

## ***TX6™ 10GIG™ UTP COPPER CABLING SYSTEM***

Best-in-class performance through a synergistic combination of components

## Introducing the TX6™ 10GIG™ UTP Copper Cabling System.

***PANDUIT leading edge technology delivers a true 10 Gigabit Ethernet Copper Cabling System, not just a new cable or single connectivity component.***

***Each system component features innovative complementary design technologies, which work together to achieve optimum and balanced performance. Modular and scalable, the TX6™ 10GIG™ UTP Copper Cabling System delivers a cost effective media for high bandwidth data center, workstation and web-enabling applications of today and tomorrow.***

### ***Why 10 Gigabit Ethernet?***

With most workstations currently running on 100 BASE-T systems, it may seem unnecessary to install a structured cabling system with such high capacity. However, the world of Ethernet is constantly evolving and many organizations are looking to the benefits of 10 Gigabit Ethernet to support higher speeds across the entire network. Simply put, with its interoperability and scalability, 10 Gigabit Ethernet is an ideal solution for organizations with growing bandwidth needs.

## 10 Gigabit Ethernet Over Copper is Now a Reality

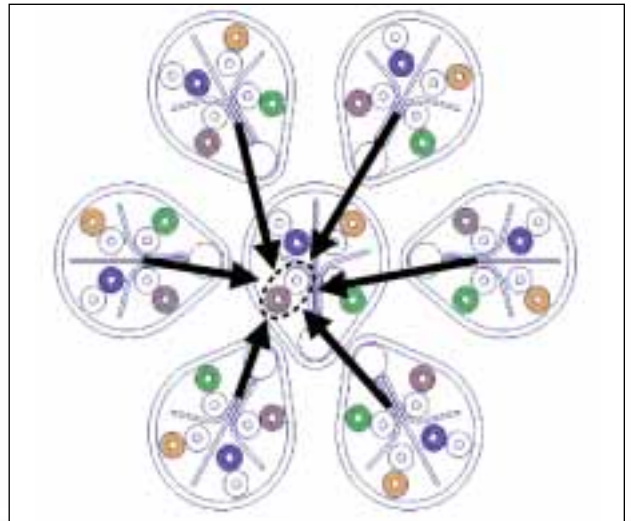
IEEE started looking at the 10 Gigabit over copper twisted pair through the 802.3an study group formed in March 2003 and the 802.3 10GBASE-T standard was ratified in June 2006. The 10GBASE-T standard defines 10Gigabit Ethernet operation over a 4-conductor 100-meter channel of augmented Category 6 copper cabling.

### Is Category 6 Good Enough?

10 Gigabit Ethernet performance has raised the bar for copper structured cabling systems. The IEEE requires Category 6 electrical channel parameters to be extended from the current 250 MHz to 500 MHz. This standard also introduces Power Sum Alien Crosstalk requirements up to 500 MHz and calls for the use of the line-encoding scheme PAM16. While the standard recognizes that Category 6 cabling systems may support 10 Gigabit Ethernet over limited distances, only augmented Category 6 copper cabling systems will be able to support 10Gb/s data rates for distances up to 100 meters.

### Achieving 10 Gigabit Ethernet

The IEEE has determined that Alien Crosstalk is the main electrical parameter limiting the performance of the structured cabling system when applied to 10 Gigabit transmission lines. Alien Crosstalk is a coupled signal in a disturbed pair arising from a signal in a neighboring cable. Today's digital signal processing (DSP) electronics are not as effective in canceling Alien Crosstalk as they are for internal channel noise. In order to support 10Gb/s data rates, a new cable must be designed to improve cable separation in bundles and new connectors must also be designed so that gains achieved by the cable improvements are not lost in the channel. A synergistic combination of components is required to support today's high bandwidth applications.



#### **Power Sum Alien Crosstalk (PSANEXT)**

is the aggregation of unwanted signal coupling of crosstalk noise at the near end from external cabling pairs into an affected pair of a cable.

