GIGALIGHT Marketing Report

Data Center Cabling Monograph

Issue 2, 2023

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- Structured Cabling Products

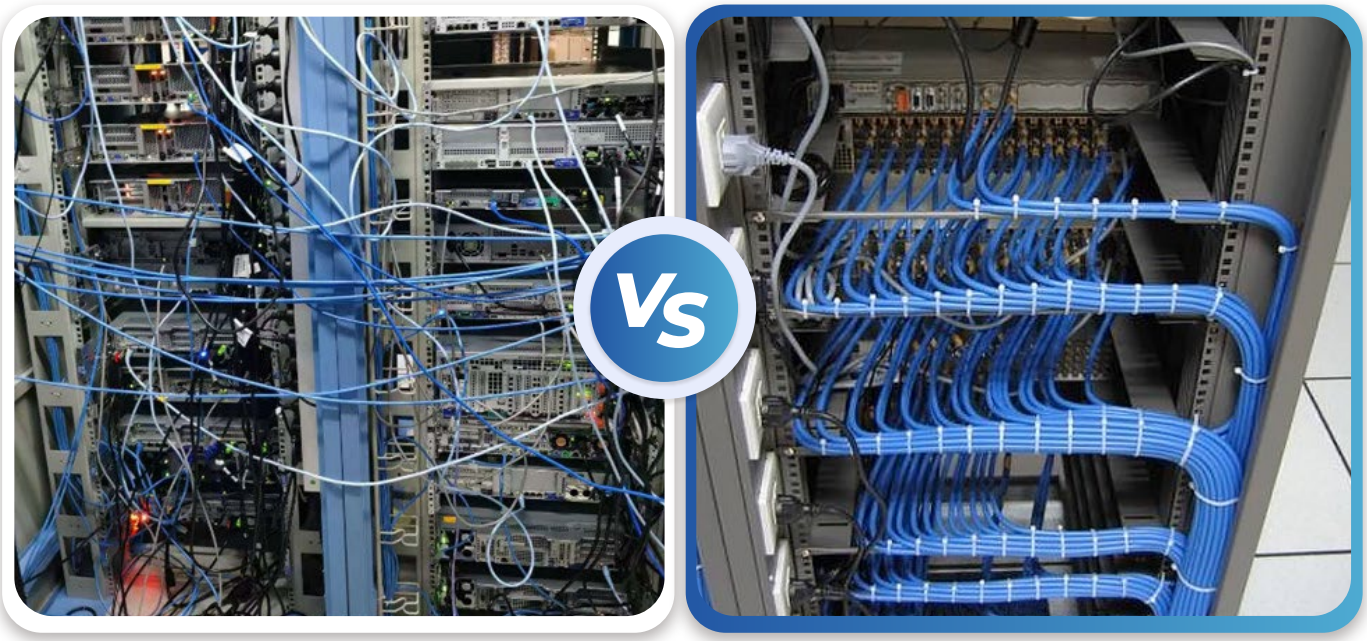
Data Center Cabling Overview

With the exponential growth of data flow, the space and efficiency of data centers have become important considerations for enterprises. All hardware and wiring designs must be modular and scalable, make full use of space and consider cooling and energy consumption issues.

The purpose of the wiring system design of data center is to realize the modular architecture of the system, which is simple, flexible, operable and practical, and to adapt the facilities to the needs of the business development of the public communication network. Experience shows that enough space to expand addition–al equipment and services is crucial for the installation of facilities in the latter stages. Current technology should provide modular wiring devices that can be added or replaced by simple "plug and play" connections and reduce downtime and labor costs.

