

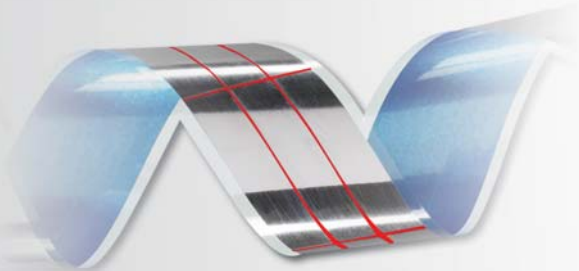
Benefits of a Small Diameter Category 6A Copper Cabling System

The Panduit TX6A-SD™ 10Gig™ UTP Copper Cabling System with MaTriX Technology is a cost effective, small diameter Category 6A UTP cabling system that is fully compliant up to 70 meters (230 feet). This high performance cabling system is comprised of unshielded twisted pair horizontal cable and patchcords which utilize 26 AWG copper conductors and patent pending MaTriX Technology to suppress alien crosstalk. MaTriX Technology in the cable, combined with the split foil MaTriX Technology and advanced connector compensation techniques in the TX6A™ 10Gig™ UTP Jack Modules result in guaranteed headroom margin well above industry standard requirements. The resulting channel performance eliminates the time and cost associated with cumbersome alien crosstalk field testing, providing an optimized alternative for deploying 10GBASE-T channel links up to 70 meters.



MaTriX Technology

The patent pending MaTriX Technology embedded in the TX6A-SD™ 10Gig™ Cabling System is constructed of discontinuous metallic elements that provide a very high degree of alien crosstalk suppression. This UTP cabling system rivals the performance of a shielded system without the need for bonding and grounding and eliminates the concern for shield current flow arising from ground potential differences.



About 26 AWG Category 6A Cabling

Most Category 6A cabling utilizes 23 AWG copper conductors in the cable. Industry standard ANSI/TIA-568-C.2 generically specifies 22 – 24 AWG horizontal cable with 26 AWG patch cable. The primary difference between smaller and larger wire gauges is signal attenuation: the attenuation of a 26 AWG cable at 70 meters is similar to that of 23 AWG cable at 100 meters, with all electrical parameters of a Category 6A component and channel requirements being met. A 26 AWG system significantly reduces the diameter of the cable (54% smaller area than allowed by industry standards) and results in a cabling system that is easier to install and manage with all electrical parameters of a Category 6A component and channel requirements being met. With less copper, the 26 AWG cabling system becomes a cost effective option, and with the MaTriX Technology it provides a high performance Category 6A cabling system.

Key Features

Benefits

Risk Mitigation	Advanced connectivity and cable design provide significant headroom margin above Category 6A and Class E _A standards, eliminating the time and cost associated with alien crosstalk field testing.
Agility and Flexibility	Scalable and modular system provides clear migration path to next generation application demands. Supports a wide range of data center architectures and applications and allows bundling and co-mingling with other copper category cables.
Reduced CapEx	<p>Maximizes real estate utilization through high-density physical infrastructure solutions combined with leading data center reference architectures. Also available in pre-terminated solutions, reducing installation time by up to 75%.</p> <p>Brownfield Installation – The small diameter allows for seamless migration from 1000BASE-T to 10GBASE-T applications through utilization of existing pathways and cable managers installed for Category 6 or 5e cabling systems.</p> <p>Greenfield Installation – Maximizes real estate utilization through high-density physical infrastructure solutions combined with leading data center reference architectures.</p>
Reduced OpEx	Improves energy efficiency through better airflow management due to smaller, effectively shaped cabling.

TX6A-SD™ 10Gig™ UTP Copper Cabling System with MaTriX Technology

Technical/Performance Info

Guaranteed Headroom Margin

The TX6A-SD™ 10Gig™ UTP Copper Cabling System is not only the smallest Category 6A UTP cabling system on the market, it is also backed by the highest guaranteed channel headroom performance in the industry.