# Enterprise Applications Driving The Deployment of 10 Gigabit Ethernet

Increased pressure for return on investment (ROI) and the need to compete more effectively in a global market are driving enterprise organizations to deliver new services and increase productivity. These market drivers create the need for companies to implement reliable, high-bandwidth network infrastructures. 10 Gigabit Ethernet provides customers with a cost effective solution to address the most demanding bandwidth needs in a LAN environment. Applications for this new technology will be found in data centers, high-end workstations and web-enabling applications.



## Data Center Applications

Data centers continue to emerge as strategic tools that provide growing enterprises the ability to host critical applications required in today's business environment. As the quantity and the importance of these applications continue to grow, so will the demands that are placed on the supporting cable infrastructure. As a result of this growth, many data center applications require 10 Gigabit Ethernet over copper media:

- Data back-up/disaster recovery for fast and efficient back-up or recovery of critical data
- Storage on-demand to reduce time to retrieve and scribe data between workstation and servers
- Computer cluster farms to perform high-speed transfers of data to reduce lag-time between servers
- Aggregation of data to reduce network congestion
- Switch-to-switch links for consolidation of department switches
- Network Attached Storage (NAS) and Storage Area Networks (SAN) to improve network efficiency and manageability





## *High-End Workstation Applications*

Increased computing power at the workstation is being used by many organizations looking to gain a competitive edge and to deliver new products and services. With 10 Gigabit Ethernet, network bandwidth needs are easily met to support high-end applications:

- Workgroup file transfers between client computers
- Scientific modeling file transfers between workstations (CAD drawings, 3-D images, DNA sequencing)
- High-resolution medical imagery (MRI/CT/X-Ray) file transfers
- Media rendering between workstations and work-groups for animation, special effects and broadcast editing files
- Vital business management applications such as Oracle and SAP

## *Web-Enabling/Service Oriented Applications*

The use of web-enabling services is changing the way organizations are doing business. Software engineers are continuously working on new Internet based applications requiring 10 Gigabit Ethernet to increase business productivity, build customer relationships and reduce operating costs:

- Live video/audio broadcasting over the Internet for training in schools and business campuses
- Video/audio on demand to multiple workstations
- VoIP (voice encapsulation on data network lines)
- High definition video/audio emails
- Digital video conferencing
- Telemedicine (allowing global transfer of medical information)
- Telecommuting and distance learning



# PANDUIT® TX6™ 10GIG™ UTP Copper Cabling System

## The Importance of an Integrated System Approach

All components in a 10 Gigabit Ethernet system are important. Jack modules, copper cable, patch panels and patch cords must be precisely tuned to achieve 10 Gigabit speeds. Enhancing a cable or connectivity component alone is insufficient. Starting from the ground up, PANDUIT Labs has designed a complete, integrated system for 10 Gigabit Ethernet that organizations can rely on to achieve their strategic goals. Only through the use of innovative complementary design technologies that are developed to work together as a system can true 10 Gigabit warranted performance be achieved.

### TX6™ 10GIG™ Jack Modules

**Reliability** — All TX6™ 10GIG™ Jack Modules are 100% performance tested to guarantee adherence to standards. Once passed, each module is individually serialized for traceability.

**Optimized Performance** — Through the use of patent-pending Flex Technology, PANDUIT delivers innovative connectivity to support 10 Gigabit Ethernet. Compact jack design ensures optimized network performance.

**Quick and Consistent Termination** — Patent-pending enhanced GIGA-TX™ Technology provides a termination method that optimizes performance by maintaining cable pair geometry and eliminating conductor untwist. TX6™ 10GIG™ Jack Modules snap in and out of MINI-COM® modular products (faceplates, surface mount boxes and modular patch panels – flat and angled) to support 10 Gb/s data rates when used as part of the TX6™ 10GIG™ Copper Cabling System.