Data Center Cabling

Before and After

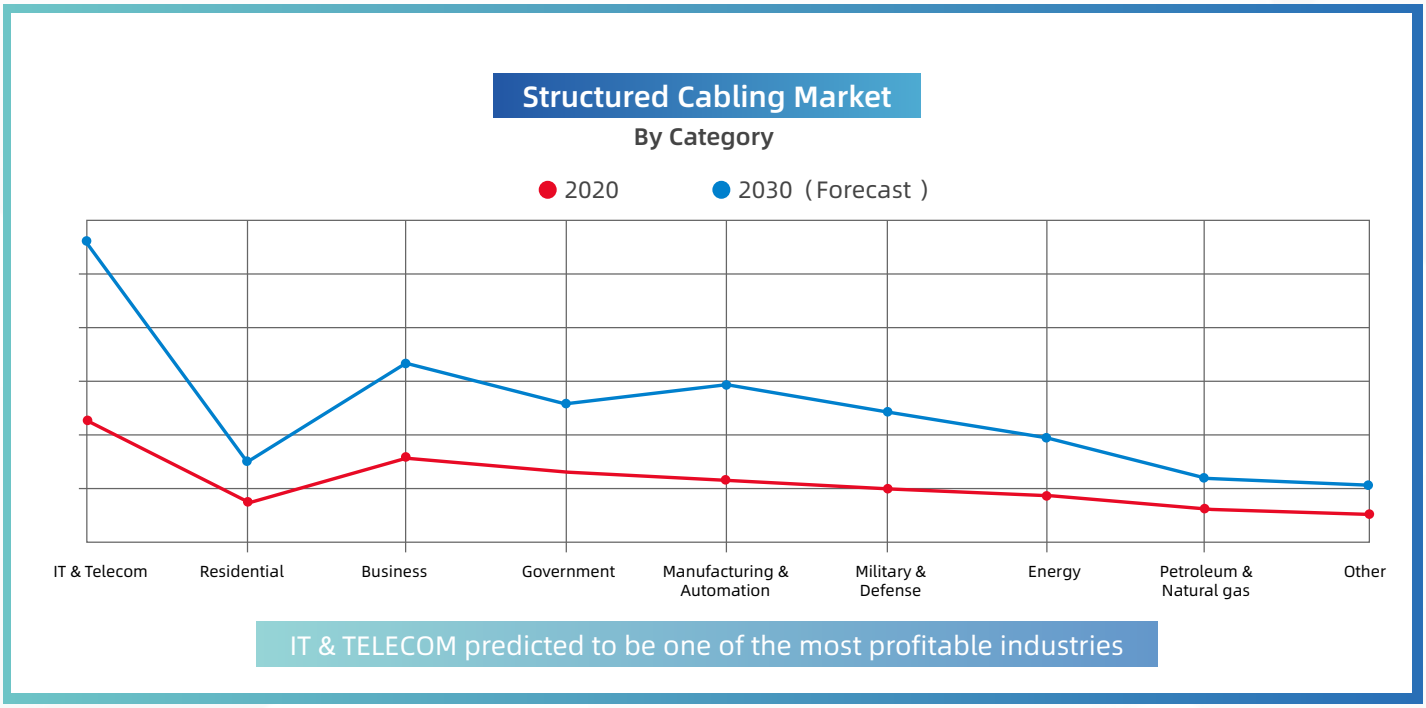


Structured Cabling Market

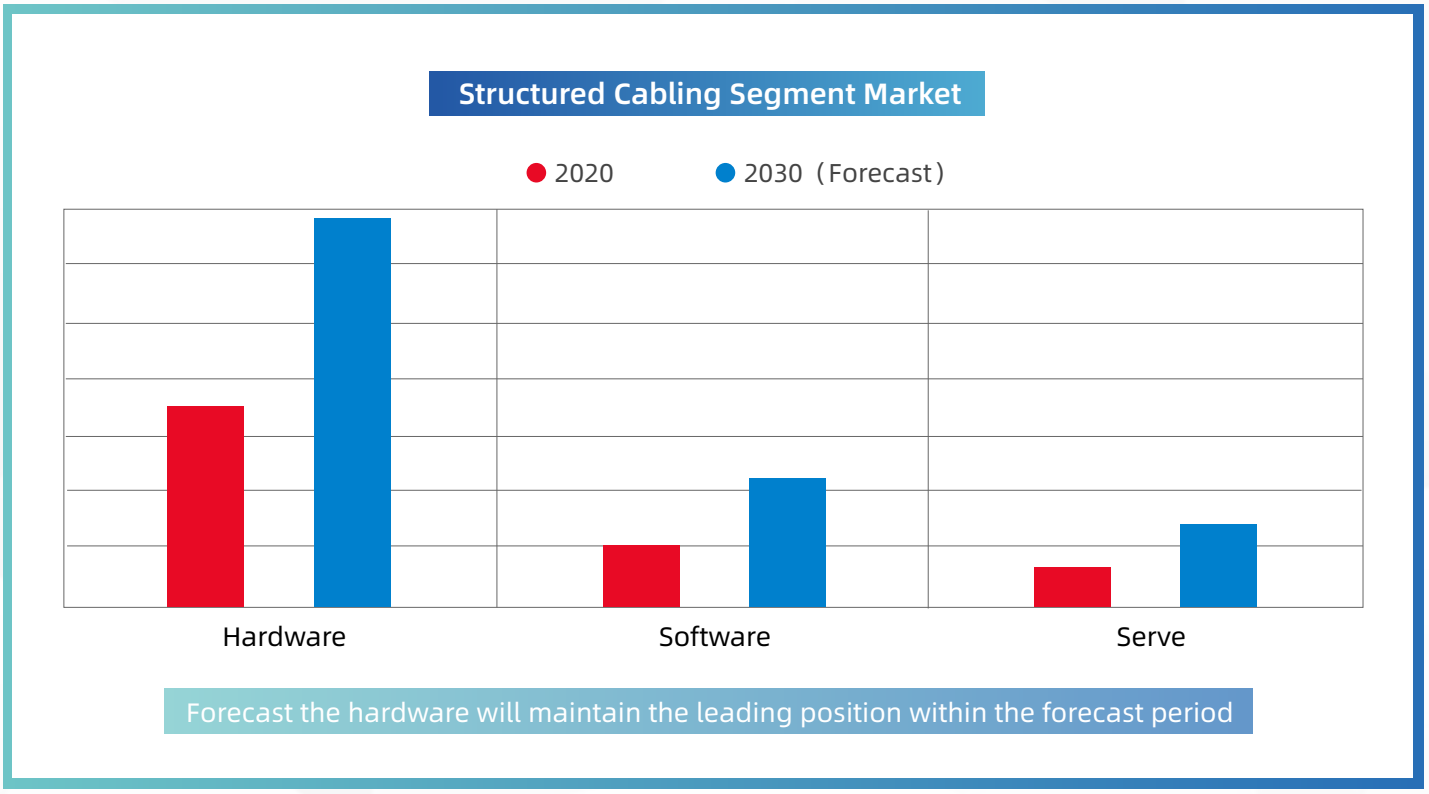
Structured Cabling Market:Trends and opportunities

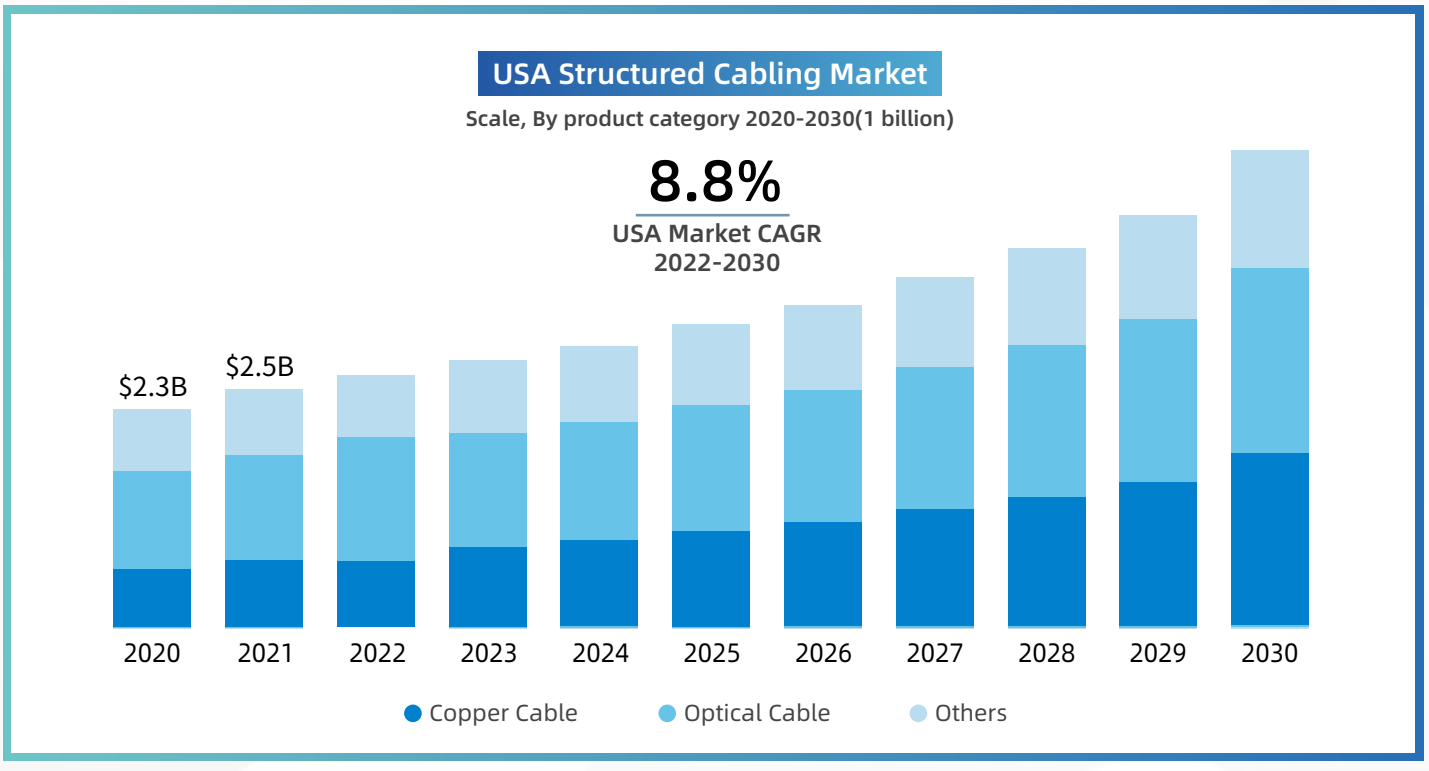
According to the analysis of Data Bridge Market Research, the structured wiring market value of data centers was 10.32 billion US dollars in 2021, which is expected to reach 22.45 billion US dollars by 2029, with a compound annual growth rate of 10.2% during the forecast period. Structured wiring is an infrastructure of electrical wiring, it contains multiple standardized small electrical components, provides predictable performance, has the ability to adapt to add, change and maximize the flexibility of system availability and provides redundancy for the wiring system.

