



Data Center **MRJ21 & MPO**

High Density
Data Center Cabling



Introduction

Data Centers are referred to as “Mission-Critical” facilities for a reason, they process and store information vital to the organization and its clients. Many data centers support global organizations and as such, uptime and information availability around the clock is critical.

Successful operation of a data center includes many operational efficiencies that can affect both cost of operation and lifespan of the network. Key issues to consider when building or overhauling a data site include:

- application performance
- speed and quality of installation
- documentation
- heat dissipation
- port density
- recovery or change
- cable management
- floor space
- security
- power consumption

Thoughtful planning and hardware selection have a major impact on the operational efficiency of these sites. High-density, factory-terminated and tested, modular solutions enable the desired efficiencies above while providing an immediate to short term Return on Investment (ROI).

The following pages will introduce you to the innovative, industry leading technologies from Tyco Electronics that address these challenges.



Save Cost from the Very Beginning

Key Features

Networks can be up and running in minutes, not hours or weeks. No tool kits or consumables are necessary; no field-testing and no training is required – all this can minimize your overall cost. Additionally, all cables and cassettes are factory terminated and tested, so the high-performance you need is built into the products...

This Plug&Go System is ...

... simple and fast:

- Building up the system is as simple as pushing a power plug into its socket
- Connectors click into their adapters and are reverse polarity protected
- Cassettes snap into any slot that holds a snap-in adapter

...modular and adaptable – with only three components:

- Trunk cables in various lengths
- Snap-in cassettes and break-out panels in various port counts
- Fan-out cable assemblies for even more flexibility

... high-density:

- Up to 72 fibers (MPO) or 48 RJ-45 ports (MRJ21 connectors) per 1U
- Up to 24 fibers (MPO) or 24 twisted pairs (MRJ21 connectors) per trunk cable
- More performance in less space
- Less cables save cabinet and trunking space

... scalable:

- Modular, pre-terminated and re-pluggable components simplify data network changes and growth
- Capital investment is scalable

... reliable:

- Cables terminated and tested in factory
- High precision processes
- Outstanding quality control

... cost efficient:

- Reduced labor cost for installation, terminating and testing
- Reduced secondary cost for trunking, cabinet and consumables



48 pins plugged at once!



Background/Technology

Specifically Engineered Data Center Solution

Cabling is often taken for granted - but making the right investment will initially save time, money and frustration in the near term and minimize disruptive upgrades in the future.



The requirements for Data Center or Storage Area Network cabling differ from those of traditional structured office cabling networks:

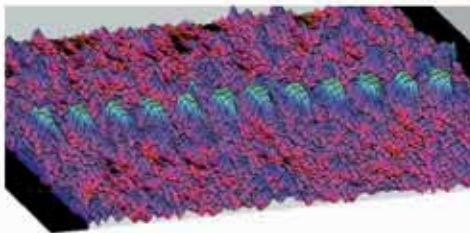
- Capability of handling huge data streams at the fastest possible rate
- Fast deployment and changes
- Higher density
- Highest reliability (Zero Downtime)

Top Products for Top Performance

Tyco Electronics has developed an application specific cabling system - specially designed for Data Center and SAN. A factory terminated Plug&Go system for both media, Twisted Pair and Fiber Optic.

MPO Connector

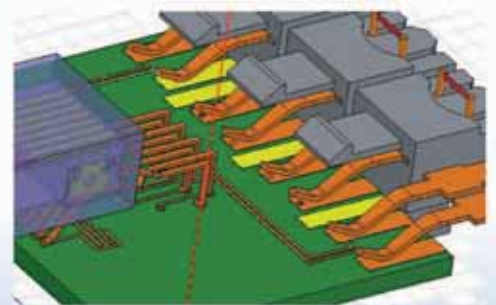
- Utilizes the high-density MT-Ferrule
- 12 fibers per ferrule on only 3 mm²
- Very accurate fiber positioning
- 10 Gb/s capable



Interferometer graph of MT ferrule surface shows the accuracy of the 12 fibers

MRJ21 Connectors

- Very compact metal connector with 48 pins
- Resistant against mechanical loads
- Factory terminated and tested to help ensure reliable transmission parameters
- Designed for Gigabit Ethernet and PoE



High-Frequency Structure Simulator Software allows emulation and testing of electro-magnetic connector characteristics

