Data Center

MRJ21 & Hi-D & MPO

High Density
Data Center Cabling

AMP **NETCONNECT**

Tyco Electronics
Our commitment. Your advantage.

Introduction

Data Centers are the "nerve centers" of the new economy – special environments that boast the latest technology and computing processes. The purpose of the data center is to centralize and consolidate IT resources, thereby giving business the infrastructures that offer 24/7 availability, 365 days a year. Designed to offer around the clock business continuity and uninterrupted services for mission critical data operations, they often have different requirements to that of traditional office network physical layer systems.

Plug&Go

Tyco Electronics offers the products you need for quick and easy installation of high-performance Data Center and Storage Area Networks. Combining pre-terminated cable assemblies and compact break-out cassettes makes installation as simple as "Plug&Go":

Mount the cassettes in a rack or wallmount box, lay the trunk cables, and plug the cables into the cassettes!
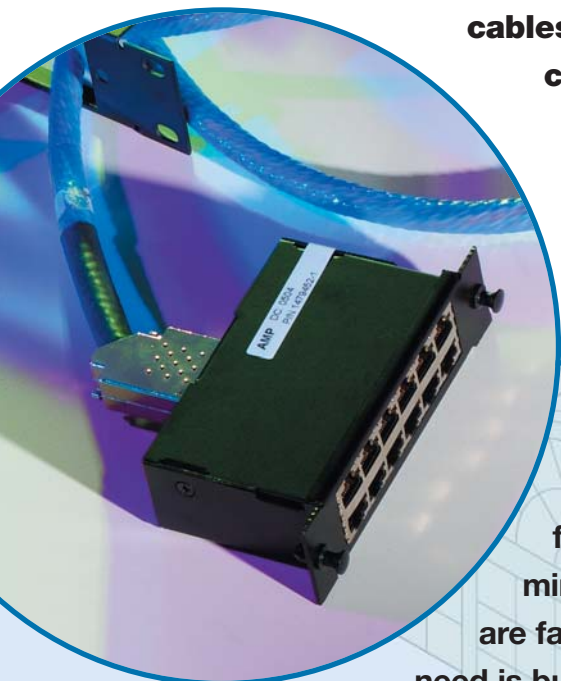
Data Center Requirements

- 100% availability
- Fail-safe reliability and continuous monitoring
- Power and network communications redundancy and path diversity
- Physical and network access security and surveillance
- Zoned environmental control
- Intelligent systems to facilitate Moves, Adds and Changes (MACs)

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 results in minimized overall cost. Additionally, all cables and cassettes are factory-terminated and tested, so the high-performance you need is built into the products…

Save Cost from the Very Beginning

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 short 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

To meet these requirements Tyco Electronics has developed an application specific cabling system – specially designed for Data Center and SAN. A factory terminated Plug&Go system for both, Twisted Pair and Fibre Optic.

MRJ21 Connector
● Very compact metal connector with 48 pins
● Resistant against mechanical loads
● Factory terminated and tested to ensure reliable transmission parameters
● Full 10/100/1000 Ethernet support

MPO Connector
● Utilizes the high-density MT-Ferrule
● 12 fibers per ferrule on only 3 mm^2
● Very accurate fiber positioning
● Full 10 Gb/s support

AMP NETCONNECT 10 GBit Ethernet Systems
XG 10 Gb/s approved

Interferometer graph of MT ferrule surface shows the accuracy of the 12 fibers
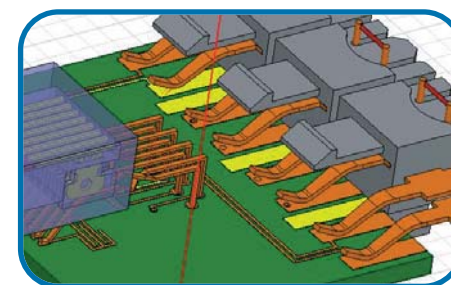
High-Frequency Structure Simulator Software allows emulation and testing of electro-magnetic connector characteristics

High-Tech, High-Speed, High-Density

Physical Security

Whether it's a military installation, a multiple data center suite, a financial institution or a local secure network, protecting and segregating your data can be a monumental task. With off-site server space in high demand for security reasons, many companies are offering services to multiple clients in one location, often within feet, or even inches of other clients (some of who may be competitors of the client). Our multi-color offering makes it intuitively obvious which jack or adapter will accept each plug (and which will not), thus greatly reducing that risk by simply using a color code to segregate each client.

