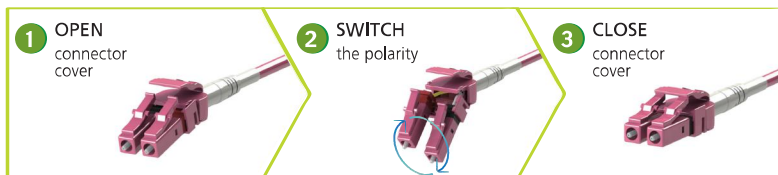


- Uniboot LC is polarity switchable design
- Red/Black color indication for polarity check
- 100% Factory terminated and tested
- Half tube counts are ease of cable management
- Flexible microcable reduced weight and carriage costs
- 2, 8, 12, 24, 36, 48 cores... up to 144 cores are available
- Options with OM3, OM4, OM5 bend-insensitive fiber and OS2 G.657A
- Breakout tubing length Max. 250cm.

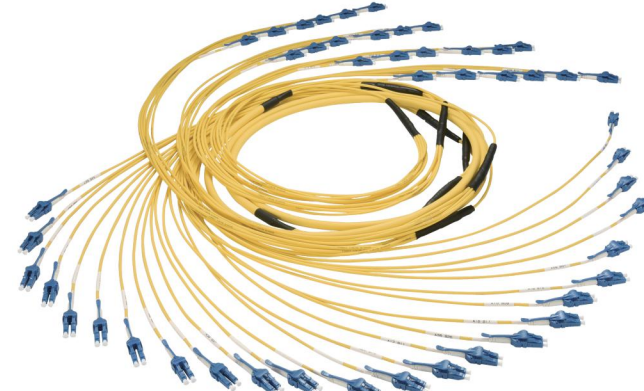
### Transmission Performance

LC mated pair	BIMMF OM3/OM4/OM5		OS2 G.657A	
	Standard Loss	Low Loss	Standard Loss	Low Loss
Insertion Loss	< 0.3dB	< 0.15dB	< 0.2dB	< 0.15dB
Return Loss	> 35dB	> 40dB	> 55dB	> 55dB

### Switch Polarity

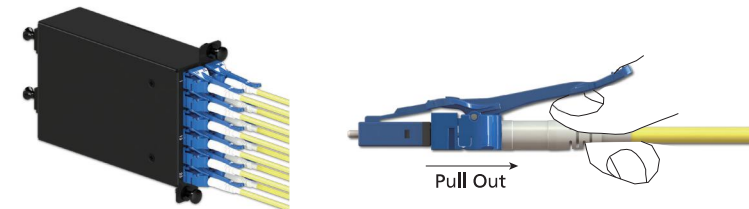


## Extractor LC MicroCable Assembly

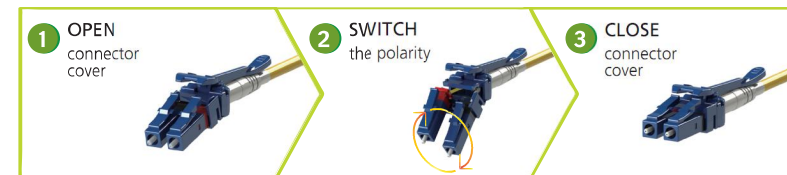


- Seesaw tab design makes LC connector easy extraction in high density construction
- Extractor LC is polarity switchable design
- Red/Black color indication for polarity check
- 100% Factory terminated and tested
- Half tube counts are ease of cable management
- 2, 8, 12, 24, 36, 48 cores... up to 144 cores are available
- Options with OM3, OM4, OM5 bend-insensitive fiber and OS2 G.657A
- Breakout tubing length Max. 250cm.

### Remove from high density construction



### Switch Polarity



# 1 Second Polarity Change LC Uniboot Connector



- Patented design with 1 second time operation to change the LC polarity
- White dot and black color indication help polarity check
- 1.6mm cable/tubing o.d. brings advantages of reducing weight, saving space and carriage cost
- Options with MM OM3, OM4, OM5 bend insensitive fiber and SM G657A
- Half tubing counts is ease of cable management

## Polarity Switchable Steps

**LC PC/UPC connector**

(1) Press both sides to unlock the trigger module

(2) Remove the trigger module direction front

(3) Rotate the connector upside down

(4) Put the trigger back until you hear a "CLICK"

**LC APC connector**

(1) Press both sides to unlock the trigger module

(2) Remove the trigger module direction front

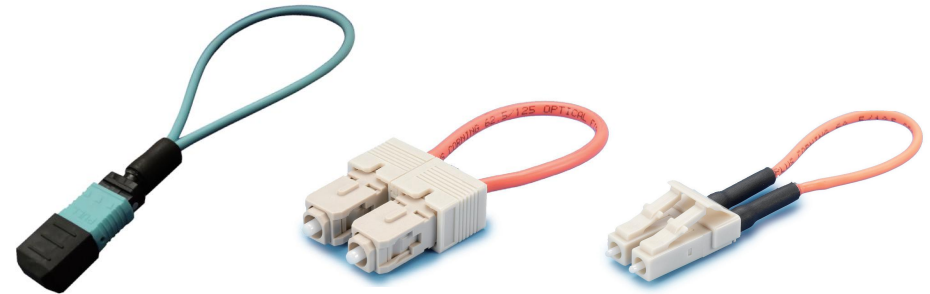
(3) Rotate APC ferrule housing upside down