High-Tech, High-Speed, High-Density

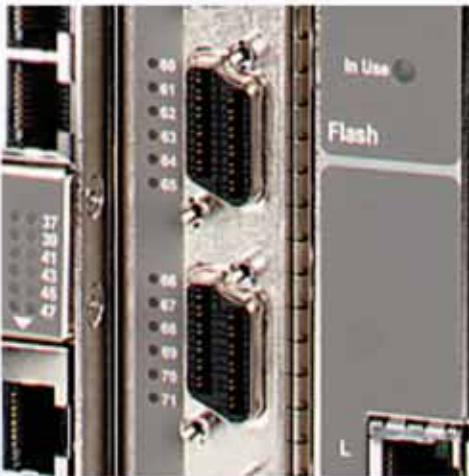
Directly Connect with Manufacturers of LAN Electronics

One Design for LAN Electronics Connectivity and Cabling Systems

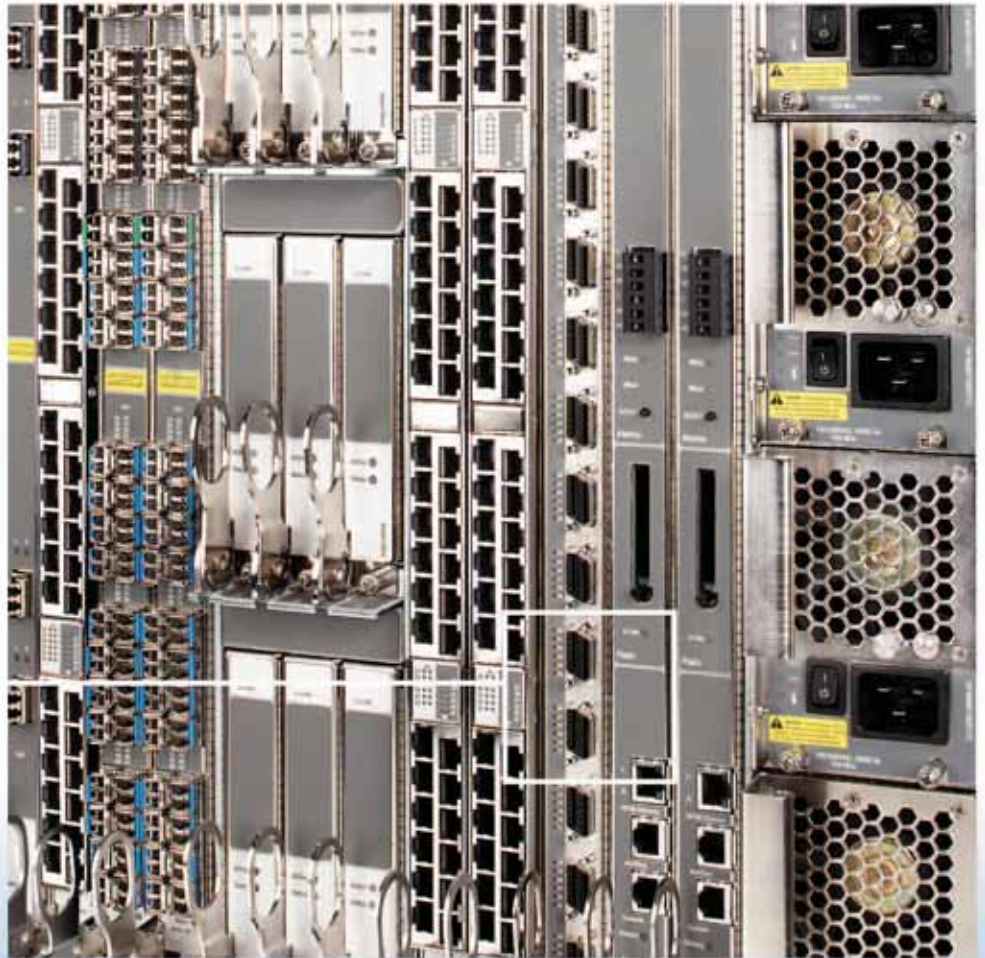
Tyco Electronics is the world's largest manufacturer of passive components. With our knowledge and experience we develop and engineer visionary connectivity technology. While we are integrating our advanced connectors into our own products to offer best in class cabling systems, we also collaborate closely with manufacturers of IT devices that connect directly to our cabling systems.



Consequently Tyco Electronics supplies the same high-tech connectivity to various switch and server manufacturers to provide really **seamless End-to-End System solutions to data center users** around the globe. The MRJ21 48 pin copper connector is integrated on switch blades and server cards.