The increased data volume generated globally is expected to drive the global data center structured cabling market in the next few years. The demand for structured cabling of data centers is expected to increase due to necessities of better infrastructure solution. Structured cabling systems provide faster data transmission speeds. In addition, the increase in the use of the Internet of Things (IoT) in vertical industries and automated processes is expected to promote the structured wiring market for data centers in the near future. The increase in Internet penetration and the adoption rate of digital services lead to the exponential growth in sensitive data volumes. The governmental measures of promoting digitalization, advanced infrastructure development and population growth will drive the structured wiring market for global data.



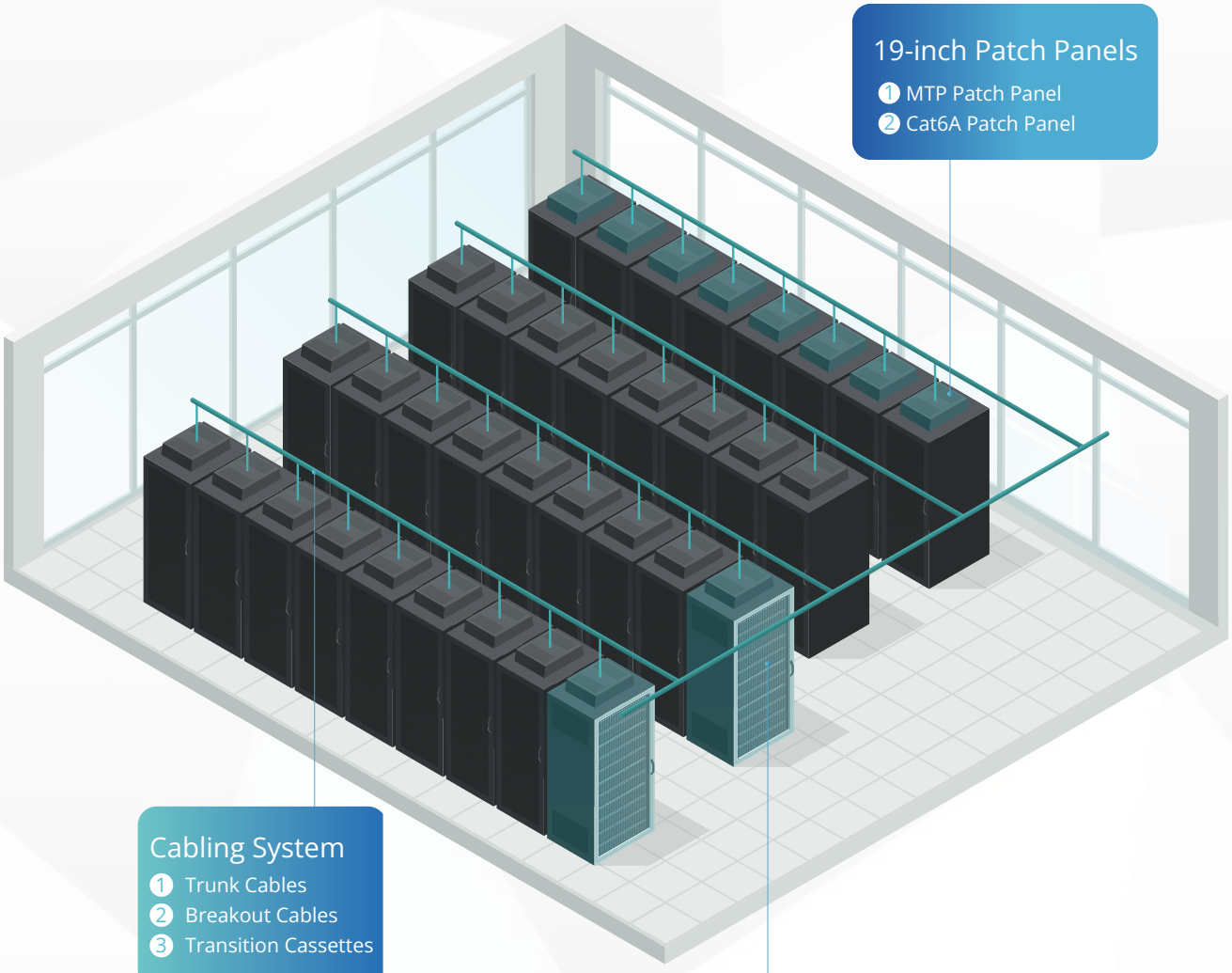
Based on component division, the global data center structured cabling market can be divided into hardware, software and professional services. The hardware part can be further divided into copper cable, optical cable and components. Since the copper cable is suitable for short– and medium–distance transmission applications, it is expected that the copper cable part will dominate the market within the forecast period (2020–2030) with a rapid compound annual growth rate. However,due to the increasing demand for high–speed data, the fiber optic cable segment will grow at a rapid CAGR during the forecast period.





Data Center Cabling Architecture

Data Center Cabling Architecture



Copper Cables

The copper cable segment dominated the market in 2021, with a share of more than 45.0%. Copper cables are applicable to short- and medium-distance transmission. Due to technological progress, copper cables are expected to gain favor in data centers and desktop connections, and to provide profitable opportunities for the copper cable market. Copper cables and the cable industry are mainly driven by factors such as rising demand for electricity and strong investment in construction development, in addition, the development of smart grid and increased investment in upgrading intelligent transmission and distribution systems are driving the demand for copper cables.