(4) Rotate the connector upside down

(5) Put the trigger back until you hear a "CLICK"

# Loop Back

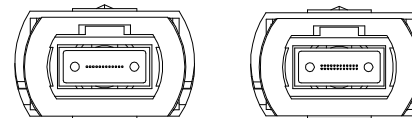
Fiber loop back provide an economical solution for a number of fiber optic test applications. These loop back cables offer a generous manageable fiber loop virtually eliminating bend loss. Each cable is functionally tested before shipping and is covered by a lifetime warranty. For MPO, device burn-in and loopback testing for network cards and QSFP modules. A signal loop from transceiver to receiver is within one MPO. Loopback includes SC, LC and 12C / 24C MPO connector types, allows testing of optical network segment by segment.



## Transmission Performance

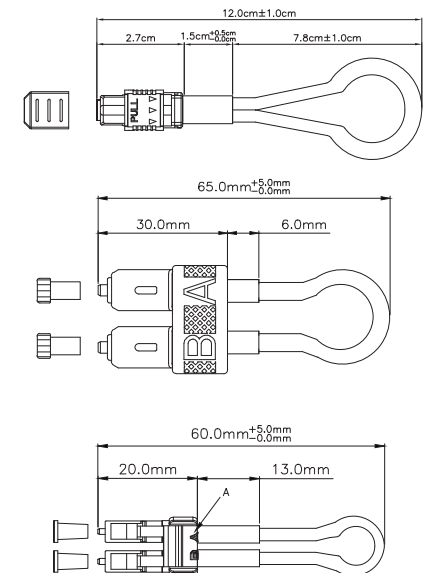
Insertion Loss	Multimode	Singlemode
MPO	< 0.5 dB	< 0.75 dB
LC / SC	< 0.5 dB	< 0.3 dB

## MPO Polarity



Channel Standard	Fiber Number
01	to 12
02	to 11
03	to 10
04	to 09
05	to 08
06	to 07

Channel Standard	Fiber Number
01	to 13
02	to 14
03	to 15
04	to 16
05	to 17
06	to 18
07	to 19
08	to 20
09	to 21
10	to 22
11	to 23
12	to 24



# 12-144F Optical Fiber Cable

Linkwylan 12-144 optical fiber cables are designed for internal applications such as backbone and data centers. Each subunit of the 12- color 250um fiber is composed of aramid as a strength member. The fiber cores have a bend insensitive construction for improved performance. These high density cables are extremely flexible and easy to install.

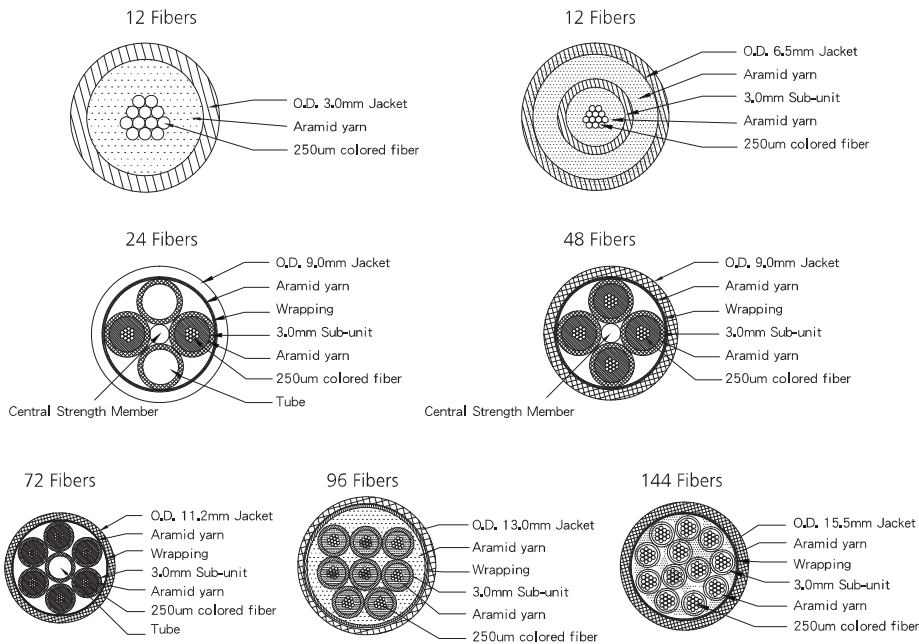
### Features

- Plenum NFPA 262 Rated
- Riser UL 1666 Rated
- LSFRZH compliant to CPR EuroClass B2ca, Cca and Eca
- EIA/TIA 568-B3, Telcordia GR-409-CORE and ANSI/ICEA S-83-596

### Benefits

- 3.0mm sub-unit suitable for MTP® /MPO direct termination
- Flexible micro- cable reduced weight and carriage cost

### Cable Section



For reference only, not based on the actual ratio.

