

Standards of Installation
for
Network Cabling
at the
University of Texas at Arlington
Arlington, Texas



OIT Campus Network Services

Standards as of 2/20/09

Revision – 23.1

(changes for revisions will be highlighted in yellow)

This Page Intentionally
Left Blank



List of Effective Pages

Item/Description	Page Number	Effective Date	Revision Number
Title Page	n/a	2/20/09	23.1
ILB (Intentionally Left Blank)	n/a	2/20/09	23.1
LEP (List of Effective Pages)	i	2/20/09	23.1
LEP	ii	2/20/09	23.1
TOC (Table of Contents)	iii	2/20/09	23.1
TOC	iv	2/20/09	23.1
TOC	v	2/20/09	23.1
TOC	vi	2/20/09	23.1
List of Diagrams, Figures, Tables, and Photos	vii	2/20/09	23.1
List of Diagrams, Figures, Tables, and Photos	viii	2/20/09	23.1
Chapter 1	1-1	10/1/07	23
Chapter 1	1-2	10/1/07	23
Chapter 1	1-3	10/1/07	23
Chapter 1	1-4	10/1/07	23
Chapter 1	1-5	10/1/07	23
Chapter 1	1-6	10/1/07	23
Chapter 1	1-7	10/1/07	23
Chapter 1	1-8	10/1/07	23
Chapter 1	1-9	10/1/07	23
Chapter 1	1-10	10/1/07	23
Chapter 1	1-11	10/1/07	23
Chapter 1	1-12	10/1/07	23
Chapter 1	1-13	10/1/07	23
Chapter 1	1-14	10/1/07	23
Chapter 1	1-15	10/1/07	23
Chapter 1	1-16	10/1/07	23
Chapter 1	1-17	10/1/07	23
Chapter 1	1-18	10/1/07	23
Chapter 1	1-19	10/1/07	23
ILB	1-20	10/1/07	23
Chapter 2	2-1	2/20/09	23.1
Chapter 2	2-2	2/20/09	23.1
Chapter 2	2-3	2/20/09	23.1
Chapter 2	2-4	2/20/09	23.1
Chapter 2	2-5	2/20/09	23.1
Chapter 2	2-6	2/20/09	23.1
Chapter 2	2-7	2/20/09	23.1
Chapter 2	2-8	2/20/09	23.1
Chapter 2	2-9	2/20/09	23.1

Standards of Installation for Network Cabling at UTA



List of Effective Pages

Item/Description	Page Number	Effective Date	Revision Number
Chapter 2	2-10	2/20/09	23.1
Chapter 2	2-11	2/20/09	23.1
Chapter 2	2-12	2/20/09	23.1
Chapter 2	2-13	2/20/09	23.1
Chapter 2	2-14	2/20/09	23.1
Chapter 2	2-15	2/20/09	23.1
ILB	2-16	2/20/09	23.1
Chapter 3	3-1	10/1/07	23
Chapter 3	3-2	10/1/07	23
Chapter 3	3-3	10/1/07	23
Chapter 3	3-4	10/1/07	23
Chapter 3	3-5	10/1/07	23
Chapter 3	3-6	10/1/07	23
Chapter 3	3-7	10/1/07	23
Chapter 3	3-8	10/1/07	23
Chapter 3	3-9	10/1/07	23
Chapter 3	3-10	10/1/07	23
Chapter 4	4-1	10/1/07	23
Chapter 4	4-2	10/1/07	23
Chapter 4	4-3	10/1/07	23
Chapter 4	4-4	10/1/07	23
Chapter 5	5-1	10/1/07	23
Chapter 5	5-2	10/1/07	23
Chapter 5	5-3	10/1/07	23
Chapter 5	5-4	10/1/07	23
Chapter 5	5-5	10/1/07	23
Chapter 5	5-6	10/1/07	23
Chapter 5	5-7	10/1/07	23
Chapter 5	5-8	10/1/07	23
Chapter 6	6-1	10/1/07	23
Chapter 6	6-2	10/1/07	23
Chapter 6	6-3	10/1/07	23
ILB	6-4	10/1/07	23
Appendix A	A-1	10/1/07	23
Appendix A	A-2	10/1/07	23
Appendix A	A-3	10/1/07	23
Appendix A	A-4	10/1/07	23
Appendix A	A-5	10/1/07	23
Appendix A	A-6	10/1/07	23

Table of Contents

List of Effective Pages Page i-ii

Table of Contents Page iii-vi

List of Diagrams Figures, Tables, and Photos Page vii-viii

Chapter 1 - General Specifications & Material.....Page 1-1

1. General Network Drop Requirements.....Page 1-1

- A. Number of Drops per Room Page 1-1
- B. Network Data Cable Page 1-2
- C. Telephone Cable Page 1-2
- D. Telephone Trunk Cables Page 1-3

2. General Telecommunication Equipment Room Overview.....Page 1-3

- A. Size Requirements Page 1-3
- B. Location..... Page 1-3
- C. Unacceptable Locations Page 1-4
- D. Environmental Factors Page 1-5
- E. Other Uses Page 1-5
- F. Power Page 1-5
- G. Fire Protection Page 1-5
- H. Grounding Page 1-5
- I. Pathways..... Page 1-5

