TX6A™ 10Gig™ UTP COPPER CABLING SYSTEM STANDARD COMPLIANT CATEGORY 6A CABLE INSTALLATION GUIDELINES PN576

The standard compliant TX6A™ 10Gig™ UTP Copper Cabling System is to be installed in accordance to the cable management requirements set forth in ANSI/TIA-568-C.2 (*Commercial Building Telecommunications Cabling Standard*) and in ANSI/TIA-569-C (*Commercial Building Standard for Telecommunications Pathways and Spaces*). To aid compliant installation, guidelines for Panduit standard compliant TX6A™ 10Gig™ UTP Copper Cabling System are provided below.

Pathways and Spacing Management

- Pathways should be located to minimize occupant disruption and allow for easy moves, adds, and changes.
- For initial installation, the maximum fill capacity for pathways (i.e. conduit, raceways, trays, baskets) is 40 percent.

$$\text{Number cables} = \frac{\text{Pathway Internal Area}}{\text{Cable Area}} \times 40\%$$

TX6A™ 10Gig™		Cable Area	
Flame Rating	**P/N**	**inches²**	**mm²**
Plenum	PUP6XC04**	0.083	54
Riser	PUR6XC04**	0.091	58
LSZH	PUL6XC04**	0.083	54
CM/PVC	PUC6XC04**	0.083	54

- The maximum fill capacity of 60 percent is allowed to accommodate future additions after initial installation.
- Proper cable bend radius control must be maintained throughout the pathways. The bend radius needs to be four (4) times the cable diameter.

TX6A™ 10Gig™		Bend Radius	
Flame Rating	**P/N**	**inches**	**mm**
Plenum	PUP6XC04**	1.30	33
Riser	PUR6XC04**	1.36	34
LSZH	PUL6XC04**	1.30	33
CM/PVC	PUC6XC04**	1.30	33

Pathways and Spacing Management

- For data center applications, it is recommended to use Panduit® FiberRunner™ or GridRunner™ Underfloor Cable Routing Systems for cable raceway management. The fittings provide minimum 1.5-inch bend radius to protect against signal loss due to excessive cable bends.

- Pathways should be designed to allow for future expansion (minimum two cables per work area, with pathways supporting three cables per work area). Therefore when designing a pathway, the pathway needs to accommodate 150% of the initial cable installation. For example, if the initial design requires 2 cables each for ten work areas, the pathway shall be designed to accommodate 30 cables.

- Conduit should be run in the most direct route possible with no more than two 90 degree bends between pull boxes and serve no more than three outlet boxes. Conduit bends should be at least six times the conduit diameter.

- Cable trays are to be installed per manufacturing guidelines and loading capacities must be considered during cabling installation.

- Cable trays used in the ceiling should allow for at least 12 inches (305 mm) of clearance above the tray. Cable trays used in the floor should allow for at least 2 inches (51 mm) of clearance between the top part of the tray and the bottom of the floor tile.

- J-Mod® or J-Pro® Cable Support System should be located at 5 foot intervals maximum and have at least 3 inches (76 mm) of clearance above suspended ceilings.

- Please reference Panduit website for J-Mod® or J-Pro® Cabling Support System fill capacity information for various sizes available.

Cable Separation Management

- TX6A™ 10Gig™ UTP Copper Cables do not have any specific limitations with sharing pathways with other category copper cables throughout the whole cable run.

- Separation and physical barriers between TX6A™ 10Gig™ UTP Copper Cable and power cables must be maintained within raceways. If TX6A™ 10Gig™ UTP Copper Cable and power cables need to cross install perpendicular to each other. Please reference the National Electric Code for local installation guidelines.

- The maximum channel distance for the TX6A™ 10Gig™ UTP Copper Cabling System in the backbone and/or horizontal is 328 feet (100 meters). The total length of equipment cords, patch cords and work area cords shall not exceed 33 feet (10 meters).