# 12-144F Optical Fiber Cable

### Mechanical & Environmental Characteristics

Fiber Count	Number of Subunits	Cable Diameter	Weight (KG/KM)	Strength		Crush Resistance Short-term (N/100mm <sup>2</sup> )	MIN. Bending Radius (CM)	
				Long-term (N)	Short-term (N)		Installation	Long-term
12	1	3.0 mm	8.7	60	100	500	9.0	3.0
12	1	6.5 mm	41.6	80	150	500	19.5	6.5
24	2	9.0 mm	73.4	300	600	1,000	18.0	9.0
36	3	9.0 mm	77.2	300	600	1,000	18.0	9.0
48	4	9.0 mm	79.3	300	600	1,000	18.0	9.0
72	6	11.2 mm	117.3	300	600	1,000	22.4	11.2
96	8	13.0 mm	148.5	300	600	1,000	22.4	11.2
144	12	15.5 mm	224.0	300	600	1,000	22.4	11.2

### Fiber Specifications

Fiber Type	Maximum attenuation (dB/KM)				OFL Bandwidth MHz-KM			EMB MHz-KM		Link Distance			
	850 nm	953 nm	1300 nm	1550 nm	850 nm	953 nm	1300 nm	850 nm	953 nm	40 Gb/s BiDi Duplex	40 Gb/s SWDM4™ Duplex	100 Gb/s BiDi Duplex	100 Gb/s SWDM4™ Duplex
OM3	3	/	1.2	/	1,500	/	500	2,000	/	100m	240m	70m	70m
OM4	3	/	1.2	/	3,500	/	500	4,700	/	150m	350m	100m	100m
OM5	3	2.3	1.2	/	3,500	1850	500	4,700	2,470	200m	440m	150m	150m
OS1/ OS2	/	/	0.5	0.5	/	/	/	/	/	1,000m	1,000m	1,000m	1,000m

### Cable Jacket Color

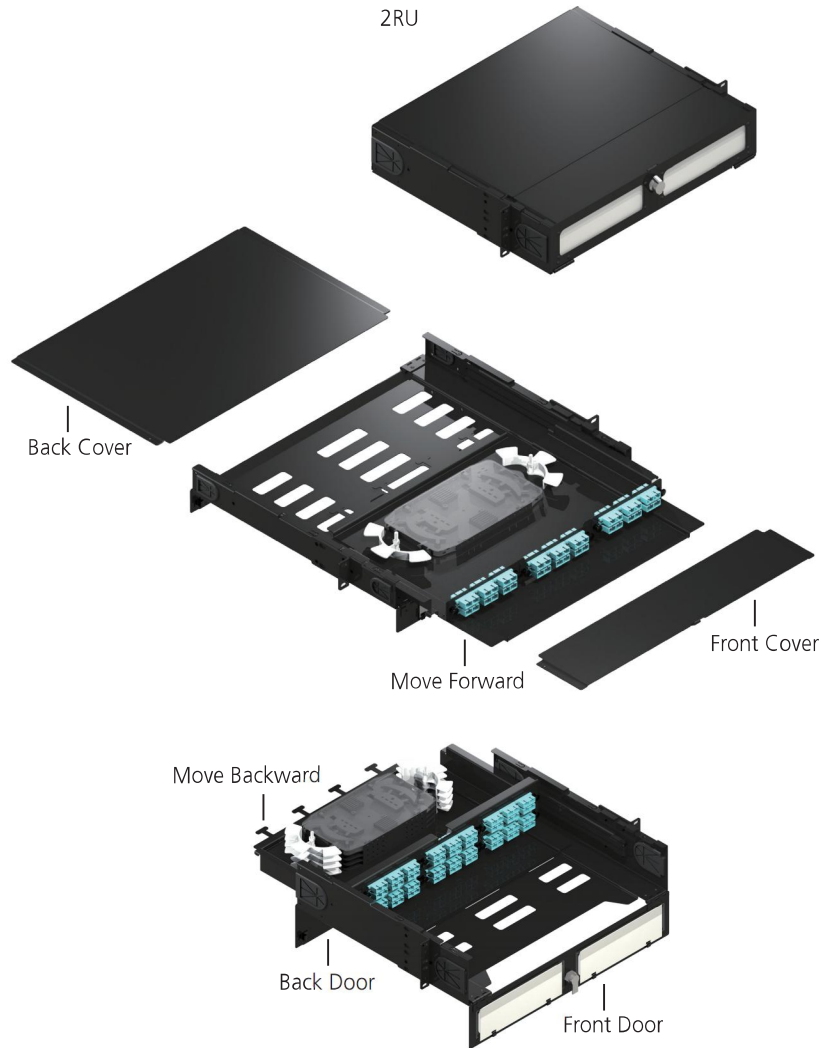
Fiber	Color	
SM	Yellow	Pantone 108C
OM3	Aqua	Pantone 325C
OM4	Aqua	Pantone 325C
	Erika Violet	RAL 4003
OM5	Lime Green	Pantone 367C
Options	Red	Pantone 200C
	Green	Pantone 3415C