A perfect inter-balance between high-density connectivity for high-speed switches and an innovative cabling system solution ensures maximum throughput and reliability.



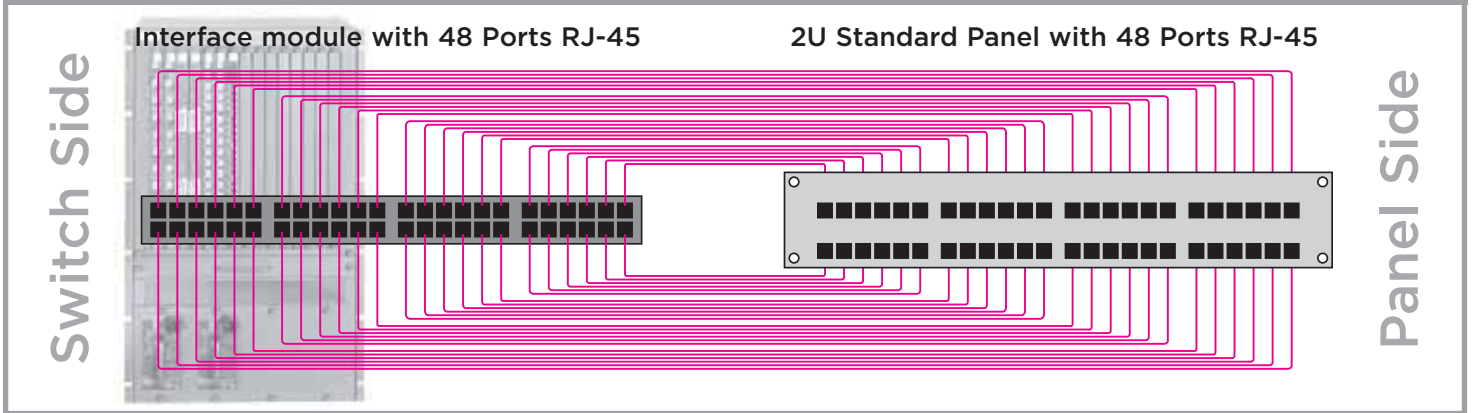
Complete Solution Strategy

Service Presentation with MRJ21 Connectors

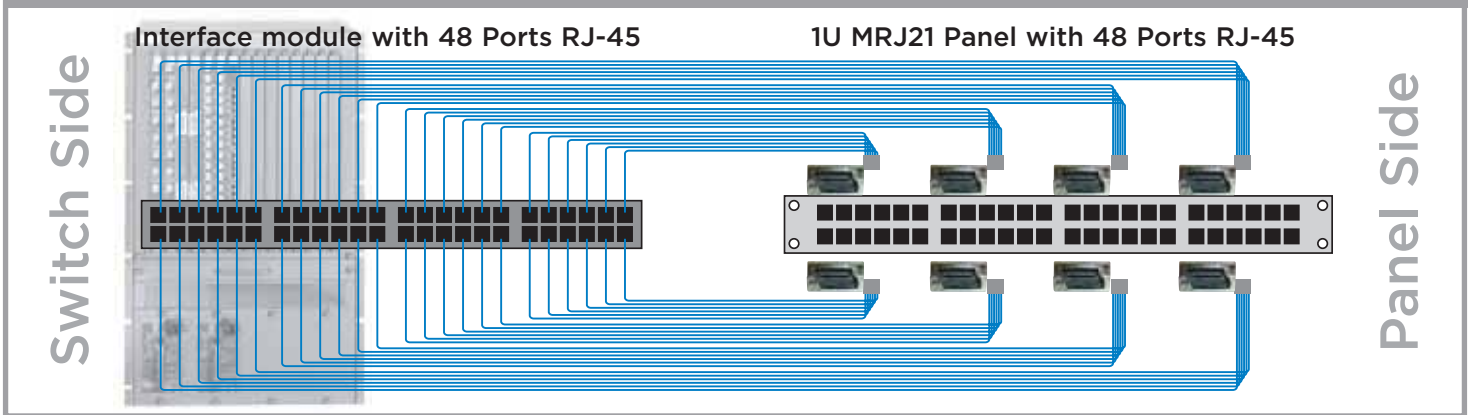
Migration opportunities for Service Presentation Users

Countless users of huge core switches implement Service Presentation Panels to maximize their network's reliability of operation. The AMP NETCONNECT MRJ21 Connectors System offers some smart opportunities to considerably facilitate Service Presentation! The examples below show a migration option for Service Presentation of 48 core switch ports.