- The maximum permanent link distance for the TX6A™ 10Gig™ UTP Copper Cabling System in the backbone and/or horizontal is 295 feet (90 meters).

- Please reference Appendix B for Panduit Recommended Standard Compliant Cat 6A Cable Channel Configurations with no restrictions (including HD applications).

Cable Pulling & Installation Management

- The maximum pulling tension is not to exceed 25 lbf. Cable installation should not in any way deform the cable jacket.
- The cable should not come in contact with any water or chemicals (ex. paint, lubricants), or be exposed to any high humidity during or after installation.
- Avoid any cable kinks and maintain proper bend radius control during cabling pulling. If any kinks should occur, kinked cable should be removed and replaced.
- Tak-Ty® Hook & Loop Cable Ties, Contour-Ty® Cable Ties, Belt-Ty™ In-Line Cable Ties or Pan-Ty® Cable Ties should be applied loosely and at random intervals to cable bundles to avoid any pinching or crushing of the cable jackets.
- For aesthetics and ease of bundling, the Cable Bundling and Organizing Tool (i.e. P/N CBOT24K) is recommended.

Cable Management in the Telecommunication Room

- Organize and manage cables for quick and easy moves, adds and changes
- Termination procedures at the patch panel include:
  - Feed cables from both sides of the panel
  - Maintain acceptable bend radius levels
  - Do not kink cables
  - Do not cinch cable ties so tightly as to deform the cable in any way
  - To enhance wire management in the back of the panel, it is recommended that a strain relief bar (i.e. P/N SRBM19BLY) be mounted to the rack. The strain relief bar includes Tak-Ty® Hook & Loop Cable Ties for additional cable management.
- Termination procedures for the DP6A™ 10Gig™ Punchdown Patch Panel include:
  - Follow installation instruction sheet PN379.
  - Outer cable jacket should be as close as possible to point of termination
  - Last twist should be no further than 0.5 inches from the point of termination.

Cable Management in the Work Area

- For surface raceway applications, the Pan-Way® TG Surface Raceway System is the optimal solution in the work area for routing TX6A™ 10Gig™ Copper Cables. The TG Raceway system provides adequate space to maintain proper cable bend radius control.
- Allow for at least one outlet per work area with a minimum of two cable terminations.
- Pathways should be designed to allow for future expansion. For example, work areas with two cables must be served by pathways that can accommodate a minimum of three cables.

- Allow for at least 12 inches (305 mm) of slack at the work area. Pull slack up into the ceiling or back into the raceway and store it there, where it can later be pulled into the box if re-termination is necessary.

- Terminate Mini-Com® TX6A™ 10Gig™ UTP Jack Modules per installation instruction sheet PN511.

- To improve bend radius control of TX6A™ 10Gig™ Copper Cable in junction boxes, it is recommended that Panduit sloped faceplates (i.e. P/N UICFPSE2**) be used in the work area.

- With Panduit sloped faceplates, the following junction boxes can be used with TX6A™ 10Gig™ UTP Copper Cable (i.e. P/N JBX3510**-A, JB1**-A, JBP1**-A, JBP1I**-A, JB1FS**-A, JBP2**-A, JB1D**-A, JBP1D**-A, JBP2D**-A).

- With Panduit® flush faceplates, the following junction boxes can be used with TX6A™ 10Gig™ UTP Copper Cable (i.e. P/N JB1D**-A, JBP1D**-A, JBP2D**-A).