Color Coded and Mechanically Keyed

Those requirements may apply to the following areas

- Military
- Insurance companies
- Financial institutions
- Industrial applications

Our copper and fiber systems have a unique keying system, identified with easy to recognize color coding (each colored connector will only fit into the corresponding jack). The fiber solutions are available with either traditional through couplers or MPO cassette based systems.

These systems allow 100% accurate service connectivity all of the time, with further benefits for Data Center operators:

- Physical and optical segregation of multiple clients or services in one Data Center
- Easy service assignment
- Errors excluded

## Physical Connectivity Security

2

One Design for LAN Electronics Connectivity and Cabling Systems

Tyco Electronics is the world's largest manufacturer of electrical and electronic connectors. 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.
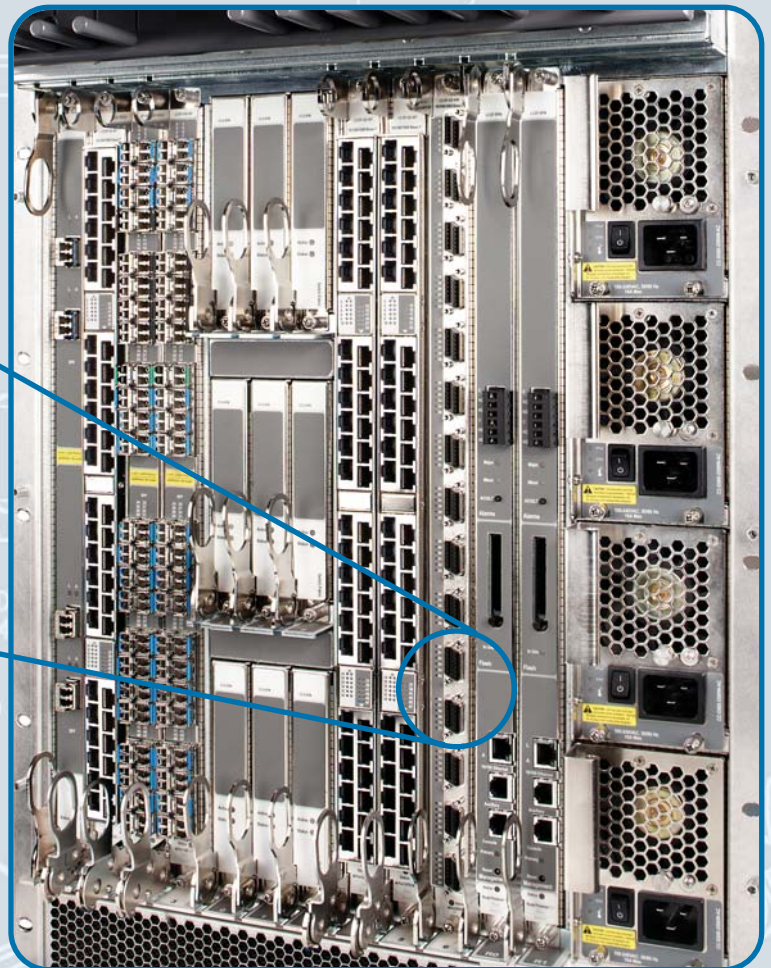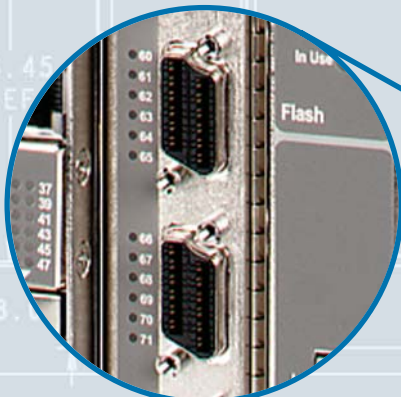
A perfect inter-balance between high-density connectivity for high-speed switches and an innovative cabling system solution ensures maximum throughput and reliability.