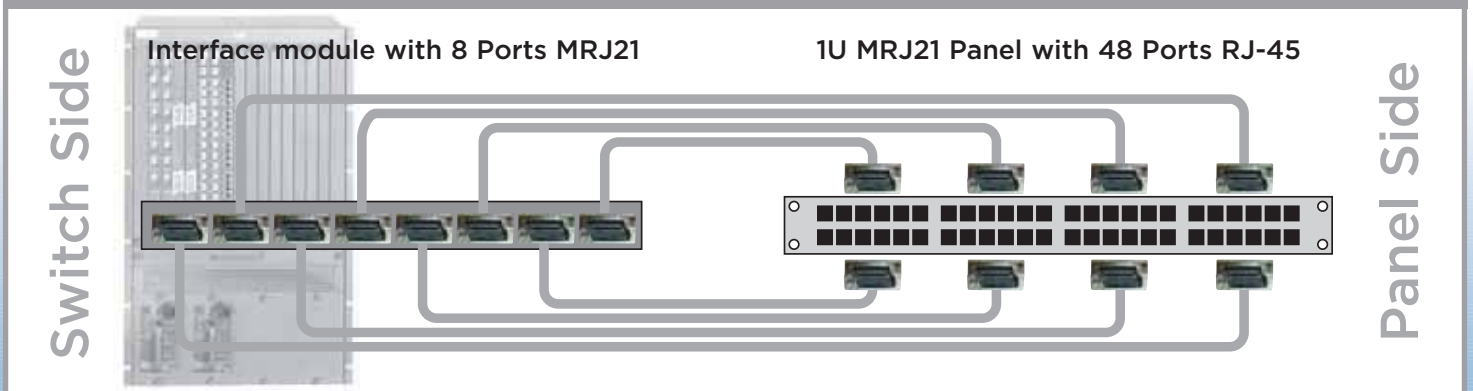
Yesterday: 48 x discrete RJ-45/RJ-45 CP Cords



Today: 48 x RJ-45 to 8 x MRJ21 Fan-Out Assemblies



Today and Tomorrow: 8 x MRJ21/MRJ21 Trunk Cables



MPO Fiber Optic System Solution

MPO cabling system is an excellent choice for various applications on fiber. Modular components are the key to fast deployment, simple installation, capital effectiveness and network flexibility. Pre-terminated trunk cables, breakout cassettes and cable assemblies are the basic modular components needed for a complete network.



MPO Trunk Cables

- Factory terminated and tested high-density MPO connectors
- 12 fibers per connector
- MPO connectors based on push-pull type
- Available in various length (10 m to 300 m) and fiber types (OM1, 2, 3 or OS1)



MPO Fan-out Cable Assemblies

- From distribution cable to single fibers
- Work with MPO to MPO couplers
- Available in LC, SC Duplex, MT-RJ or ST
- Reduce the need for patch panels



MPO SECURE

Connectors/Segregated Network Option

- Keyed and color-coded for physical connection security
- Trunk and port level security
- Fits same enclosures as above
- 12 or 24 fiber multimode options available



MPO Snap-in Cassettes

- These breakout cassettes are transition between MPO and standard interfaces (e.g. LC, SC, MT-RJ)
- Fit into 19" patch panels (up to 3 cassettes per 1U) or wall mount enclosures (up to 6 cassettes)
- Suitable for 12 or 24 fibers per cassette
- Allow for 72 fibers per 1U

Pre-terminated and Factory Tested



MRJ21 Copper Connectors System Solution

The MRJ21 Connectors system is a high-density, high-performance modular system. This Tyco Electronics solution is designed to deliver multiple Gigabit Ethernet ports in a high-density package that fully supports PoE. The twenty four pair cabling and connector solution supports any plug and play environment including Data Centers. MRJ21 trunk cables, cassettes and cable assemblies are the basic components of this modular connectivity solution.