Reference Documents

ANSI/TIA-568-C (*Commercial Building Telecommunications Cabling Standard*)

ANSI/TIA-569-C (*Commercial Building Standard for Telecommunications Pathways and Spaces*)

DP6™ 10Gig™ Patch Panel installation instruction sheet PN379

Mini-Com® TX6A™ 10Gig™ UTP Jack Modules installation instruction sheet PN511

TX6A™ or TX6A-SD™ 10Gig™ UTP Copper Cabling Systems with MaTriX Technology Installation Guidelines PN390

Appendix A
Panduit® Standard Compliant TX6A™ 10Gig™ UTP Copper Cabling System
Conduit Fill Capacity Table

Standard Compliant TX6A™ 10Gig™ UTP Copper Cable (PUP6XC04, PUL6XC04, PUC6X04)										
Conduit Trade Size Inches (mm)		Internal Conduit Area						Cable Area		Max. No. Cables Using 40% Fill Rate
		Internal Diameter		Area-.79D^2 Total 100%		Area 40% Fill				
		inches	mm	inches^2	mm^2	inches^2	mm^2	inches^2	mm^2	
3/4	(21)	0.82	20.9	0.53	345	0.21	138	0.083	54	3
1	(27)	1.05	26.6	0.87	559	0.35	224	0.083	54	4
1	(35)	1.38	35.1	1.50	973	0.60	389	0.083	54	7
1	(41)	1.61	40.9	2.05	1322	0.82	529	0.083	54	10
2	(53)	2.07	52.5	3.39	2177	1.35	871	0.083	54	16
2-1/2	(63)	2.47	62.7	4.82	3106	1.93	1242	0.083	54	23
3	(78)	3.07	77.9	7.45	4794	2.98	1918	0.083	54	36
3-1/2	(91)	3.55	90.1	9.96	6413	3.98	2565	0.083	54	48
4	(103)	4.03	102.3	12.83	8268	5.13	3307	0.083	54	61
5	(129)	5.05	128.2	20.15	12984	8.06	5194	0.083	54	96
6	(155)	6.07	154.1	29.11	18760	11.64	7504	0.083	54	139

Standard Compliant TX6A™ 10Gig™ UTP Copper Cable (PUR6XC04)										
Conduit Trade Size Inches (mm)		Internal Conduit Area						Cable Area		Max. No. Cables Using 40% Fill Rate
		Internal Diameter		Area-.79D^2 Total 100%		Area 40% Fill				
		inches	mm	inches^2	mm^2	inches^2	mm^2	inches^2	mm^2	
3/4	(21)	0.82	20.9	0.53	345	0.21	138	0.083	58	2
1	(27)	1.05	26.6	0.87	559	0.35	224	0.083	58	4
1	(35)	1.38	35.1	1.50	973	0.60	389	0.083	58	7
1	(41)	1.61	40.9	2.05	1322	0.82	529	0.083	58	9
2	(53)	2.07	52.5	3.39	2177	1.35	871	0.083	58	15
2-1/2	(63)	2.47	62.7	4.82	3106	1.93	1242	0.083	58	21
3	(78)	3.07	77.9	7.45	4794	2.98	1918	0.083	58	33
3-1/2	(91)	3.55	90.1	9.96	6413	3.98	2565	0.083	58	44
4	(103)	4.03	102.3	12.83	8268	5.13	3307	0.083	58	57
5	(129)	5.05	128.2	20.15	12984	8.06	5194	0.083	58	90
6	(155)	6.07	154.1	29.11	18760	11.64	7504	0.083	58	129

Appendix B

Panduit® Recommended Category 6A Channel Configurations with Minimum Patch Cord and Cable Lengths

(PUP6XC04, PUR6XC04, PUC6XC04, PUL6XC04)

Panduit Recommended Standard Compliant Cat 6A Cable Channel Configurations with no restrictions (including HD applications)				
Description	Number of Connectors in Channel			
	4	4	3	2
Work area cord	5	3	2	2
Telecommunication outlet / Connector	P	P	P	P
Consolidation point cabling	5	5		
Consolidation point connector	P	P		
Horizontal cabling	85	15	15	15
Horizontal cross-connect or Interconnect	P	P	P	P
Patch Cord or jumper cable	2	3	2	2
Horizontal cross-connect or Interconnect	P	P	P	
Telecommunications room equipment cord	3	4	3	
Total Channel Length	100	30	22	19

Lengths are in meters. P=Connector Present