Guaranteed Channel Headroom

Electrical Value	TIA/EIA Category 6A	ISO Class E _A
Insertion Loss	3%	3%
NEXT	3.5 dB	2.5 dB
PSNEXT	5 dB	4 dB
PSACR-F	10 dB	10 dB
Return Loss	3 dB	3 dB
PSACR-N	6.5 dB	6.5 dB
PSANEXT	2 dB	2 dB
PSAACR-F	10 dB	10 dB

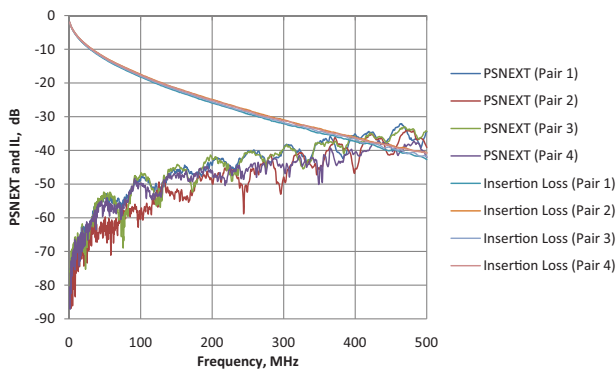
*Electrical values above are specified standards and consist of worst pair margin per ANSI/TIA-568-C.2 Category 6A and ISO 11801 Edition 2.1 Class E_A standards.

10GBASE-T Ecosystem

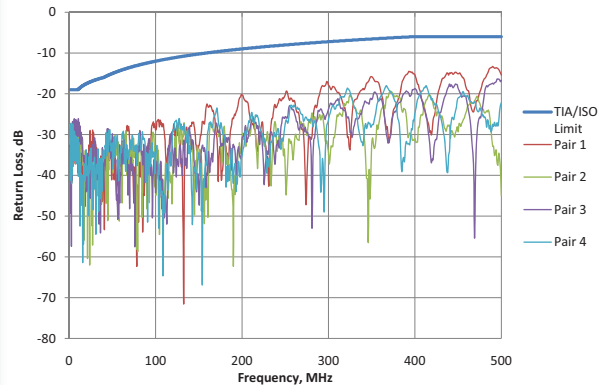


Technology leaders in their respective product systems of switching fabric, server adapters, and physical infrastructure have joined together to provide an end to end 10 Gb/s networking solution. The Cisco, Intel, Panduit 10GBASE-T ecosystem solution ensures users a cost effective high performance highly available and reliable 10Gigabit Ethernet network.

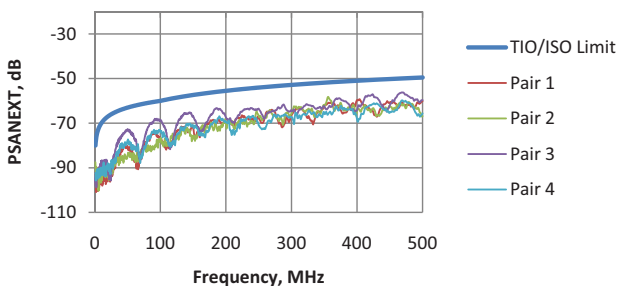
Channel PSNEXT



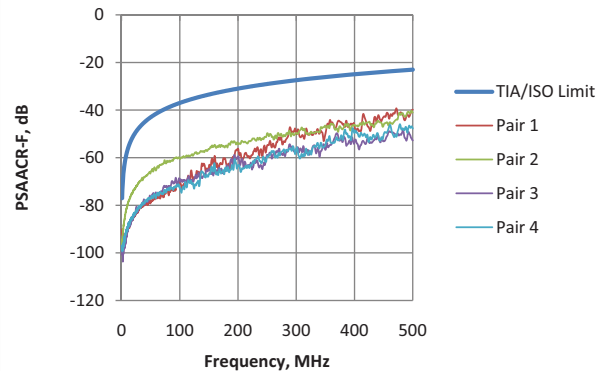
Channel Return Loss



Channel PSANEXT



Channel PSAACR-F



PoE Compliant

Each component of the TX6A-SD™ 10Gig™ UTP Copper Cabling System with MaTriX technology is compliant with IEEE 802.3af and IEEE 802.3at for PoE and PoE+ applications. The TX6A-SD™ 10Gig™ horizontal cable has been validated per TSB-184 for temperature rise in bundled cabling. This cable operates within all temperature rise limits with 25% margin.