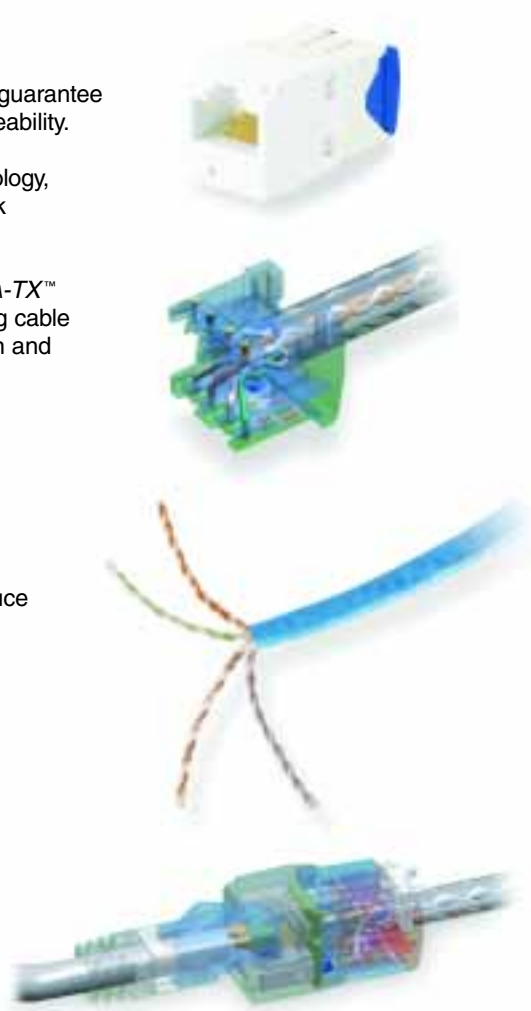
### TX6™ 10GIG™ UTP Copper Cables

**Outstanding Crosstalk Suppression** — Patent-pending cable features innovative internal construction designs, including a filler, that provides superior Power Sum Alien Crosstalk performance. The cable also uses pair separators to reduce internal near-end crosstalk and return loss to further maximize performance.

### TX6™ 10GIG™ Patch Cords

**Assured Compatibility** — TX6™ 10GIG™ Patch Cords are 100% tested to deliver optimum electrical performance. Featuring an RJ45 plug with an integral pair manager, TX6™ 10GIG™ Patch Cords provide operation in the center of the TIA/EIA component range. The integral pair manager delivers interoperability and the highest electrical performance when mated with TX6™ 10GIG™ Jack Modules.

**Robust Construction** — The RJ45 plug exceeds all applicable FCC part 68 Subpart F requirements. The RJ45 plug also contains a patented tangle free latch and a slender strain relief boot that provides easy access in high-density applications. To suppress Alien Crosstalk, the patch cord utilizes TX6™ 10GIG™ Solid Copper Cable to ensure 10 Gigabit performance.



## DP6™ 10GiG™ Patchdown Patch Panels

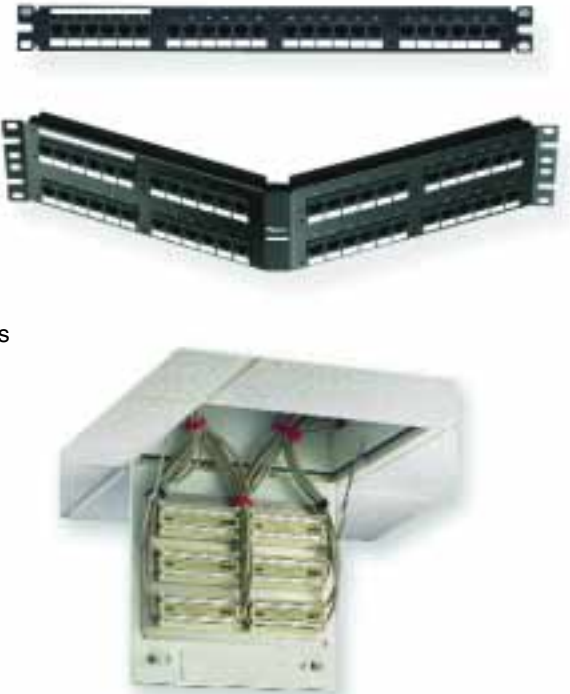
**Modularity** — DP6™ 10GiG™ Patch Panels provide complete modularity for convenient moves, adds and changes in both flat and angled versions. Configured with individual replaceable modules, DP6™ 10GiG™ Patch Panels deliver flexibility to meet a variety of applications. In addition, each port on a DP6™ 10GiG™ Patch Panel is individually serialized to support traceability.