Cat6A Cabling System

Cat6A Patch Cables

GIGALIGHT provides a series of shielded twisted pair (STP) Cat6A patch cables for network adapters, hubs, switches, routers, HDBaseT applications, etc., which are ideal for use with 10GBASE-T ports and devices to ensure a 10G high-speed network connection that is immune to noise and electromagnetic interference for fast data transfer and optimal performance.

Featuring an accessible connector design for high-density environments and protected RJ-45 connector locking, the GIGALIGHT Cat6A patch cables are constructed of high-quality cables and plugs to minimize near-end crosstalk levels, and are available in a variety of colors and lengths (up to 100m), allowing for easy color coding of network installations. There are individual length labels on each cable for easy access.

Cat6A RJ-45 Plugs

GIGALIGHT's Cat6A RJ-45 plugs can be used to terminate Cat6A patch cables, and their rugged die-cast metal shells provide excellent shielding and mitigate alien crosstalk, with Cat6A performance for 10GBASE-T channel-compatible networks and are backward compatible with Cat6 and Cat5e cables.

Complete termination solution includes load bar, modular plug and strain relief sleeve superior construction of the STP wire connector combines a metal shell with a strain relief boot and gold-plated contacts to suppress alien crosstalk and provide a secure connection. Crimp style plugs terminate solid or stranded cables with three-point staggered contacts to provide a secure connection.

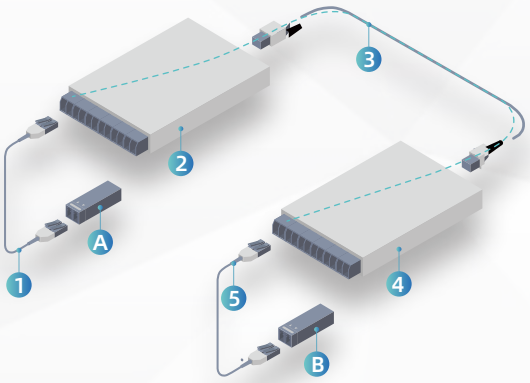
24-Port Cat6A Patch Panels

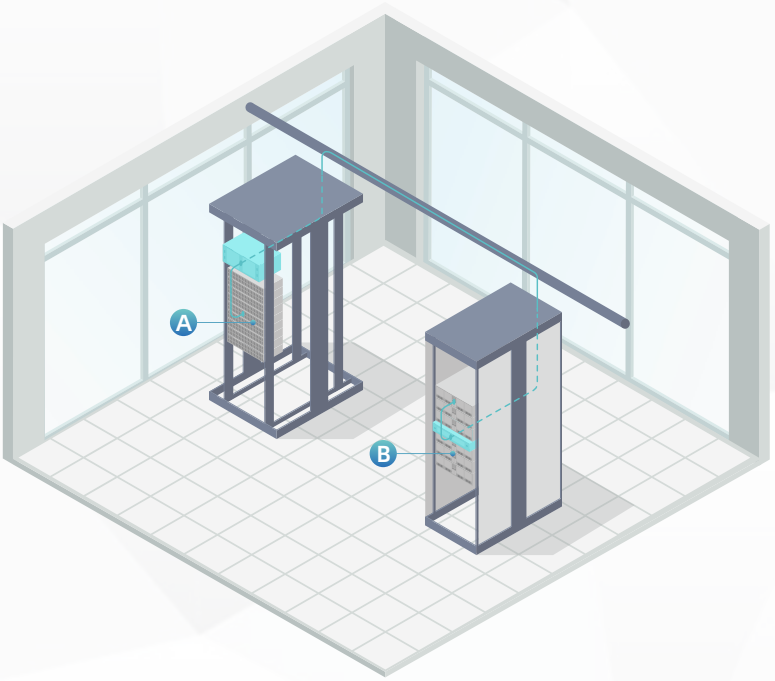
GIGALIGHT's 24-port Cat6A shielded 1U patch panel is designed for use with Cat6A STP cables. It is complies with ANSI/EIA/TIA 568-B.2-1 and ISO/IEC 11801 specifications, and is compatible with Cat5e, Cat6 and Cat6A cabling, ideal for GE and 10GE copper cabling networking.

This patch panel eliminates EMI and crosstalk, ensuring optimal performance and data integrity.

Optical Cables

It is estimated that the optical cable part has the highest compound annual growth rate during the forecast period (2022–2030). Optical fiber acts as the backbone of the Internet, the fiber cable acts as a medium to transfer data from one site to another. These cables are used in various vertical fields, including telecom, residential and commercial, government, utilities, aerospace and private data networks. Increased demand for high-speed Internet services will become a key growth factor in the field of optical cable. The increasing popularity of new telecommunications technologies such as 5G mobile and FTT × (optical fiber to X) applications are expected to promote the development of this field.

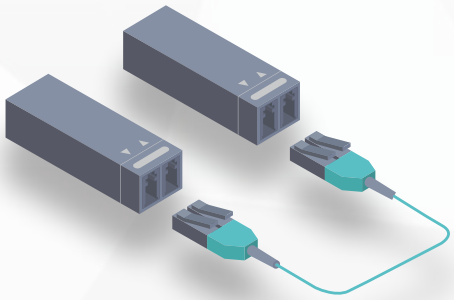


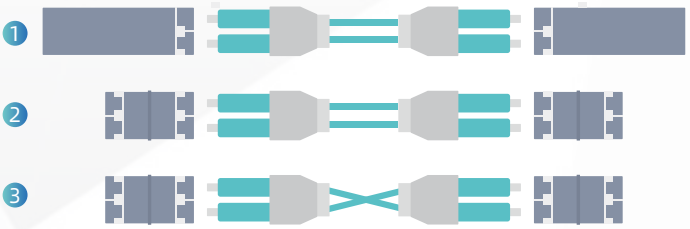


- A Optical Transceivers on switch side
- B Optical Transceivers on server side
- 1 Patch cable on switch side
- 2 MTP transition cassette on switch side
- 3 MTP trunk cable between switch and server
- 4 MTP transition cassette on server side
- 5 Patch cable on server side

LC Duplex Patch Cables

GIGALIGHT provides a series of LC duplex patch cables with A–B/B–A or A–A/B–B polarity types, supporting the following three interconnection application scenarios.