### Temperature Specifications

	Temperature Range
Installation	0°C to +50°C (32°F to +122°F)
Operation	0°C to +50°C (32°F to +122°F)
Storage	-20°C to +70°C (-4°F to +158°F)

## Bi-Direction Sliding Fiber Enclosure

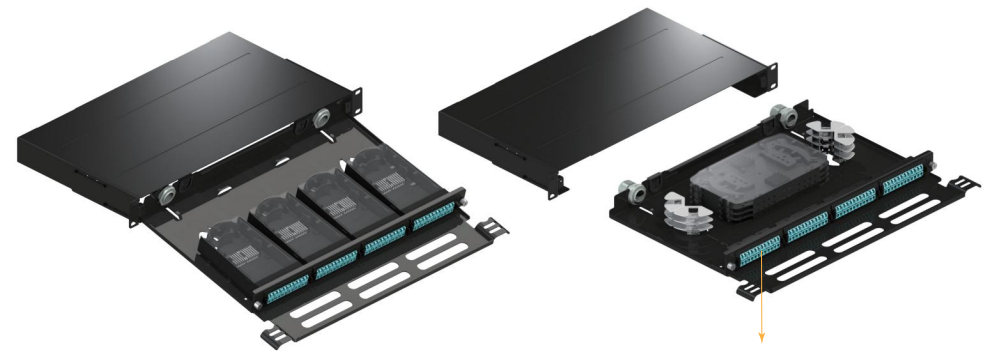
Bi-Direction sliding fiber enclosure can be shut off with hinged front door and rear cover after termination, so it is away from dusts and prevents disconnection by careless touch, more secured and compact construction. The panel accepts LGX fiber adaptor plates, cassettes and RJ45 keystone jack plates.



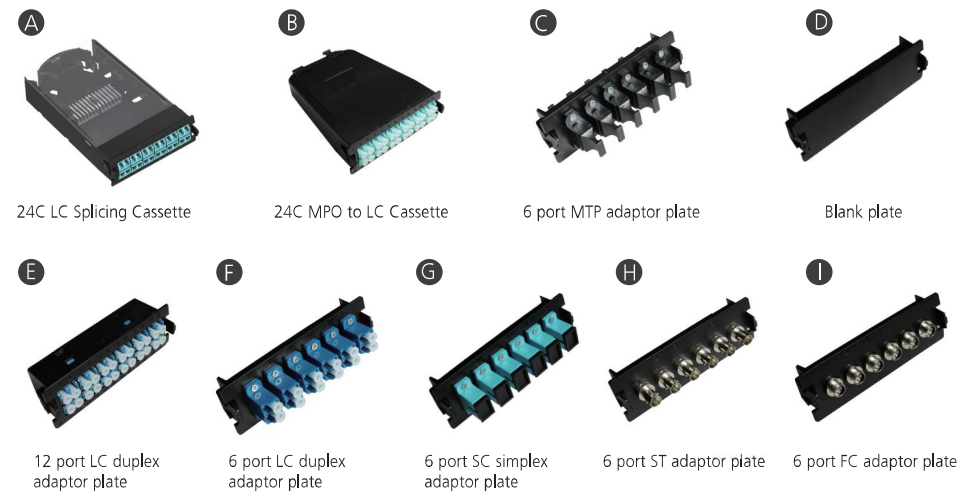
\* Both of 1RU and 2RU are available.

## Multi-Function PHD Fiber Patch Panel

Multi-Function PHD Fiber Patch Panel is constructed by flexible design to achieve diversified applications, like in-field fiber termination with plastic plates / splicing cassettes, or pre-termination fiber cassettes. The panel accommodates 4 sets plate or cassettes, max. 96C LC in 1RU patch panel.



Changeable cassettes and adaptor plates (A)-(I)