Mini-Com® TX6A™ 10Gig™ UTP Jack Modules

- Exceed requirements of ANSI/TIA-568-C.2 Category 6A, IEEE 802.3an-2006, and ISO 11801 Class E_A channel standards
- Exceed ANSI/TIA-568-C.2 Category 6A and IEC 61156-5 Category 6A component standards
- Meet requirements of IEEE 802.af and IEEE 802.3at for PoE and PoE+ applications
- Each jack is 100% tested to ensure NEXT and RL performance and is individually serialized for traceability
- Utilize patent-pending enhanced Giga-TX™ Technology for jack terminations which optimizes performance by maintaining cable pair geometry and eliminating conductor untwist
- No punchdown tool required; termination tool (EGJT) ensures conductors are fully terminated by utilizing a smooth forward motion without impact on critical internal components for maximum reliability
- Terminate 4-pair, 22 – 26 AWG, 100 ohm, solid or stranded twisted pair cable
- Universal termination cap is color-coded for T568A and T568B wiring schemes



Part Number	Part Description
CJ6X88TG**	Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module.
CJD6X88TG**	Shuttered Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module.

**Available in standard colors IW (Off White), EI (Electric Ivory), WH (White), AW (Arctic White), IG (International Gray), BL (Black), BU (Blue), RD (Red), YL (Yellow), GR (Green), OR (Orange) and VL (Violet).

Mini-Com® High Density Modular Patch Panels

- Accept Mini-Com® Jack Modules, which snap in and out for easy moves, adds, and changes
- Conserve valuable rack space
- Pre-printed numbers above each port for easy identification
- Mount to standard EIA 19" racks or 23" racks with optional extender brackets
- Angled patch panels facilitate proper bend radius control and minimize the need for horizontal cable managers

Part Number	Part Description	Std. Pkg. Qty.
Angled High Density Modular Patch Panels		
CPPA48HDWBLY	48-port angled high density patch panel supplied with rear mounted faceplates.	1
CPPA72FMWBLY	72-port angled high density flush mount patch panel supplied with rear mounted faceplates.	2
CPPA48HDEWBL	48-port high density angled patch panel with enhanced labeling features and compatibility with Panduit hand-held printers.	1
CPPA48HDVNSWBL	48-port high density angled patch panel with vertical numbering sequence from top to bottom across panel.	1
Flat High Density Modular Patch Panels		
CPP48HDWBLY	48-port high density patch panel supplied with rear mounted faceplates.	1
CPP72FMWBLY	72-port high density flush mount patch panel supplied with rear mounted faceplates.	2
CPP48HDEWBL	48-port high density patch panel with enhanced labeling features and compatibility with Panduit hand-held printers.	1
CPP48HDVNSWBL	48-port high density patch panel with vertical numbering sequence from top to bottom across panel.	1



CPPA48HDWBLY

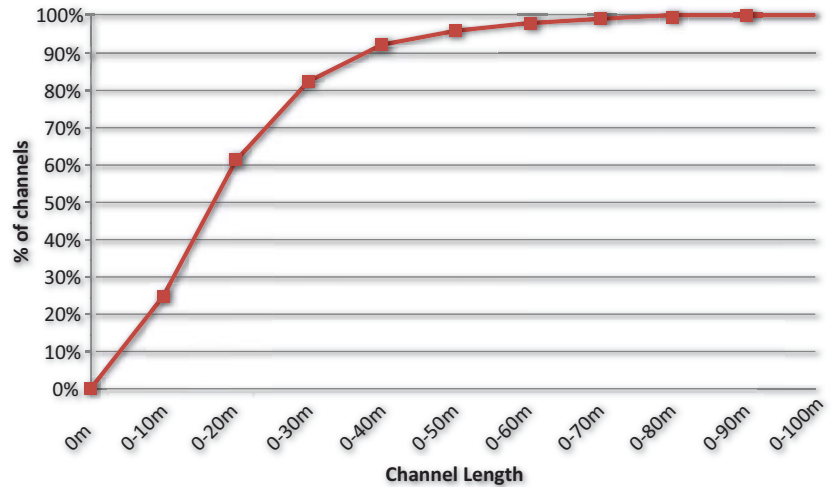


CPP48HDWBLY

Why 70 meters?