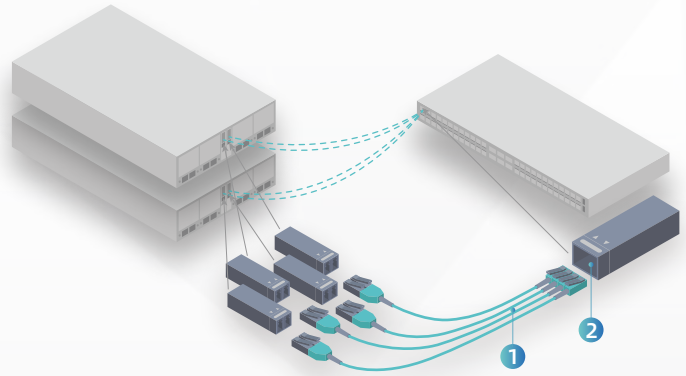




1. Direct-connect duplex transceivers with A-B/B-A duplex patch cable (light goes from Tx to Rx)
2. Interconnect duplex adapters with A-B/B-A duplex patch cable (light goes from A to B)
3. Interconnect duplex adapters with A-A/B-B duplex patch cable (light goes from A to A)

VSFF Duplex Patch Cables

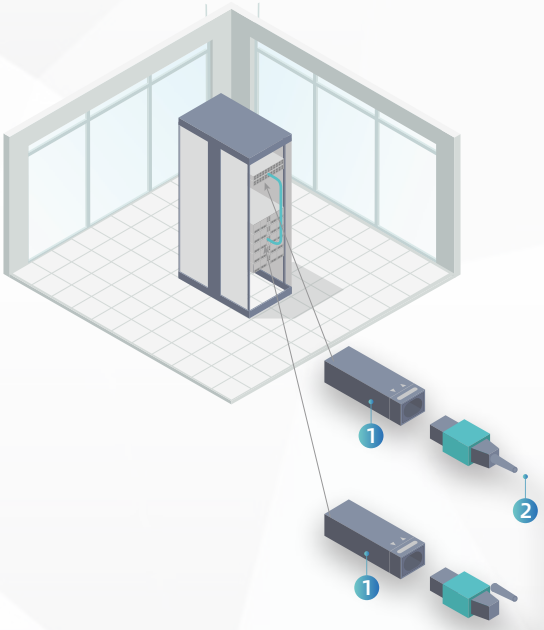
In 2023, GIGALIGHT has launched a new series of duplex patch cables with very small form factor (VSFF) fiber optic connectors, supporting optical transceivers with MC/SN interfaces. The following are examples of application scenarios.



1. Single transceiver operating over 4 parallel lanes with VSFF connector interface
2. Discrete duplex patch cables connecting 4 parallel transceivers

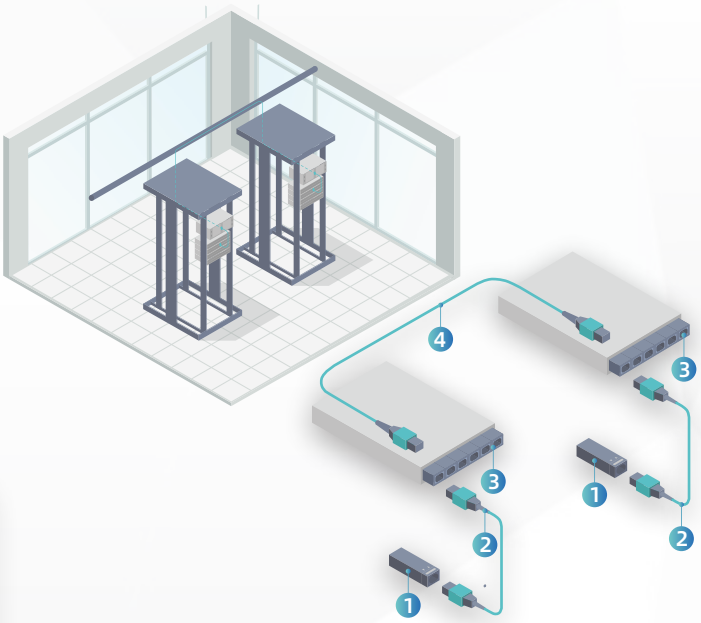
MTP Patch Cables

GIGALIGHT provides Base-8(8-fiber), Base-12(8-fiber) and Base-24(16-fiber,20-fiber or 24-fiber) MTP patch cables, which can support all 4-, 8-,10- and 12- channel parallel transceivers. The following are application examples:



Direct-connect MPO 8-fiber transceivers
e.g., QSFP SR4/PSM4/DR4 series

1. MPO 8-fiber transceiver on switch side
2. Female to female MTP patch cable (Base-8 or Base-12)
3. MTP 8 adapder panel
4. 8-fiber MTP trunk cable (or patch cable)



Direct-connect MPO 16-fiber transceivers
e.g., QSFP-DD SR8/PSM8/DR8 series

1. MPO 16-fiber transceiver on switch side
2. Female to female MTP patch cable (Base-24)
3. MTP 16 adapder panel
4. 16-fiber MTP trunk cable (or patch cable)

Direct-connect MPO 20-fiber transceivers
e.g., 100G CFP/CFP2 SR10

1. MPO 20-fiber transceiver on switch side
2. Female to female MTP patch cable (Base-24)
3. MTP 20 adapder panel
4. 20-fiber MTP trunk cable (or patch cable)

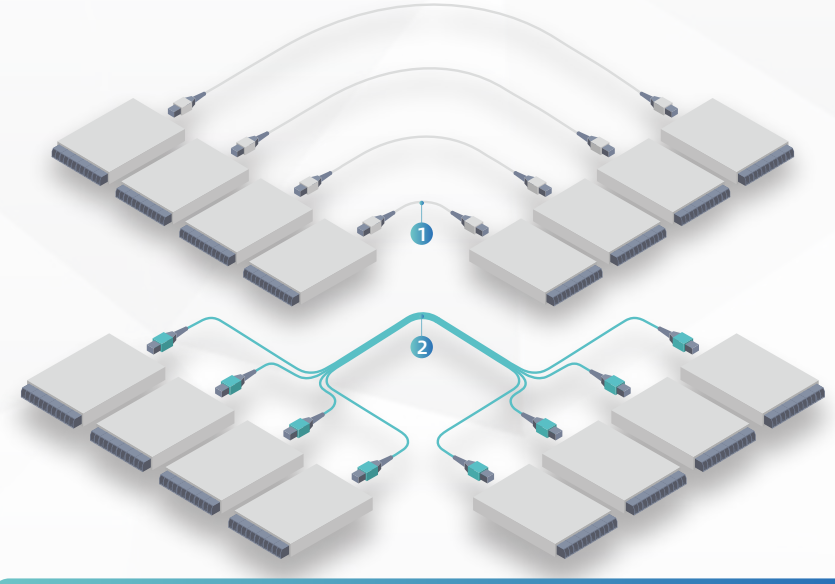
Direct-connect MPO 24-fiber transceivers
e.g., 120G CXP SR12 & 300G CXP2 SR12

1. MPO 24-fiber transceiver on switch side
2. Female to female MTP patch cable (Base-24)
3. MTP 24 adapder panel
4. 24-fiber MTP trunk cable (or patch cable)

MTP Trunk Cables

MTP Trunk Cables

GIGALIGHT provides Base-12 and Base-24 MTP trunk cables, including discrete series(8/12/24 fibers) and integrated series (16 to 288 fibers).