**Secure Termination** — DP6™ 10GiG™ Patch Panels feature enhanced punchdown technology to ease installation plus a wire cap to provide added cable strain relief.

**Clear Network Identification** — DP6™ 10GiG™ Patch Panels offer flat and angled designs with write-on areas which facilitate port and panel manual identification or which guide the location of pre-printed adhesive backed labels.

## GP6™ PLUS Punchdown System

**Versatility** — The GP6™ PLUS Punchdown System is ideal for use in cross connects and consolidation point applications, featuring punchdown contacts and assembly methods. High-density kits offer 44% higher wiring capacity over a standard 110 system.



## World-Class Quality

10 Gigabit Ethernet transmissions are achieved through innovative design and precise manufacturing procedures. Ensuring world-class quality, all TX6™ 10GiG™ UTP Copper Cabling System components are designed and manufactured to strict ISO 9001 and 14001 procedures for ultimate reliability across the entire network.

- All TX6™ 10GiG™ Jack Modules undergo more than 90 individual quality checks in production and is 100% verified to meet 10 Gigabit Ethernet electrical performance specifications; each jack module is given a unique serialized quality verification number as certification of performance
- All TX6™ 10GiG™ Patch Cords are 100% performance tested to ensure compliance to stringent design specifications; each patch cord is individually identified with a performance verification number
- All TX6™ 10GiG™ UTP Copper Cables are manufactured to strict quality controls with electrical performance verified on every production run

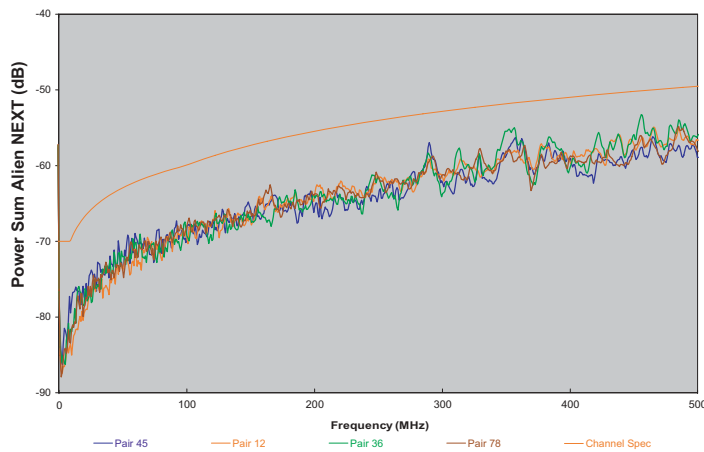
### 10 Gigabit Performance Requires a System Solution

Each component in the PANDUIT® TX6™ 10GIG™ UTP Copper Cabling System contributes to optimal channel performance. This solution supports 4-connector channel up to 100-meters and exceeds the electrical channel requirements of the 10 Gigabit IEEE Std. 802.3an, 2006, for:

- Power Sum Alien Crosstalk (PSANEXT) up to 500 MHz
- Insertion Loss, NEXT, PSNEXT, ELFEXT, and PSELFEXT up to 500 MHz
- Return Loss up to 400 MHz, with 6 dB limit above 400 MHz up to 500 MHz

In addition, the complete solution is compliant with current EIA/TIA Augmented Category 6 draft requirements. Test results based on a 4-connector channel configuration exclusively utilizing TX6™ 10GIG™ UTP Copper Cabling System components.