Panduit developed the TX6A-SD™ 10Gig™ UTP Copper Cabling System with MaTriX Technology to address customer Category 6A pain points such as cable size, performance, and cost. Panduit Labs' extensive knowledge of Data Center architectures determined that 98% of all channels in data centers are less than 70 meters with 95% less than 50 meters. This research and product development resulted in a cost effective small diameter cabling solution that will meet 98% of data center installations.

Data Center Copper Channel Lengths



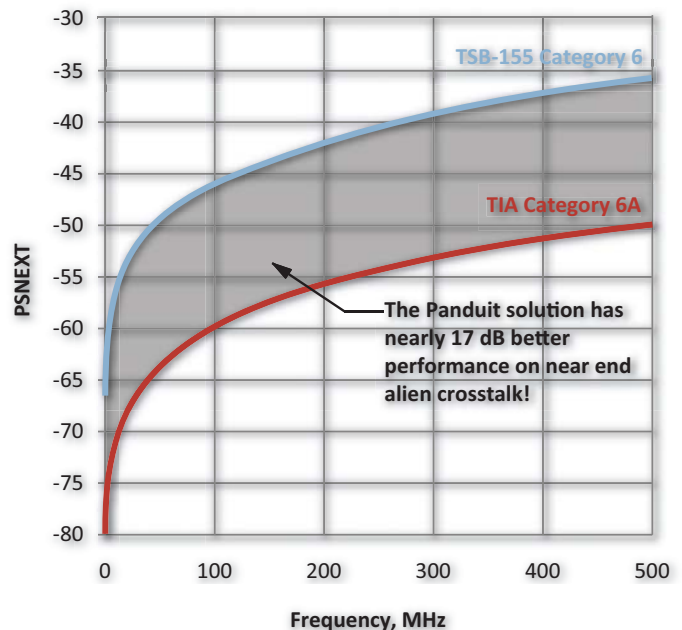
Can TX6A-SD™ 10Gig™ UTP Patch Cords be used in a channel with TX6A™ 10Gig™ 23 AWG UTP Copper Cable with MaTriX Technology?

Yes, small diameter TX6A™ 10Gig™ Patch Cords are a very appealing option as they greatly improve manageability when connecting 48- or 32-port high density switches. Up to 10 meters of TX6A-SD™ smaller diameter patch cords can be incorporated with existing Panduit TX6A™ 10Gig™ 23 AWG horizontal cable, without having to de-rate the channel length. If a total of more than 10m (33 ft.) of patch cords are installed, the maximum channel length should be de-rated by 50% for the amount greater than 10m. For example, if 15m (49 ft.) of patch cords are installed, the maximum channel length would be derated by 2.5m (8.2 ft.) to 97.5m maximum (i.e., 5m x 50%, subtracted from 100 meters).

Comparing Panduit TX6A-SD™ 10Gig™ UTP Copper Cabling System to TSB-155 Only Compliant Solutions

Beware of smaller diameter cable or Category 6 cabling systems which claim 10GBASE-T compliance, yet only meet TSB-155 guidelines. These are minimally compliant solutions and do not provide any guaranteed headroom margin for installation variations. These systems provide no margin on the critical parameter of alien crosstalk and cannot be fully certified for 10GBASE-T performance unless time-consuming and expensive testing for alien crosstalk is carried out in the field. In addition, insertion loss, NEXT and PSANEXT have lower internal performance requirements in TSB-155 as compared to TIA Category 6A. The solutions may be prone to field mitigation techniques such as unbundling cables or using non-adjacent ports to ensure 10 Gb/s performance. The TX6A-SD™ 10Gig™ UTP Copper Cabling System is a Category 6A system that exceeds ANSI/TIA-568-C.2 and ISO 11801 Class E_x internal and alien crosstalk parameters up to 70 meters. It should not be confused with other Category 6/6e small diameter cables that claim 10GBASE-T performance, but only meet TSB-155 guidelines.