The list of suppliers comprises many major network companies, which supply active enterprise solutions for Data Centers. **Ask your supplier about MRJ21 high density solutions.**

Complete Solution Strategy

The MPO system is an excellent choice for many fiber applications. 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 push-pull type connectors
- Available in various length (10 m to 300 m) and fiber types (OM1, 2, 3 or OS2)

MPO Snap-in Cassettes
- These breakout cassettes are transitions between MPO and standard interfaces (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 up to 72 fibers per 1U
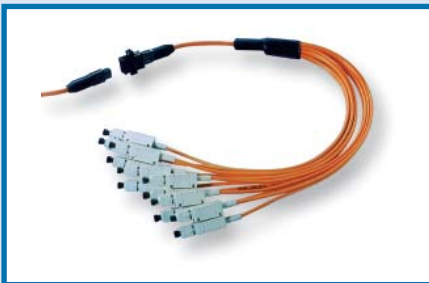
MPO Fan-out Cable Assemblies
- From distribution cable to single fibers
- Couples with MPO adaptors
- Available in LC, SC Duplex, MT-RJ or ST
- Reduces the need for patch panels

Pre-terminated and Factory Tested
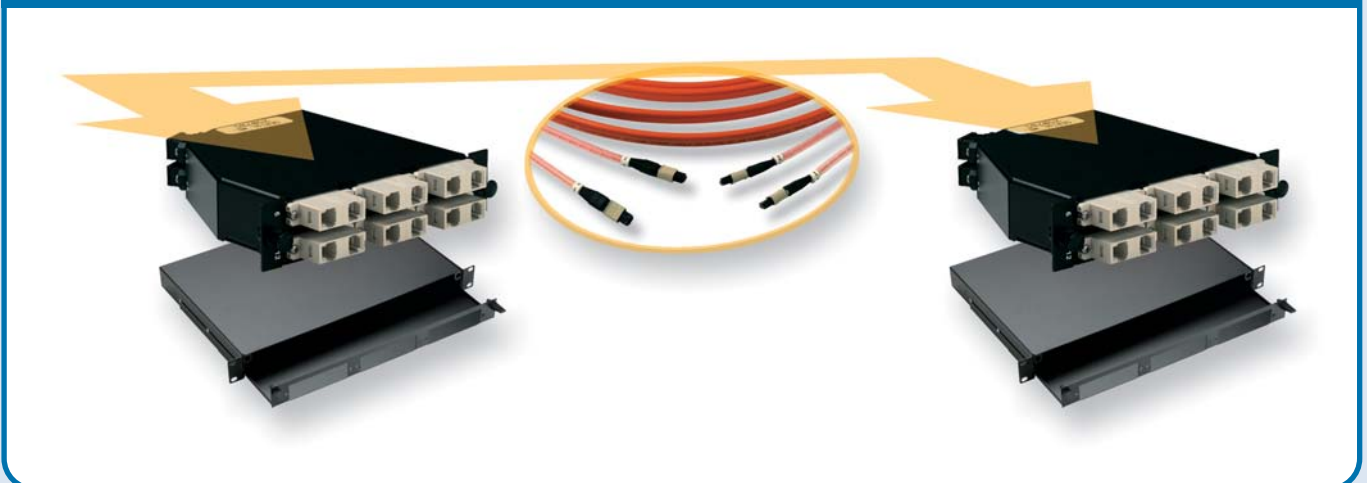
High-Density Fiber

The MRJ21 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
- Reverse polarity protection

MRJ21 Snap-in Cassettes
- These breakout cassettes are transitions between MRJ21 and RJ-45 interface
- 6 port cassettes for 1000Base-T (4 pair service)
- 12 port cassettes for 10/100Base-T (2 pair service)
- Also available as fully integrated 19″ patch panel
- Allows up to 48 RJ-45 ports per 1U