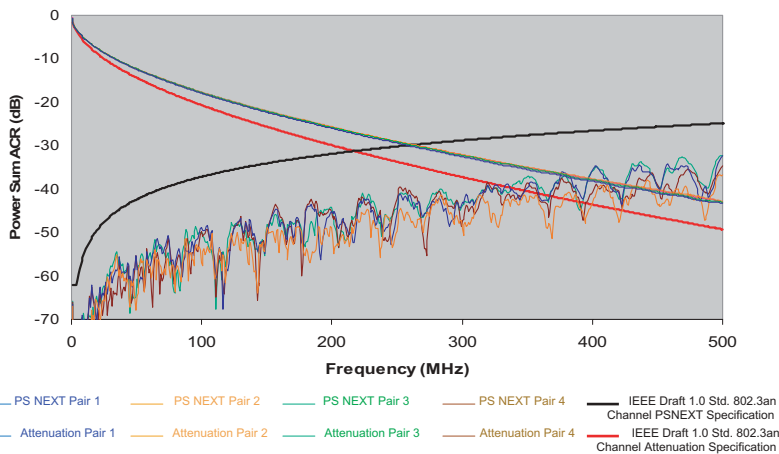
#### PSANEXT 100 Meter Channel



#### Power Sum Alien Near-End Crosstalk (PSANEXT)

is the aggregation of unwanted signal coupling of crosstalk noise at the near end from external cabling pairs into an affected pair of a cable. Today's digital signal processing (DSP) electronics that drive an Ethernet cabling system have limited capability of suppressing alien crosstalk in a 10Gb/s Ethernet environment. In order to achieve a 10Gb/s data rate, alien crosstalk must be compensated within the cable and connectors of a cabling system.

#### Power Sum ACR 100 Meter Channel

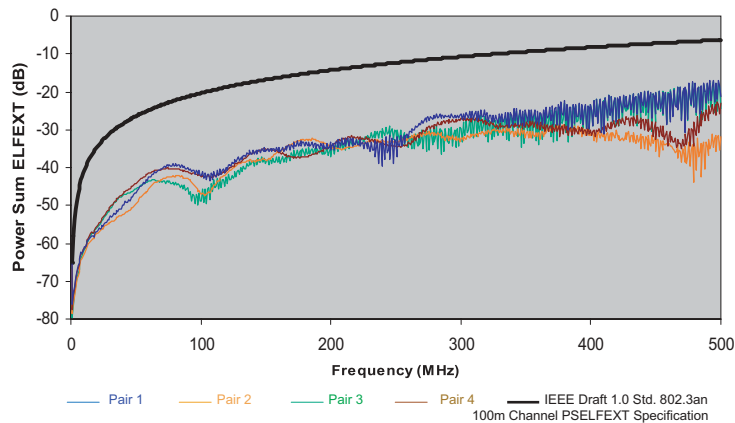


#### Power Sum ACR

is the difference between PSNEXT (total unwanted internal signal coupling from a transmitter at the near-end into a neighboring pair measured at the near-end) and attenuation (signal strength) of a cabling system.

In full-duplex environments where data is transferred in both directions at the same time, PSNEXT and attenuation are important parameters in distinguishing the signal from noise generated at the near-end. In order to achieve a 10Gb/s data rate, attenuation and PSNEXT must be "in-spec" for all frequencies up to 500 MHz.

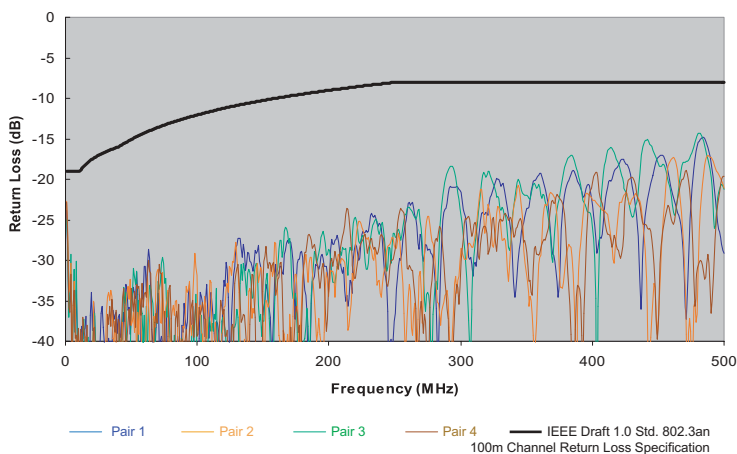
### Power Sum ELFEXT 100 Meter Channel



**Power Sum ELFEXT** is the ratio of the amount of signal coupled onto a fourth pair at the receiving end when the three other pairs are transmitted, relative to the attenuated signal strength at the receiving end of the powered signal. Simply, PSELFEXT is a measure of the total crosstalk that is seen at the receiving end of the cabling system relative to the received transmitted signal.