PSANEXT Standard Line Comparison 60m channels



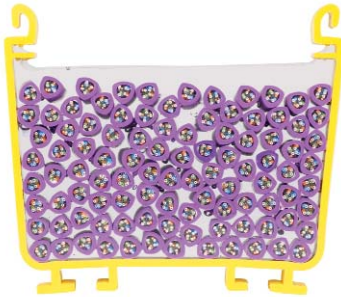
Panduit TX6A-SD™ 10Gig™ UTP Copper Cable alien crosstalk specifications versus TSB-155 compliant small diameter solutions.

Cable Construction

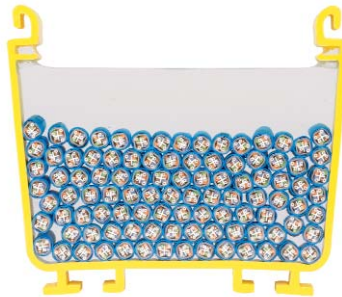
Panduit TX6A-SD™ 10Gig™ UTP Copper Cable allows more than twice the number of cables in a cable tray compared to industry's maximum cable diameter.



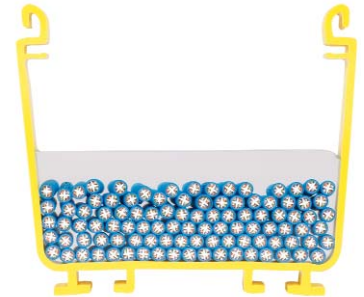
Each cable fill example represents 100 cables installed in a pathway. The visual comparison clearly identifies the capacity improvement Panduit TX6A-SD™ 10Gig™ UTP Copper Cable provides above other industry standard Category 6A UTP Copper Cables.



Industry standard Category 6A UTP copper cable advertised overall cable diameter is 0.335 in. (8.5mm), which is still less than the industry guideline of 0.354 in. (9.0mm).

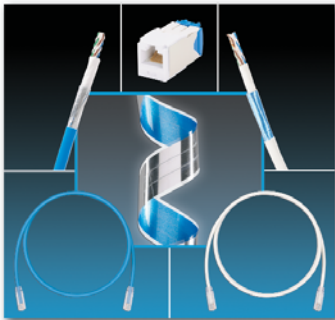


Panduit® TX6A™ 10Gig™ UTP Copper Cable improves pathway capacity up to 30% compared to industry standard cable diameter guidelines.



Panduit® TX6A-SD™ 10Gig™ UTP Copper Cable improves pathway capacity up to 115% compared to industry standard cable diameter guidelines with a 0.240 in. (6.1mm) cable diameter. It is even smaller than most industry Category 6 cables.

Panduit Category 6A UTP Cabling Options



	TX6A-SD™ 10Gig™ UTP Copper Cabling System (Small Diameter Category 6A, 70m solution)	TX6A™ 10Gig™ UTP Copper Cabling System (Category 6A, 100m solution)
Where is it used?	Optimized for Data Center and Enterprise environments with channels up to 70m	Data Center and Enterprise environments with channels up to 100m
Cable Diameter	0.240" (6.1mm)	0.300" (7.6mm)
Patch Cable Diameter	0.240" (6.1mm)	0.280" (7.1mm)
10GBASE-T Reach	230' (70m)	328' (100m)
1000BASE-T Reach	230' (70m)	328' (100m)
Category 6A/10GBASE-T Headroom	Significant	Significant
PoE/PoE+	Compliant	Compliant

Improved Cable Fill Capacity



Cable Pathway	Maximum Industry Standard Category 6A Cable 0.354 In. (9mm)	Typical Industry Category 6A Cable 0.300 In. (7.6mm)	Panduit TX6A-SD™ 10Gig™ UTP Copper Cable 0.240 In. (6.1mm)
	40% Fill	40% Fill	40% Fill
1.0 in. (25.4mm) Conduit	3	4	7
3.0 in. (76.2mm) Conduit	29	40	63
6.0 in. (152.4mm) Conduit	118	160	250
12 in. x 6 in. (304.8mm x 152.4mm) Tray	299	407	637