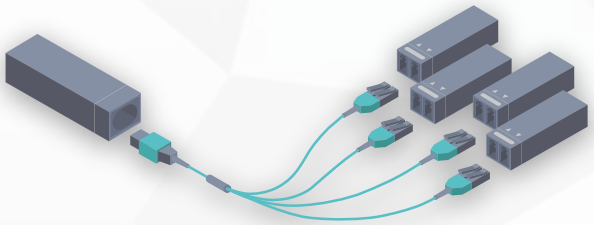
1 Discrete MTP trunk cable (equivalent to a single MTP patch cable)
2 Integrated MTP trunk cable (integrated by more than two MTP patch cables)

MTP-LC Breakout Cables

MTP-LC Breakout Cables

Parallel Transceivers to Duplex Transceivers

8-Fiber MTP to 4 Duplex LC



- Connections

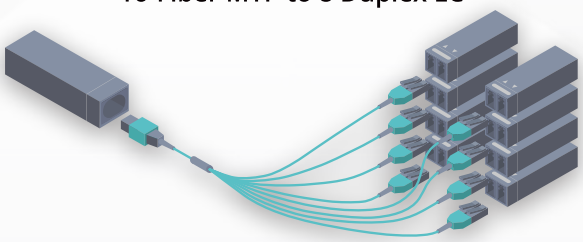
MMF series

- 40G QSFP+ SR4/CSR4 to 4×10G SFP+ SR
- 100G QSFP28 SR4/eSR4 to 4×25G SFP28 SR/eSR4
- 200G QSFP56 SR4 to 4×50G SFP56 SR
- 400G OSFP/QSFP-DD/QSFP112 SR4 to 4×100G QSFP28 SR1

SMF series

- 40G QSFP+ PLR4 to 4×10G SFP+ LR
- 100G QSFP28 PLR4 to 4×25G SFP28 LR
- 200G QSFP56 DR4 to 4×50G SFP56 DR
- 200G QSFP56 PLR4 to 4×50G SFP56 LR
- 400G OSFP/QSFP-DD/QSFP112 DR4 to 4×100G QSFP28 DR1
- 400G OSFP/QSFP-DD/QSFP112 DR4+ to 4×100G QSFP28 FR1
- 400G OSFP/QSFP-DD/QSFP112 DR4+/XDR4 to 4×100G QSFP28 FR1
- 400G OSFP/QSFP-DD/QSFP112 PLR4 to 4×100G QSFP28 LR1

16-Fiber MTP to 8 Duplex LC

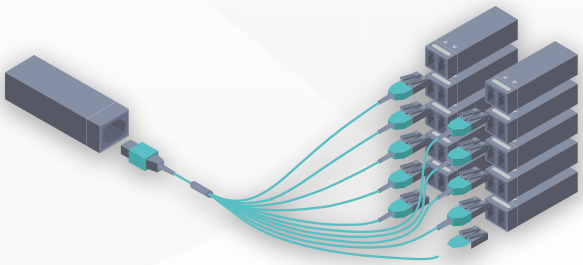


Connections

MMF series
- 200G OSFP/QSFP-DD SR8 to 8×25G SFP28 SR
- 400G OSFP/QSFP-DD SR8 to 8×50G SFP56 SR
- 800G OSFP/QSFP-DD SR8 to 8×100G QSFP28 SR1

SMF series
- 200G OSFP/QSFP-DD PSM8 10km to 8×25G SFP28 LR
- 400G OSFP/QSFP-DD PSM8 2km to 8×50G SFP56 FR
- 400G OSFP/QSFP-DD PSM8 10km to 8×50G SFP56 LR
- 800G OSFP/QSFP-DD DR8 to 8×100G QSFP28 DR1
- 800G OSFP/QSFP-DD DR8+/XDR8 to 8×100G QSFP28 FR1
- 800G OSFP/QSFP-DD PLR8 to 8×100G QSFP28 LR1

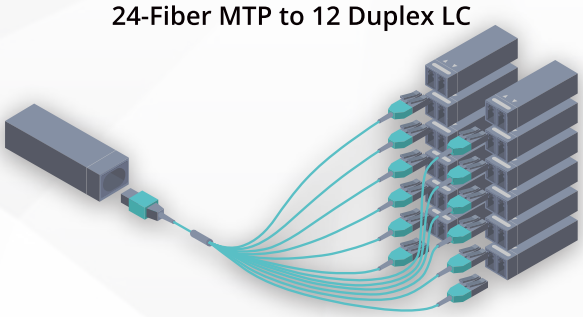
20-Fiber MTP to 10 Duplex LC



Connections

MMF series
- 100G CFP SR10/CSR10 to 10×10G SFP+ SR
- 100G CFP2 SR10/CSR10 to 10×10G SFP+ SR

24-Fiber MTP to 12 Duplex LC



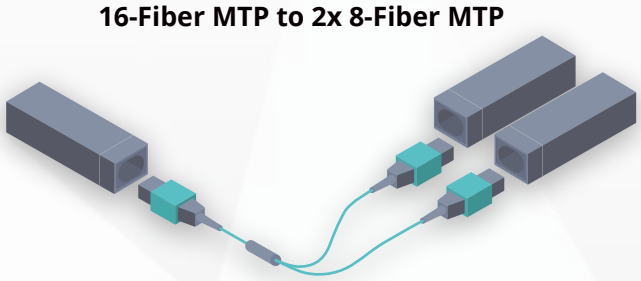
Connections

MMF series
- 120G CXP SR12 to 12×10G SFP+ SR
- 300G CXP2 SR12 to 12×25G SFP28 SR

MTP-MTP Breakout Cables

High-Speed Parallel Transceivers to Low-Speed Ones

16-Fiber MTP to 2x 8-Fiber MTP

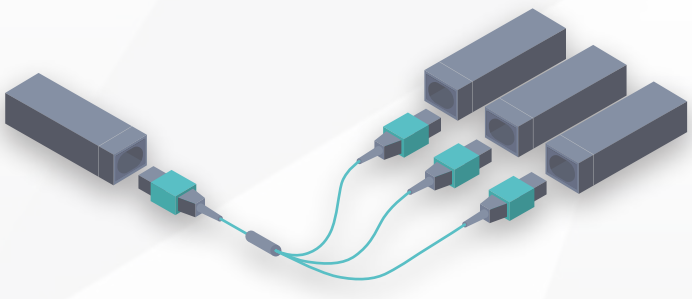


Connections

MMF series
- 200G OSFP/QSFP-DD SR8 to 2×100G QSFP28 SR4
- 400G OSFP/QSFP-DD SR8 to 2×200G QSFP56 SR4
- 800G OSFP/QSFP-DD SR8 to 2×400G QSFP112 SR4