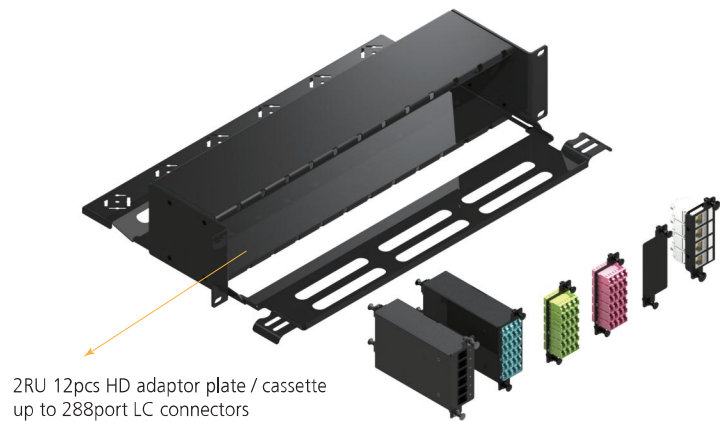
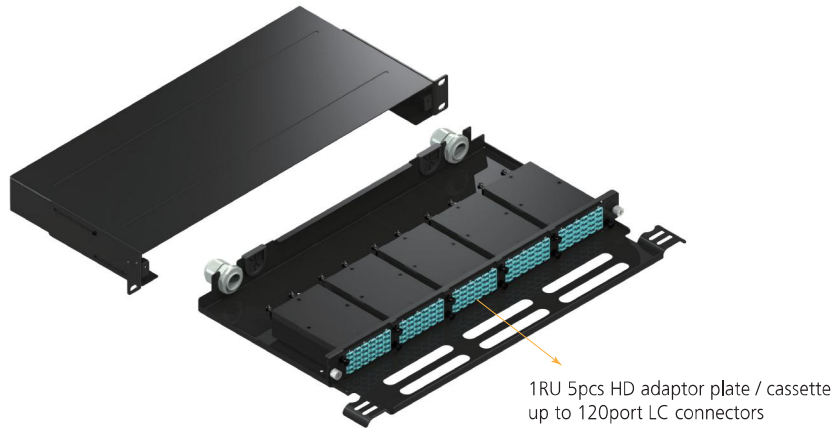


Related accessories like cable routing spool and fiber splice tray are same to page 19

# Multi-Function HD Fiber Patch Panel

Multi-Function high density fiber patch panel is constructed by flexible design to achieve diversified applications, like in-field fiber termination, pre-termination fiber cassette and RJ45 keystone termination.

The maximum port number of 1RU multi-function fiber patch panel is up to 120 ports LC connector.



- Ⓐ 4-Port Cat.6A Keystone Jack Plate
  - Full shielded by zinc alloy housing
  - C6A component performance



- Ⓑ HD Blank Plate

### All Cassettes

- SM OS2 and MM OM3/OM4/OM5 bend-insensitive fiber grades
- Supports Polarity A/C and B (TIA 568.3-D)
- 100% factory pre-terminated, assembled and tested
- MPO adaptors are also available

### Ⓒ 40G/100G Migration Cassettes

- 2 x MTP<sup>®</sup> adaptors on rear and 6 x MTP<sup>®</sup> adaptors on the front
- 2 x 24F MTP<sup>®</sup> male to 6 x 8F MTP<sup>®</sup> male



### Ⓓ 24port MTP<sup>®</sup> to LC Cassettes

- 2 x MTP<sup>®</sup> adaptors on rear and 6 x Quad LC adaptors on the front
- 2 x 12F MTP<sup>®</sup> male (pinned) to LC harness



### Ⓔ 24port MTP<sup>®</sup> to LC Cassettes

- 1 x MTP<sup>®</sup> adaptors on rear and 6 x Quad LC adaptors on the front
- 1 x 24F MTP<sup>®</sup> male (pinned) to LC harness