MRJ21 Trunk Cables

- 48 pin MRJ21 connectors terminated to high-performance powersum 24 pair cables
- Factory terminated and tested
- Available in various length (1 m to 90 m) and jacket types (PVC and Plenum)
- Reverse polarity protection



MRJ21 Fan-out Cable Assemblies

- Application specific
- MRJ21 to 6 RJ-45 plugs (1000Base-T, 4 pair)
- MRJ21 to 12 RJ-45 plugs (10/100Base-T, 2 pair)
- For building "Service Presentation" and reduction of discrete links



MRJ21 1U Cassettes and Patch Panels

- These breakout cassettes are transition between MRJ21 and RJ-45 interface
- 6 port cassettes for 1000Base-T (4 pair service)
- 12 port cassettes for 10/100 Base-T (2 pair service)
- Also available as fully integrated 19" 1U patch panel
- Allow for 48 RJ-45 ports per 1U — Angled or Straight

Pre-terminated and Factory Tested



48 Straight



48 Angled

Professional Patchcord Management

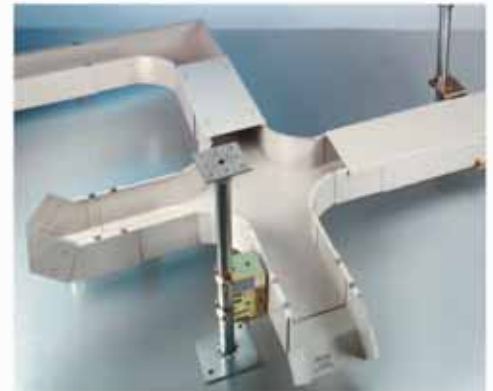
Hi-D Connect Cable Management System

With the market introduction of high-density electronics incurring extreme power and cooling requirements data center users are forced to increase the space efficiency of their structured cabling designs to accommodate reduced footprint. While the mere maximization of physical port count per sq. ft. is less complex, it is an increasing problem to effectively manage this density.



The Hi-D Connect Cable Management System has been designed to overcome these issues through innovative design. With this solution the port density of a standard cabinet can be increased to 720 ports per cabinet face. This density is achieved by patented bend control designs that automatically ensure minimum bend radii of the installed patch cords. The easily accessible cable retentions provide maximum user flexibility.

The Hi-D Connect Cable Management System supports design and installation simplicity as well as integration into a wide range of cabinet environments.