SMF series
- 200G OSFP/QSFP-DD PSM8 10km to 2×100G QSFP28 PSM4 10km
- 400G OSFP/QSFP-DD PSM8 2km to 2×200G QSFP56 XDR4
- 400G OSFP/QSFP-DD PSM8 10km to 2×200G QSFP56 PLR4
- 800G OSFP/QSFP-DD DR8 to 2×400G QSFP112 DR4
- 800G OSFP/QSFP-DD DR8+/XDR8 to 2×400G QSFP112 DR4+/XDR4
- 800G OSFP/QSFP-DD PLR8 to 2×400G QSFP112 PLR4

24-Fiber MTP to 3x 8-Fiber MTP



Connections

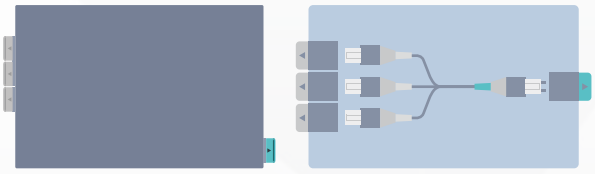
MMF series
- 120G CXP SR12 to 3×40G QSFP+ SR4
- 300G CXP2 SR12 to 3×100G QSFP28 SR4

MTP Transition Cassettes

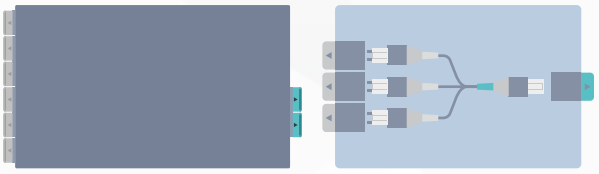
MTP-MTP Transition Cassettes

GIGALIGHT provides a series of MTP-MTP transition cassettes that support the conversion between Base-8, Base-12 and Base-24.

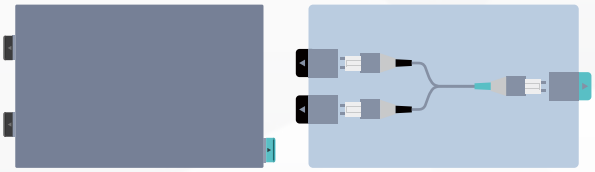
3×MTP8 → MTP24



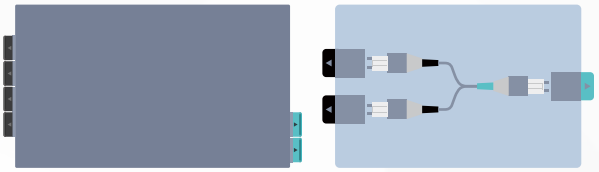
2×MTP24 → 6×MTP8



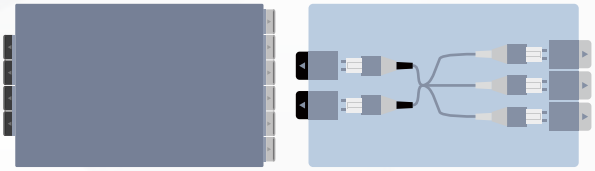
2×MTP12 → MTP24



4×MTP12 → 2×MTP24



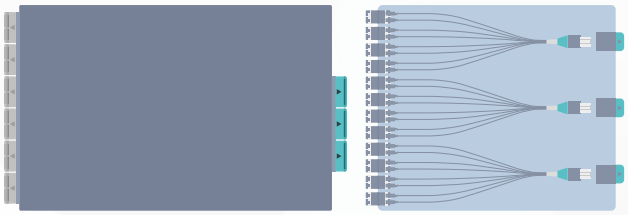
4×MTP12 → 6×MTP8



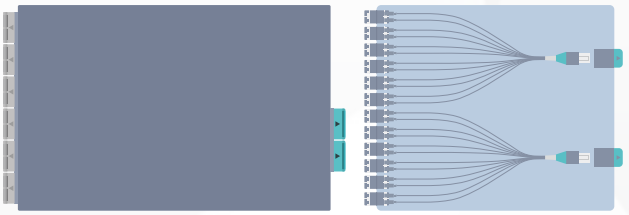
MTP-LC Transition Cassettes

GIGALIGHT provides a series of MTP-LC transition cassettes that can connect the LC patch cables to MTP cabling system flexibly.

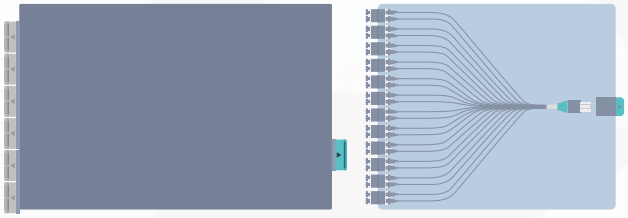
3×MTP8 → 12xDuplex LC



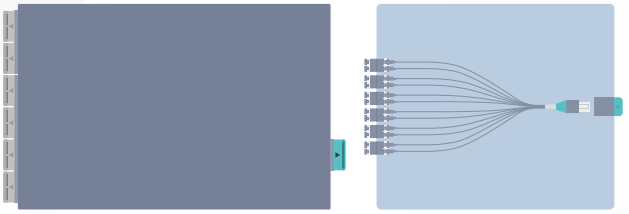
2×MTP12 → 12xDuplex LC



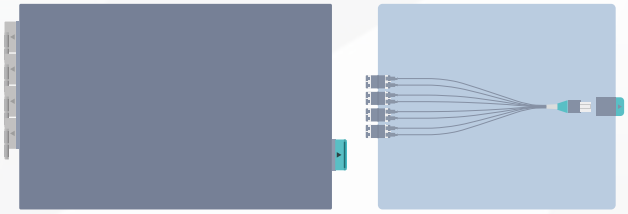
MTP24 → 12xDuplex LC



MTP12 → 6xDuplex LC



MTP8 → 4xDuplex LC



MTP Patch Panels

GIGALIGHT's MTP patch panels are paired with MTP transition cassettes for high-density cabling management, supporting up to 576 fibers (4U)

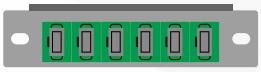
Patch Panels

Transition Cassettes

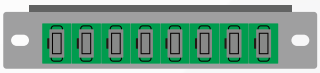
MTP Adapter Panels

GIGALIGHT provides a series of MTP adapter panels for MTP transition cassettes or MTP patch panels. A single MTP adapter panel supports up to 18 MTP ports.