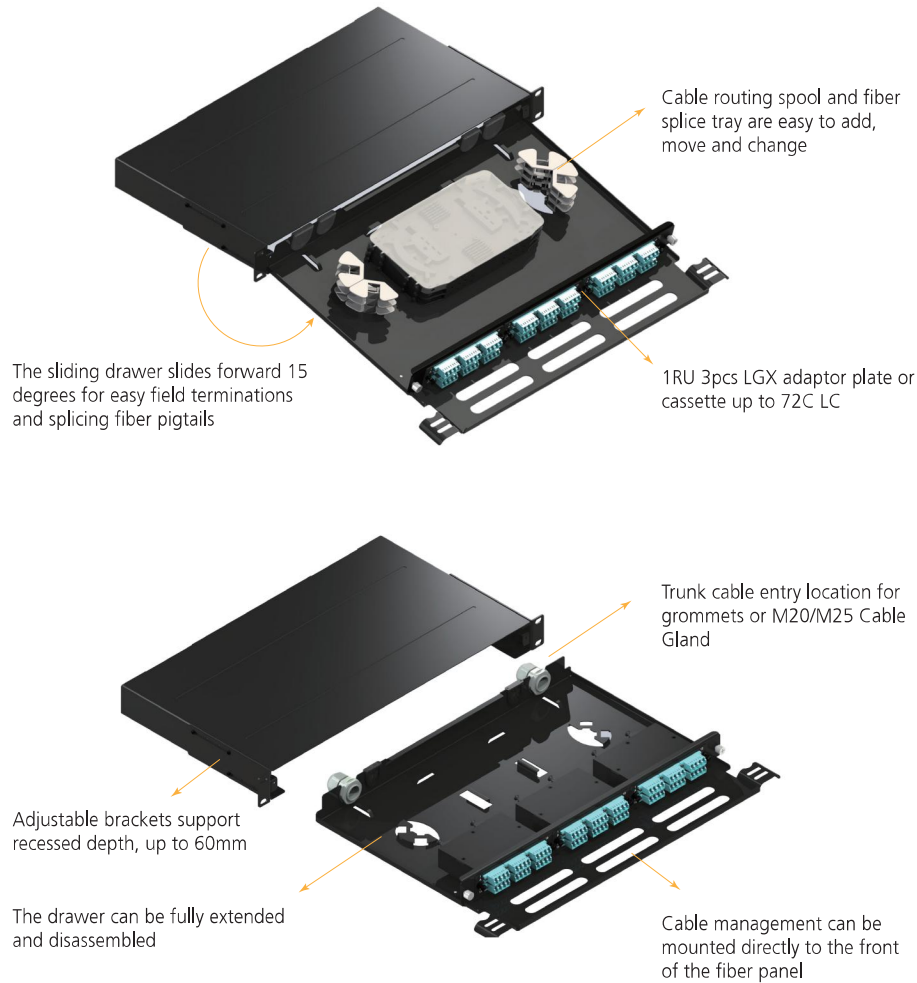


### Transmission Performance

Harness	BIMMF OM3/OM4/OM5			OS2 G.657A		
	Insertion Loss		Return Loss	Insertion Loss		Return Loss
	Standard Loss	Low Loss		Standard Loss	Low Loss	
LC	< 0.30 dB	< 0.15 dB	> 35 dB	< 0.20 dB	< 0.15 dB	> 55 dB
MTP <sup>®</sup> / MPO	< 0.50 dB	< 0.35 dB	> 20 dB	< 0.75 dB	< 0.35 dB	> 60 dB

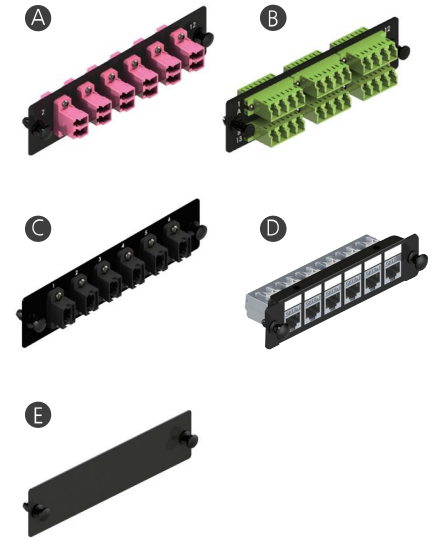
# Multi-Function LGX Fiber Patch Panel

Multi-Function LGX fiber patch panel is constructed by flexible design to achieve diversified applications, like in-field fiber termination, pre-termination fiber cassette and RJ45 keystone termination. The panel accepts LGX cutout fiber adaptor plate, fiber cassette and even LGX 6 RJ45 keystone jack plate.



## LGX Plates

- Ⓐ Ⓑ LC Adaptor Plates
  - 6pcs Duplex / Quad LC Adaptors
  - Plug and Play fast way to installation
  - Ceramic sleeve for OS2, OM3, OM4 and OM5
  - Insertion Loss < 0.2dB
  - Adaptor colors : SM APC Green, SM UPC Blue, OM3 Aqua, OM4 Violet, OM5 Lime Green
- Ⓒ MTP® Adaptor Plates
  - 6pcs MTP® Adaptors (SC Footprint type)
  - MPO adaptors are also available
  - Adaptor for polarity method B is aligned key, polarity method A/C is opposed key
- Ⓓ 6-Port Cat.6A Keystone Jack Plate
  - Full shielded by zinc alloy housing
  - C6A component performance
- Ⓔ LGX Blank Plate