In full-duplex environments, PSELFEXT is an important parameter in distinguishing the signal from noise generated at the far end. In order to achieve a 10Gb/s data rate, PSELFEXT must be "in-spec" for all frequencies up to 500 MHz.

### Return Loss 100 Meter Channel



**Return Loss** is the ratio of the amount of signal that is reflected back at the transmitter relative to the original signal sent due to impedance mismatches in the cabling system. Return loss is particularly important for applications that use full duplex transmission. Reflected signals in a channel can distort the data signal from both the transmitter and receiver.

In order to achieve a 10Gb/s data rate, a copper cabling system must be able to support full duplex transmissions over all four pairs of copper cabling for all frequencies up to 500 MHz.

### End-to-End 25 Year System Warranty

The TX6™ 10GiG™ UTP Copper Cabling System is backed with a 25-year system warranty. With this warranty, customers are guaranteed performance compliance with the 10 Gigabit to IEEE Std. 802.3an – 2006. System warranty is based on a channel configuration exclusively utilizing TX6™ 10GiG™ UTP Copper Cabling System components. For warranted channel performance, registered installations are performed by PANDUIT® Certified Installers (PCI).

For more information email, [warranty@panduit.com](mailto:warranty@panduit.com).

## TX6™ 10Gig™ Jack Modules



CJ6X88TG

Part Number	Description	No. of Module Spaces	Color*	Std. Pkg. Qty.	Std. Ctn. Qty.
CJ6X88TIW	Augmented Category 6, 10Gb/s, RJ45 8 position, 8 wire universal <i>MINI-COM</i> ® module. Compatible with <i>MINI-COM</i> ® modular patch panels, faceplates and surface mount boxes.	1	Off White	1	50

\*For jack module colors other than Off White, replace IW suffix with WH (White), EI (Electric Ivory), IG (International Gray), OR (Orange), RD (Red), BU (Blue), GR (Green), YL (Yellow), BL (Black) or VL (Violet).

## TX6™ 10Gig™ UTP Copper Cable



PUR6X04

Part Number	Description	Color	Std. Pkg. Qty. (Feet)	Std. Ctn. Qty. (Feet)
PUR6X04BU-UY	Augmented Category 6, 10Gb/s Riser UTP cable. Conductors are 23 AWG construction with polyethylene insulation. Conductors lay in a low-smoke, flame-retardant PVC jacket. 1,000' of cable per reel.	Blue	1,000	18,000
PUP6X04BU-UY	Augmented Category 6, 10Gb/s Plenum UTP cable. Conductors are 23 AWG construction with FEP insulation. Conductors lay in a low-smoke, flame-retardant PVC jacket. 1,000' of cable per reel.	Blue	1,000	18,000
PUL6X04DG-UE	Augmented Category 6, 10Gb/s LSZH UTP cable. Conductors are 23 AWG construction with polyethylene insulation. Conductors lay in a low-smoke, zero-halogen jacket. 1,000' of cable per reel.	Gray	1,000	18,000

Verify compatibility with the *PANDUIT*® *MINI-COM*® Surface Mount Boxes.

## TX6™ 10Gig™ Patch Cords



UTP6X3

Part Number	Description	Color*	Length** (Feet)	Std. Pkg. Qty.	Std. Ctn. Qty.
UTP6X3Y	Augmented Category 6 10Gb/s Patch Cord with TX6™ PLUS Modular Plug on both ends.	Off White	3	1	10
UTP6X5Y			5	1	10
UTP6X7Y			7	1	10
UTP6X10Y			10	1	10
UTP6X14Y			14	1	10
UTP6X20Y			20	1	10

NOTE: All patch cords constructed of 24AWG solid copper cable.

\*For lengths 3 to 20 feet (increments of one foot) and 25, 30, 35, 40 feet change the length designation in the part number to the desired length. For standard cable colors other than Off White, add suffix BL (Black), BU (Blue), RD (Red), GR (Green), YL (Yellow), OR (Orange) or VL (Violet) before the Y at the end of the part number. For example, the part number for a blue 15 foot cord is UTP6X15BUY.