TX6A-SD™ 10Gig™ UTP Copper Cabling System with MaTriX Technology

TX6A-SD™ 10Gig™ UTP Copper Cable

- Exceeds electrical and alien crosstalk requirements of ANSI/TIA-568-C.2 Category 6A, IEEE 802.3an-2006, and ISO 11801 Class E_A channel standards up to 70 meters (229 feet)
- Meets requirements of IEEE 802.3af and 802.3at for PoE applications
- Cable diameter 0.240 in. (6.1mm) nominal
- Operating temperature range: -4°F to 167°F (-20°C to 75°C)



Part Number	Part Description	Flame Rating
PUP6ASD04*-UG	Category 6A, plenum (CMP), 4-pair, UTP copper cable. Copper conductors are 26 AWG with FEP insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by a patent-pending matrix tape, and protected by a flame-retardant PVC jacket.	CMP
PUR6ASD04*-CG ¹	Category 6A, riser (CMR), 4-pair, UTP copper cable. Copper conductors are 26 AWG with flame retardant PVC insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by a patent-pending matrix tape, and protected by a low smoke, flame-retardant PVC jacket.	CMR
PUC6ASD04+-EG	Category 6A, (CM), 4-pair, UTP copper cable. Copper conductors are 26 AWG. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by a patent-pending matrix tape, and protected by a flame-retardant PVC jacket.	CM
PUL6ASD04+-EG	Category 6A, low smoke zero halogen (LSZH), 4-pair, UTP copper cable. Copper conductors are 26 AWG with HDPE insulation. Conductors are twisted in pairs, separated by an integrated pair divider, surrounded by a patent-pending matrix tape, and protected by a LSZH flame-retardant PVC jacket.	LSZH

*Available in standard colors BU (Blue), WH (White), IG (International Gray) or YL (Yellow).

¹Substitute PUR6ASD04*-UG for alternative manufacturing location.

+Available in standard colors BU (Blue) or WH (White).

TX6A-SD™ 10Gig™ UTP Patch Cords

- Exceed requirements of ANSI/TIA-568-C.2 Category 6A, IEEE 802.3an-2006, and ISO 11801 Class E_A channel standards
- Meet requirements of IEEE 802.af and IEEE 802.3at for PoE and PoE+ applications
- MaTriX Technology provides superior suppression of both PSANEXT and PSAACR-F and improves the installation flexibility by allowing cable combing in existing pathways without compromising performance
- Each patch cord is 100% performance tested and wired to T568B
- Plug uses an integral pair manager to optimize performance and consistency by reducing untwisting of conductors within the plug
- Labels on patch cords provide identification of performance level, length, and quality control number
- Patented tangle-free latch prevents snags and provides easy release, saving time on frequent moves, adds, and changes
- Optional patch cord color bands snap on and off individual patch cables offering a variety of color-coding options
- Optional RJ45 plug lock-in device blocks unauthorized removal of cable, IP phone, other networking equipment or critical connection



Part Number	Part Description	Flame Rating
UTP6ASD [^]	Category 6A (SD), 10 Gb/s UTP patch cord with TX6A™ 10Gig™ Modular Plugs on each end.	CM
UTP6ASDL ^{^^}		LSZH

[^]For lengths 3 to 20 feet (one foot increments) and 25, 30, 35, 40 feet add desired length. For standard cable colors other than Off White, add suffix BL (Black), BU (Blue), RD (Red), YL (Yellow), GR (Green) OR (Orange) or VL (Violet) to end of part number. For example, the part number for a blue, 5 foot, CM patch cord is UTP6ASD5BU.

^{^^}For lengths 3 to 20 feet (one foot increments) and 25, 30, 35, 40 feet add desired length. For meter lengths 1, 2, 2.5, 3 or 5, add desired length and M to part number. For standard cable colors other than Off White, add suffix BL (Black), BU (Blue), RD (Red), YL (Yellow), GR (Green) OR (Orange) or VL (Violet) to end of part number. For example, the part number for a blue, 5 meter, LSZH patch cord is UTP6ASDL5MBU.

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Printed in the U.S.A.
Product Bulletin Number **COCB07--SA-ENG**
Replaces SA-COCB32
12/2012

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Replaces SA-COCB32
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