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
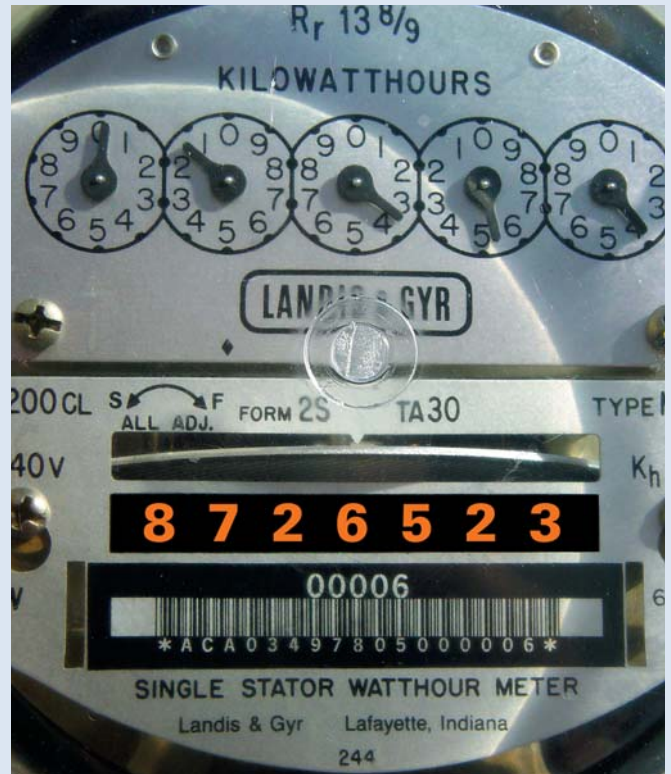
Pre-terminated and Factory Tested

High-Density Copper

## Reducing Power Consumption with "Smart" Cabling Systems

The accelerated adoption of dense computing systems, such as 1U servers and consolidated blade servers, is rapidly raising power consumption and heat emissions within the enterprise data center. Historically, the average 42 U rack has a power consumption of anywhere from 2 kilo Watts (kW) to 7 kW. Contrast this with the new generation of blade servers, which exhibit peak rack heat loads from 15 kW to 25 kW.

Your Contribution to the Environment

The graph below shows that approximately 12% of the total power consumption with in the data center can be attributed the network equipment and associated cabling. The accelerated adoption of dense computing systems requires the need for increased network performance.

Areas Contributing to Power Consumption

- Cooling
- Lightning
- Power Loss
- Server
- Network Equipment

12%
25%
50%
10%
3%

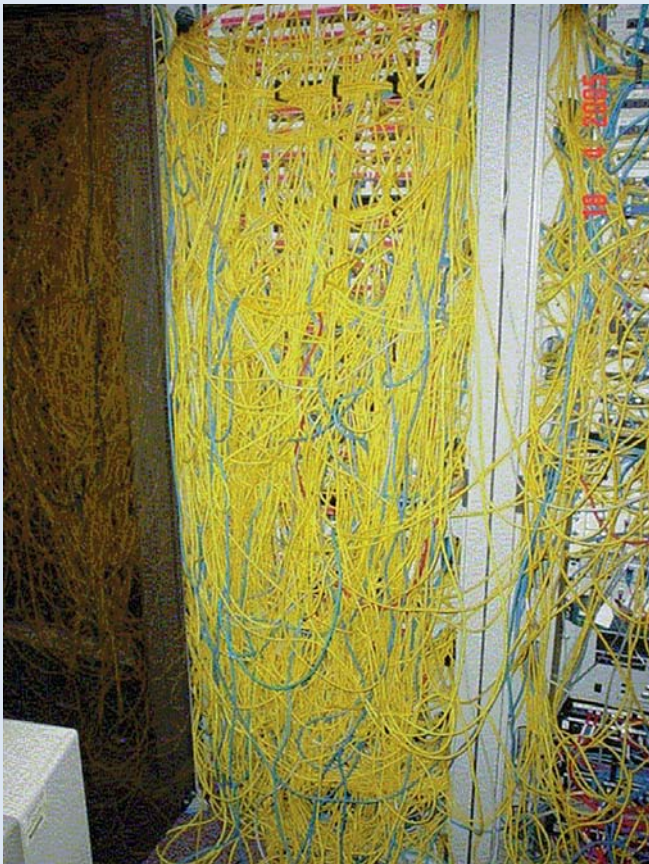## Less Cooling = Less Power Consumption
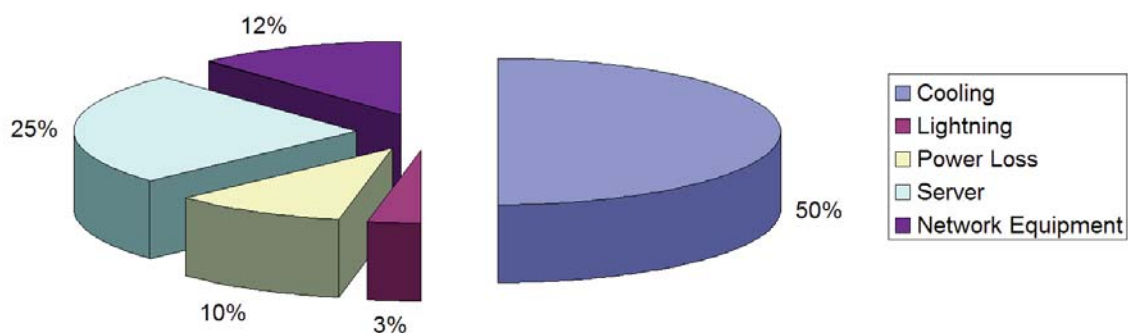
Increasing Density Whilst Reducing Power Consumption