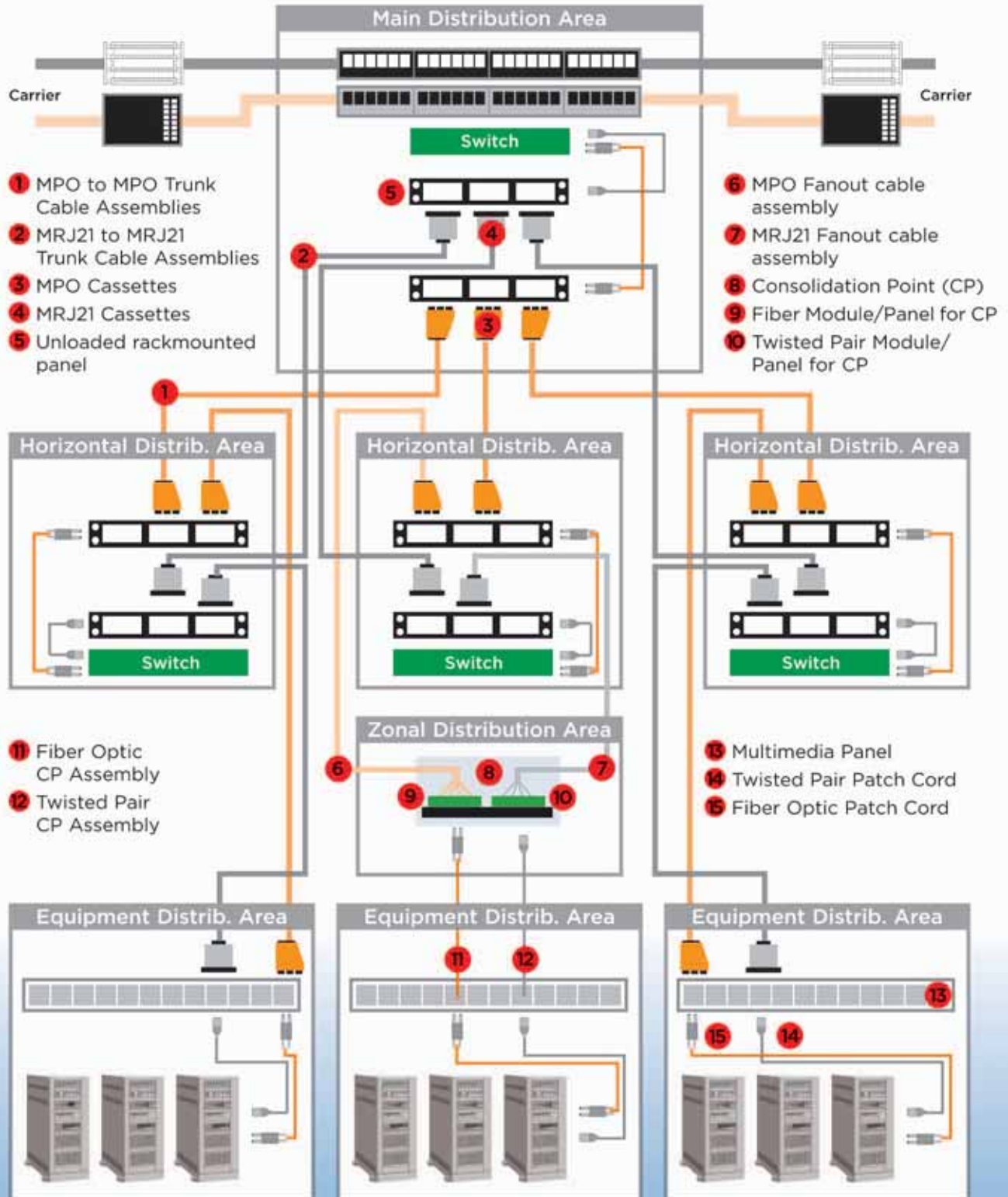


- Onsite cutting or adhesives are not required
- User-defined layout (layout assistance is available)
- Telescoping sections clip together
- Strong lightweight all-aluminum construction
- Covers available
- Utilizes existing raised floor pedestals for mounting
- Below floor system available in 3 sizes, 5", 10" and 18"

Total Data Center System Solution

Versatile Data Center Cabling

You can use the AMP NETCONNECT MRJ21 Connector System throughout your Data Center.

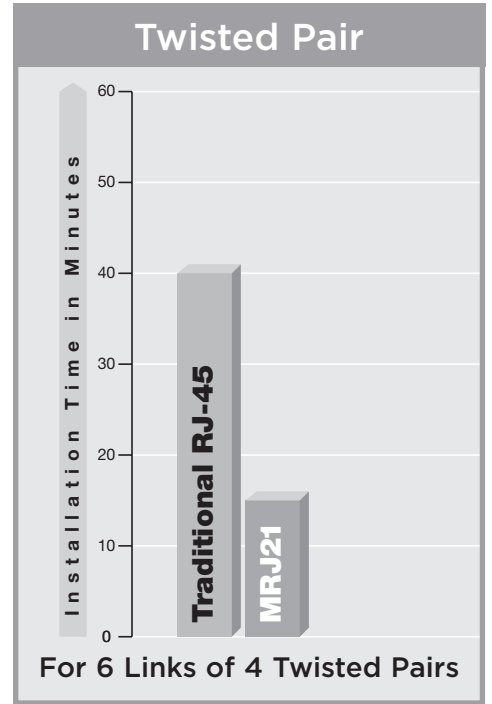
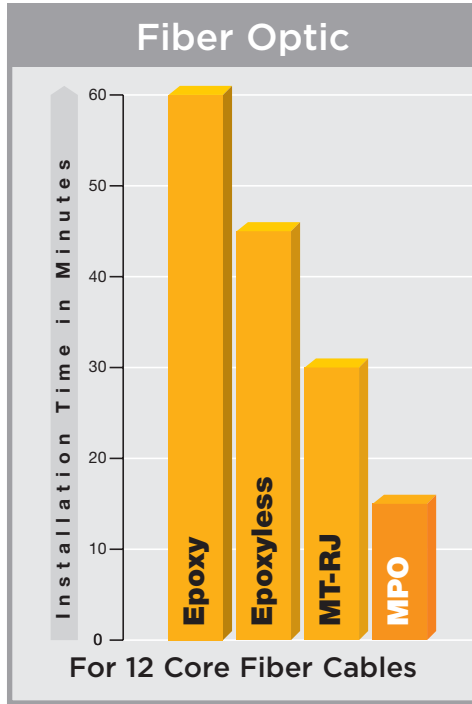