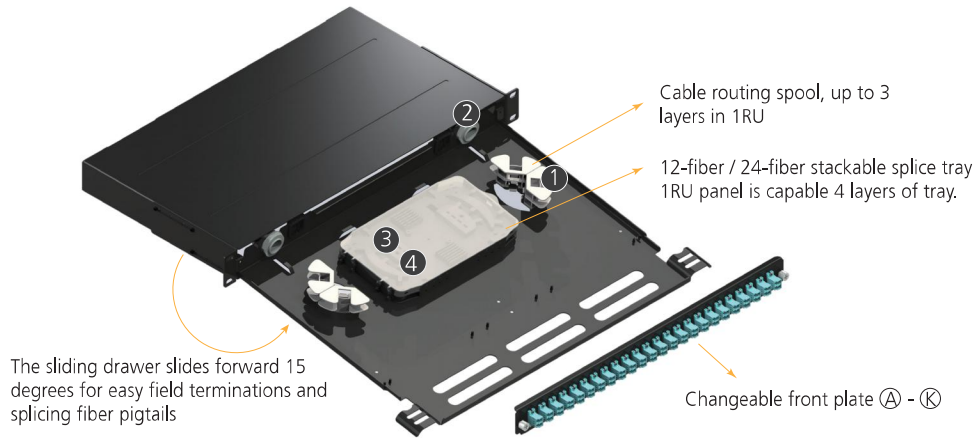
## LGX Cassette

- SM OS2 and MM OM3/OM4/OM5 bend-insensitive fiber grades
- Supports Polarity method A/B/C and customized wiring
- 100% factory pre-terminated, assembled and tested
- MPO adaptors are also available
- Transmission performance please see next page
- Ⓔ 12port MTP® to LC Cassette
  - 1 x MTP® adaptor on rear and 6 x Duplex LC adaptor on the front
  - 1 x 12F MTP® male (pinned) to LC harness
- Ⓕ 24port MTP® to LC Cassette
  - 2 x MTP® adaptors on rear and 6 x Quad LC adaptors on the front
  - 2 x 12F MTP® male (pinned) to LC harness
- Ⓖ 40G/100G Migration Cassettes
  - 2 x MTP® adaptors on rear and 6 x MTP® adaptors on the front
  - 2 x 24F MTP® male to 6 x 8F MTP® male Y cable



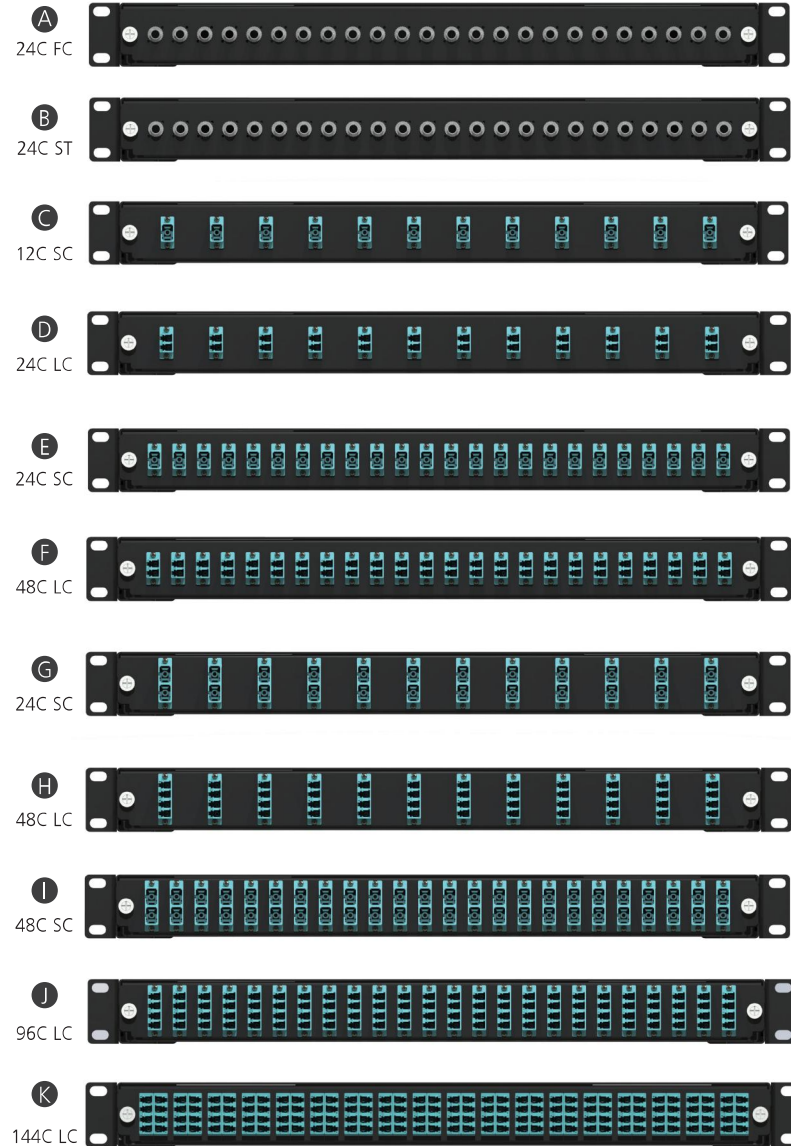
## Fiber Patch Panel with Changeable Front Plate

1RU Multi-Function fiber patch panel is constructed by flexible design to achieve diversified applications, in-field fiber termination with various adaptor plates, like ST, FC, SC simplex, SC duplex, LC duplex, LC quad. 1RU up to 144 port LC connectors.



### Front Plates

(All front plates with adaptor-loaded can be sold separately)



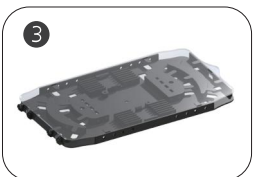
### Optional Accessories (sold separately)