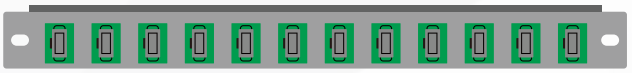
6xMTP Adapter Panels



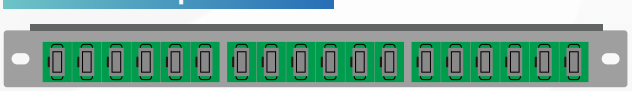
8xMTP Adapter Panels



12xMTP Adapter Panels

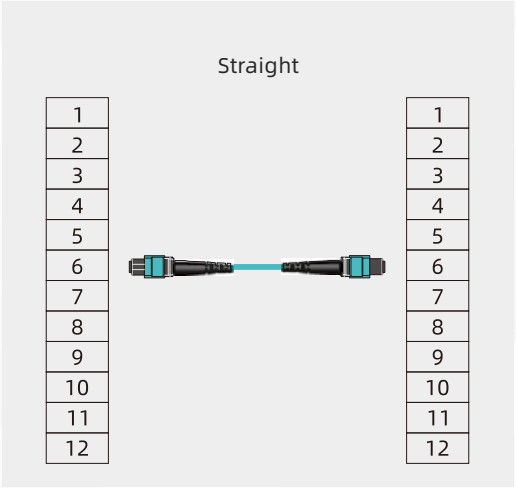


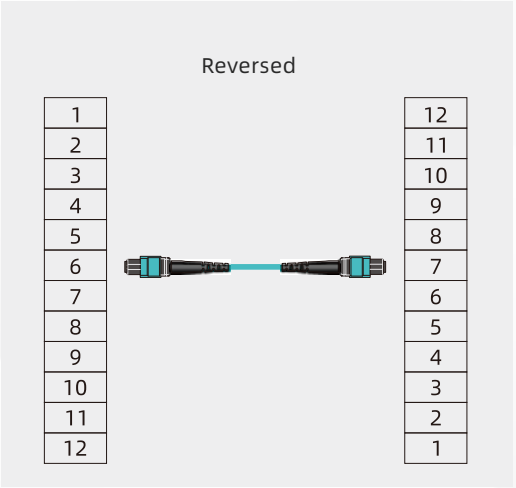
18xMTP Adapter Panels

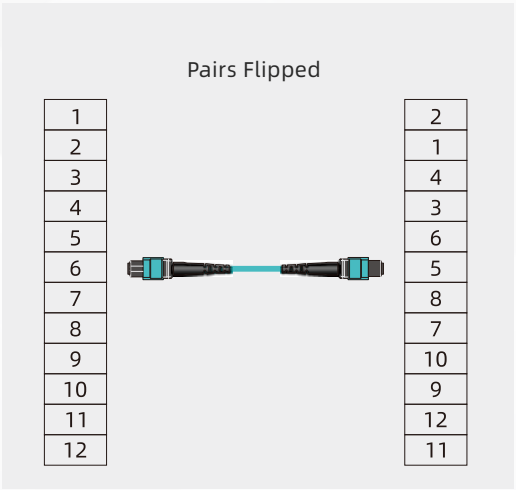


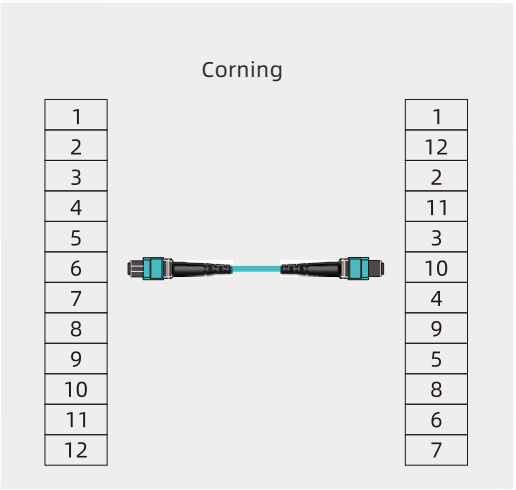
MTP Cabling Polarities

GIGALIGHT's MTP polarity checker is used to detect the polarity and connection status of multimode MTP cables (4/8/12-fiber), and the maximum detection length is 450m. In the short-distance inspection mode, the single detection time is less than 1 second, while in the long-distance inspection mode, the single detection time is less than 4 seconds.









Advantages of GIGALIGHT Data Center Cabling System

High density, space saving

It adopts a high-density 24-core (12/8-core) MPO quick-connect connector, which is only the same size as a RJ45 connector and cannot be used for traditional wiring. With this connector, combined with the 1U and 4U optical fiber distribution frames composed of MPO modules, installation densities of up to 144 or 288 cores are achieved, saving a lot of space to deploy more equipment.

Stable and reliable performance

The terminal and testing of the product are all completed in the factory. There is no melting point at either ends of the product, and the attenuation is small. The patented pre-connection branch technology is used to ensure reliability. All products are 100% factory inspected, and before leaving the factory, the two ends are protected by pressure and tensile protection tubes to protect the internal connector with the installation handle, it ensures the stable and reliable performance of the whole process of the optical cable from production to deployment.

Easy to deploy and upgrade

All connectors are plug-and-play, and the number of cables is greatly reduced compared with traditional wiring, so the construction efficiency is greatly improved. The original weekly wiring volume can be completed within a few hours.

Simple and convenient, only three steps:

- Step 1: Put the MPO optical fiber distribution frame in the cabinet;
- Step 2: Pull the optical cable of the two MPO optical fiber distribution frames;
- Step 3: Insert the MPO optical cable into the MPO module port.

It can be seen that the deployment of an MPO optical link can be completed only within a few minutes without any tools, welding, a lot of people (one person is enough) and complicated training. Because it is easy to master, the wiring difficulty is low. After a short period of simple training, the managers of data center can achieve some system changes and expansions by themselves, saving time and cost.

Support the future internet application

The application that perfectly supports the 100G/400G network avoids the need for re-routing due to network equipment upgrades. Integrated wiring is the best to provide a service life of 25 years, but the flow growth rate is 5-10 years, so we need to upgrade the system frequently. Therefore, in order for wiring to support long-term applications, it is necessary to reserve a certain amount of space for the wiring system, otherwise it'll must be rewired in the future.

Aesthetically pleasing wiring and convenient management

By reducing the empty space occupied by the cable, the empty space of the cable under the bridge or floor can be reduced by more than 40%, which is conducive to the ventilation of the data center, gets rid of the phenomenon of numerous and disorderly cables brought about by the use of ordinary optical fiber products in the past, reduces the difficulty of customer management and beautifies the space.

GigaLight

Open Optical Network Device Explore

For any needs, please contact sales@gigalight.com. Thanks!

https://www.gigalight.com/