Plug&Go in all Data Center Areas

Return on Investment

Time

Field Installation vs. Plug&Go		
Job	Field installed Cabling	Plug&Go Cabling
Cable Laying	On Field	On Field
Cable Termination	On Field	Factory Terminated
Cable Testing	On Field	Factory Tested
Space & Workmanship	Multiple runs take more space and dressing time	High count single run takes less space and time



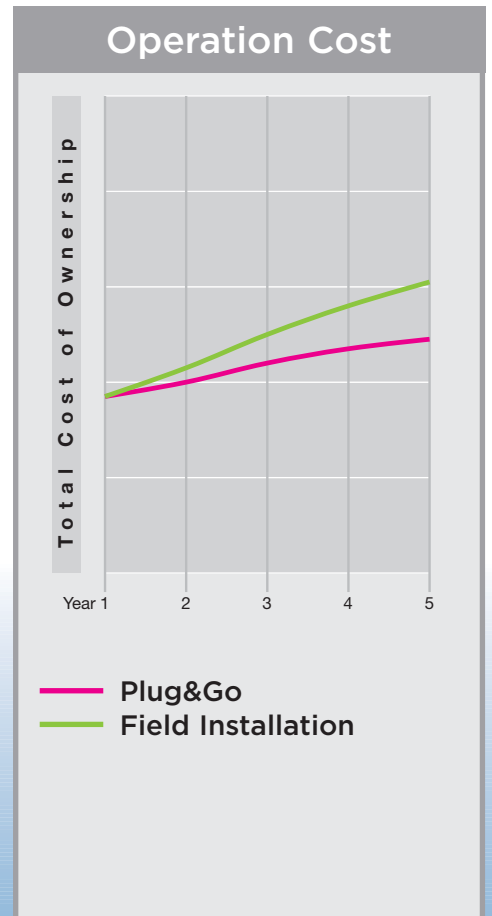
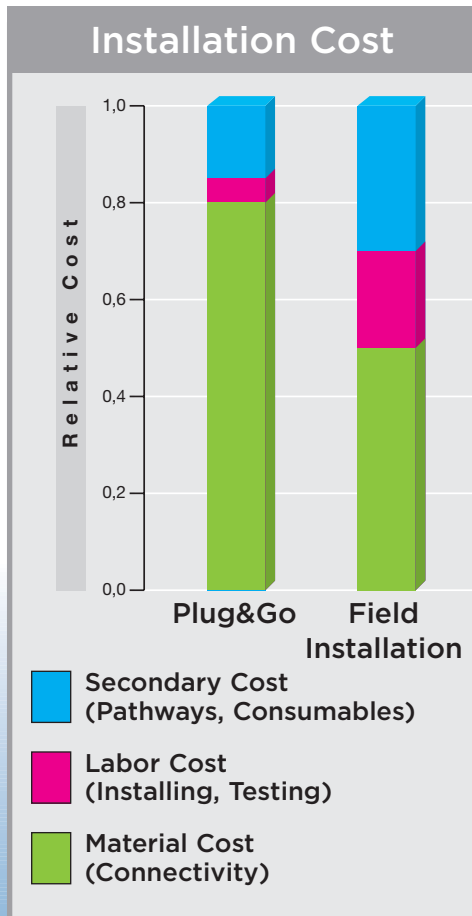
Money

Higher initial material investment is compensated by saving

- labor (installation, testing)
- secondary cost (less/smaller pathways, no consumables, etc.)

Conclusion:

Initial investment for Plug&Go and Field Installation is neutral in cost! Actual savings begin from Day 1 due to easier admin & maintenance when MACs appear (easier and faster connecting/disconnecting).



*Charts used to illustrate relative comparison. Actual costs may vary based on project size, location and purchase practice.

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All AMP NETCONNECT XG cabling system components are backed by the Tyco Electronics 25 year warranty, which provides coverage directly to the end user, when a Tyco Electronics authorized NETCONNECT Design and Installation Contractor (ND&I) performs the installation in accordance with Tyco Electronics requirements.* With 25 years coverage on system performance and components, if something goes wrong, Tyco Electronics will make it right.

Coupled with the AMPTRAC Connectivity Management System, any AMP NETCONNECT XG cabling system becomes an intelligent network with automated physical layer management for instantaneous connectivity status and documentation. So you can have your 10 Gigabit performance and manage it too.



Our commitment. Your advantage.

*Some conditions may apply. For more information, please visit www.ampnetconnect.com, or call 1-800-553-0938. Outside the U.S. please contact your local AMP NETCONNECT sales office.

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