## GP6™ PLUS Punchdown System



GPKBW24

Part Number	Description	No. of Rack Spaces^	Std. Pkg. Qty.	Std. Ctn. Qty.
GPKBW24Y	96-pair (24-port) field termination kit with legs. Kit includes a base and required quantity of 4-pair connecting blocks, label holders and labels.	2	1	10
GPKBW72Y	288-pair (72-port) field termination kit with legs. Kit includes a base and required quantity of 4-pair connecting blocks, label holders and labels.	4	1	10

^One rack space = 1.75" (44.45mm).

## DP6™ 10Gig™ Modular Punchdown Patch Panels



DP246X88TGY  
DPA246X88TGY

Part Number	Description	No. of Rack Spaces <sup>^</sup>	Std. Pkg. Qty.	Std. Ctn. Qty.
DP246X88TGY	24 port Augmented Category 6, 10Gb/s patch panel with 24 RJ45 8 position, 8 wire ports.	1	1	10
DP486X88TGY	48 port Augmented Category 6, 10Gb/s patch panel with 48 RJ45 8 position, 8 wire ports.	2	1	10
DPA246X88TGY	24 port Augmented Category 6, 10Gb/s patented angled patch panel with 24 RJ45 8 position, 8 wire ports.	1	1	10
DPA486X88TGY	48 port Augmented Category 6, 10Gb/s patented angled patch panel with 48 RJ45 8 position, 8 wire ports.	2	1	10

<sup>^</sup>One rack space = 1.75" (44.45mm).

Includes #12-24 and metric M6 bonding screws to mount and ground the patch panel to the rack.

Replacement punchdown modules available in standard color (Black) — part number DRJ6X88TGBL.

## MINI-COM® Flush Mount Modular Patch Panels



CPPA24FMWBLY



CPPA48FMWBLY



CPP24FMWBLY



CPP48FMWBLY

Part Number	Description	No. of Rack Spaces <sup>^</sup>	Std. Pkg. Qty.	Std. Ctn. Qty.
CPPA24FMWBLY	Angled 24 port flush mount patch panel supplied with rear mounted faceplates.	1	1	10
CPPA48FMWBLY	Angled 48 port flush mount patch panel supplied with rear mounted faceplates.	2	1	10
CPP24FMWBLY	24 port flush mount patch panel supplied with rear mounted faceplates.	1	1	10
CPP48FMWBLY	48 port flush mount patch panel supplied with rear mounted faceplates.	2	1	10

<sup>^</sup>One rack space = 1.75" (44.45mm).

Includes #12-24 and metric M6 bonding screws to mount and ground the patch panel to the rack.

See catalog SA-NCCB34 for a complete selection of Modular Patch Panels.



1A-B01



Suggested Label Solutions for TIA/EIA-606-A Compliance				
Component	Part Number	Laser/Ink Jet Desktop Printer Label	VIPER™ LS6 Portable Printer Label	PANACEA® LS7 Hand-Held Printer Label
Jack Modules	CJ6X88TGIW Parts	C138X019FJJ	C138X019FJ6	—
UTP Copper Cable	PUR6X04BU-UY PUP6X04BU-UY PUP6X04DG-UE	S100X150YAJ	S100X150VA6	LS7-75NL-1
Patch Cords	UTP6X3Y UTP6X5Y UTP6X7Y UTP6X10Y UTP6X14Y UTP6X20Y	S100X150YAJ	S100X150VA6	LS7-75NL-1
Punchdown System	GPKBW24Y GPKBW72Y	C788X050Y1J	C788X050Y16	LS7-50-1‡
Patch Panels	DP246X88TGY DP486X88TGY DPA246X88TGY DPA486X88TGY	C379X030FJJ	C379X030FJ6	LS7-25-1
	CPPA24FMWBLY CPPA48FMWBLY CPP24FMWBLY CPP48FMWBLY	C252X030FJJ	C252X030FJ6	LS7-25-1

For complete labeling solutions and product information, reference Identification Solutions Catalog SA-IDCB16.

‡For non-adhesive labeling solution, do not remove liner from label.



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## WORLDWIDE HEADQUARTERS

For a copy of *PANDUIT* product warranties, log on to [www.panduit.com/warranty](http://www.panduit.com/warranty)