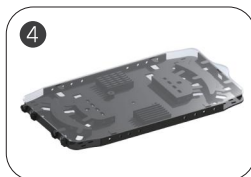
Cable Routing Spool, 1 set = 4pcs



Cable Gland  
 · M20 fits Cable O.D. 10~14mm  
 · M25 fits Cable O.D. 13~18mm



12 Fiber Splice Tray



24 Fiber Splice Tray

## 1RU 144 Ports MTP®/MPO to LC Patch Panel

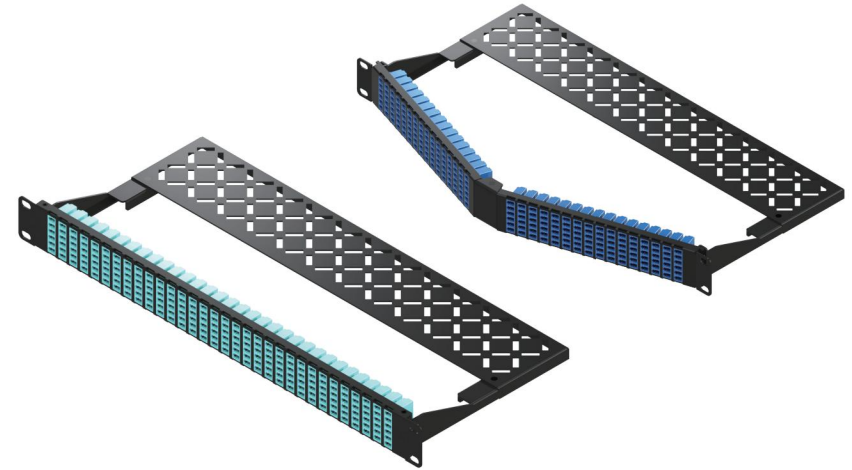


- High density design saves space and light weight
- Both of flat and angled front plates are available
- Neat and flush front plate with good looking
- Angled design minimizes patch cord bend radius to the rack
- Angled design divert cables to two separate directions, makes cable management more efficient

### Transmission Performance

Harness	BIMMF OM3/OM4/OM5			OS2 G.657A		
	Insertion Loss		Return Loss	Insertion Loss		Return Loss
	Standard Loss	Low Loss		Standard Loss	Low Loss	
LC	< 0.30 dB	< 0.15 dB	> 35 dB	< 0.20 dB	< 0.15 dB	> 55 dB
MTP® / MPO	< 0.50 dB	< 0.35 dB	> 20 dB	< 0.75 dB	< 0.35 dB	> 60 dB

## 1RU 192 Ports LC Patch Panel

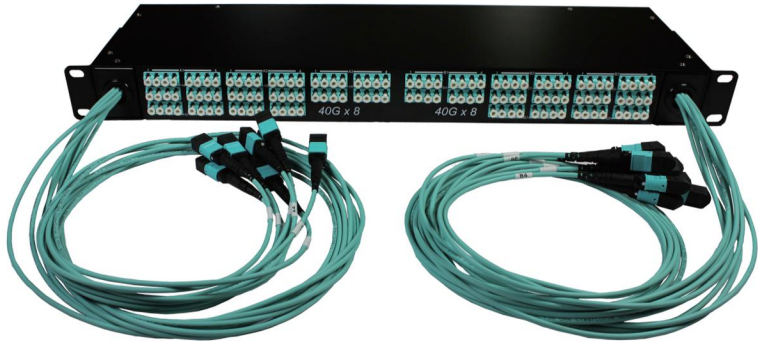


- LC 6-port adaptor designed for 1RU up to 192 ports
- Both of flat and angled front plates are available
- Neat and flush front plate has a good appearance
- Angled design reroutes cables into two separate directions and minimizes LC jumper bend radius to rack for efficient cable management
- Removable and foldable cable management bar saves transportation cost and stock space
- LC 6-port adaptor with ceramic sleeve IL < 0.2dB
- LC 6-port adaptor available in green, blue, aqua, erika-violet and lime green colors

### Foldable Cable Management



# MTP® to LC Breakout System

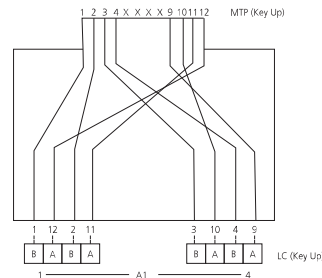


- Compact size design with 5" depth, weight 1.5kg
- Simple and easy installation with front patching design
- 16MTP® to 64LC-Duplex and 12MTP® to 48LC-Duplex offering greater choice
- Corning universal polarity or customized wiring assignment are accepted

Transmission Performance		OM3/OM4/OM5 BIMMF	OS2 G.657A
MTP® Mated Pair	Insertion Loss	≤0.35 dB	≤0.35 dB
	Return Loss	≥25 dB	≥60 dB
LC Mated Pair	Insertion Loss	≤0.15 dB	≤0.1 dB
	Return Loss	≥40 dB	≥55 dB

### Wiring map

Fiber no.	Color	Fiber no.	Color
1.	Blue	7.	Red
2.	Orange	8.	Black
3.	Green	9.	Yellow
4.	Brown	10.	Violet
5.	Slate	11.	Rose
6.	White	12.	Aqua



# FIBER OPTIC SYSTEM

400G  
Copper Trunk  
MTP® Micro Cable  
40G  
25G Pre-Termination  
Plug and Play  
10G  
100G  
High Density