In line with the desire of organisations to provide more performance in less space within their Data Center environment whilst meeting power consumption objectives, AMP NETCONNECT has realised the need to develop focused product sets for these environments that meet the design objectives of guaranteed high density performance, seamless migration and user flexibility at a reduced power level.

This provides some advantages:

● Better airflow in racks and raised floors
● Less power consumption
● Allows cost efficient cold and warm areas

Using smart cabling to improve spaces and airflows, active cooling can be focused on the areas where high heat dissipation is require and not be wasted on cooling traditional passive cable systems. Using pre-terminated systems has the additional advantage of flexibility, beeing able to allow adds, moves and changes within minutes.

Compared to traditional cable solutions, the AMP NETCONNECT Hi-D connect system can provide many cost benefits, including:
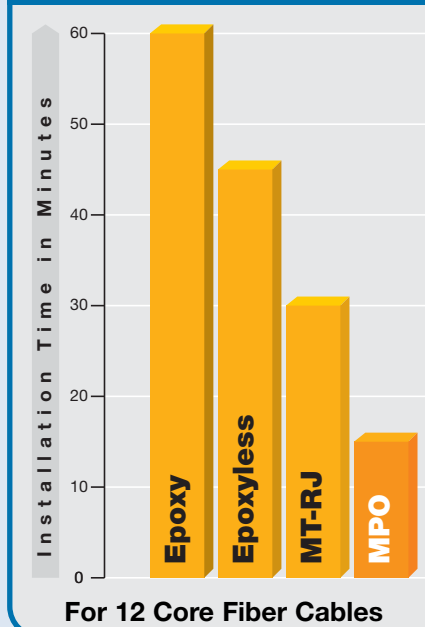
● Up to 20% reduced floor space
● Between 10% and 20% less maintenance time
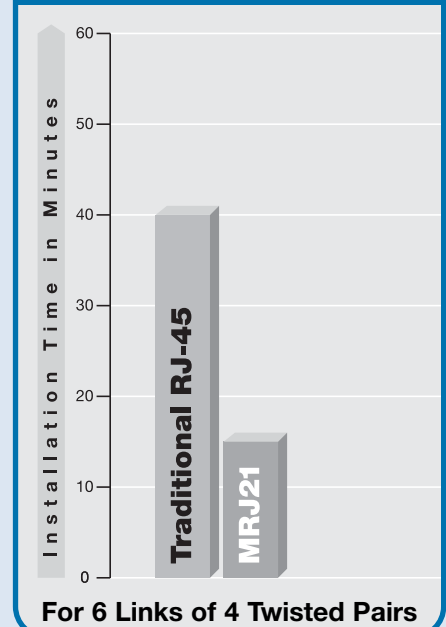● Up to 5% less power consumption
● In total up to 20% cost saving

Managing the Highest Density

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 & Work Manship	Multiple runs take more space and dressing time	High count single run takes less space and time

Fiber Optic

Installation Time in Minutes

Epoxy · Epoxyless · MT-RJ · MPO

For 12 Core Fiber Cables

Twisted Pair

Installation Time in Minutes

Traditional RJ-45 · MRJ21

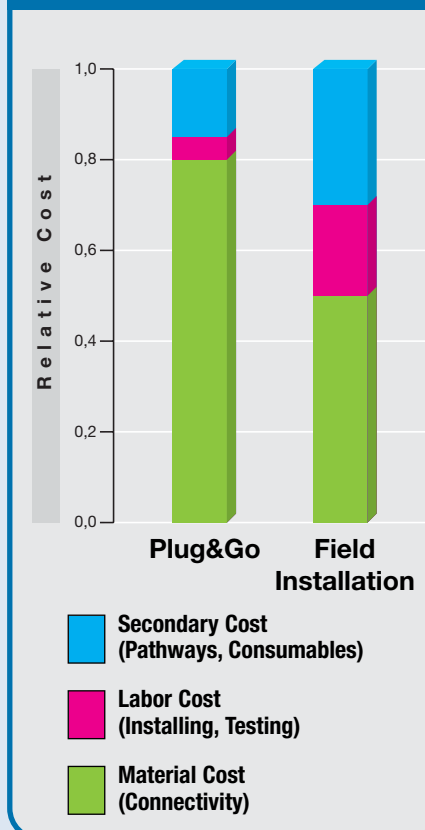**For 6 Links of 4 Twisted Pairs**

Money

Higher initial material invest is compensated by saving
- labor (installation, testing)
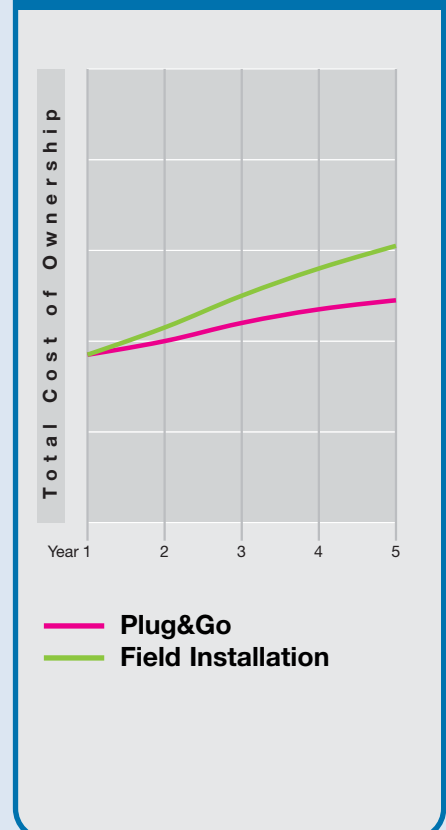- secondary cost (less/smaller pathways, no consumables, etc.)

Conclusion:
Initial invest for Plug&Go and Field Installation is neutral in cost!
Actual saving begins from day one due to easier admin & maintenance when MACs are required (easier and faster connecting/disconnecting).

Installation Cost

Relative Cost

Plug&Go · Field Installation

- Secondary Cost (Pathways, Consumables)
- Labor Cost (Installing, Testing)
- Material Cost (Connectivity)

Operation Cost

Total Cost of Ownership

Year 1 · 2 · 3 · 4 · 5

- Plug&Go
- Field Installation

Time is Money

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

48 pins plugged at once!

... 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) per 1U
- Up to 96 fibers (MPO) or 24 twisted pairs (MRJ21) per trunk cable
- More performance in less space
- Less cables save cabinet and pathway 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 a factory environment
- High precision processes
- Outstanding quality control

... cost efficient:

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

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