3. Telecommunication Equipment Room RequirementsPage 1-7

- A. Room Design and Requirements Page 1-7
- B. Cat 5e Termination..... Page 1-7
- C. Cat 6 Termination..... Page 1-8
- D. UTP Patch Panels/Wall Brackets Page 1-8
- E. Patch Panel Jack Labels Page 1-8
- F. Equipment Racks Page 1-9
- G. 66 - Block Telephone Termination Page 1-10
- H. Wire Management..... Page 1-15
- I. Transition Between Floors..... Page 1-17
- J. Patch Cord Colors in Telecommunication Rooms..... Page 1-18
- K. Patch Cord Specifications and Pin-Outs Page 1-18



Chapter 2 - Copper Cabling Installation ProceduresPage 2-1

1. Network Data - Horizontal Cable	Page 2-1
A. Cable Trauma	Page 2-1
B. Cat 5e/6 Cable Installation Specifications	Page 2-2
C. Cable Pathways	Page 2-2
2. Vertical Wall Drops.....	Page 2-6
A. Concealed (in-wall) or Flush Mounted.....	Page 2-6
B. Exposed or Surface Mounted	Page 2-6
C. Copper Terminations.....	Page 2-8
1) RJ-45 Type.....	Page 2-8
2) Jack Colors.....	Page 2-8
3. Work Area Outlet (WAO) – Office/Classroom	Page 2-9
A. New Installations	Page 2-9
B. In-Wall / Concealed	Page 2-10
C. Outside Wall / Exposed (Possible Solutions for Exposed Panduit Installations).....	Page 2-11
D. Faceplate Labels.....	Page 2-12
E. Zone Cabling.....	Page 2-13
F. Floor Boxes	Page 2-14
G. Modular Furniture Connector Installation	Page 2-15
4. Testing and Documentation	Page 2-15

Chapter 3 - Fiber Optic Cable RequirementsPage 3-1

1. Fiber Optic Cable Construction	Page 3-1
A. Fiber Optic Outside Plant Cable	Page 3-1
B. Exclusions: Fiber Optic Cable Specifications not allowed at UTA.	Page 3-1
C. Indoor Fiber Optic Cable	Page 3-2
D. Standard Fiber Optic Cable Strand Counts	Page 3-2
2. Fiber Optic Cable Wall Mount Enclosures	Page 3-2
3. Fiber Optic Cable Rack Mount Enclosures	Page 3-3
4. Fiber Optic Cable Slack Enclosures	Page 3-3
5. Fiber Optic Cable Splices and Splice Enclosures.....	Page 3-4
A. Fiber Optic Cable Splices.....	Page 3-4
B. Fiber Optic Cable Splice Enclosures.....	Page 3-4



6.	Fiber Optic Cable Connectors	Page 3-4
7.	Fiber Optic Cable - Terminating Connectors	Page 3-4
8.	Fiber Optic Cable - Labeling	Page 3-5
9.	Fiber Optic Cable – Testing and Documentation.....	Page 3-5
A.	Fiber Optic Cable - System Loss Budget Calculation.....	Page 3-6
10.	Fiber Optic Cable - Splicing Procedures.....	Page 3-7
A.	Fiber Optic Cable - Outside Plant Splice Enclosures	Page 3-7
B.	Fiber Optic Cable - Testing and Required Documentation for Splices	Page 3-7
11.	Fiber Optic Cable - Outside Plant	Page 3-8
A.	Fiber Optic Cable - Outside Plant Pathways	Page 3-8
B.	Fiber Optic Cable - Outside Plant Outdoor Pull Points.....	Page 3-8
C.	Fiber Optic Cable - Outside Plant Conduits and Inner-ducts.....	Page 3-9
12.	Fiber Optic Cable Building Entrance Point and Indoor Fiber Pathways	Page 3-10
A.	Fiber Optic Cable - Indoor Fiber Pathways	Page 3-10
B.	Fiber Optic Cable - Indoor Pull Points	Page 3-10
Chapter 4 - Grounding		Page 4-1
A.	Grounding Procedures in Telecommunication Rooms	Page 4-2
Chapter 5 - Safety		Page 5-1
1.	General Safety Practices	Page 5-1
2.	Asbestos Clearance	Page 5-1
3.	Fire Stopping	Page 5-1
4.	Environmental Health & Safety - Attachment 1	Page 5-3
	Definitions	Page 5-3
	Common Problems for Contractors.....	Page 5-3
	Storm Water Management.....	Page 5-4
	Spill Prevention, Clean-Up and Disposal	Page 5-5
	Spill and Complaint Response Program	Page 5-6
	General Safety	Page 5-6
	Contractor Requirements and Responsibilities	Page 5-7
	Notification Requirements and Procedures.....	Page 5-7



Chapter 6 - Additional Information	Page 6-1
1. Campus Notification for Core Holes	Page 6-1
2. After Hours or Holiday Work	Page 6-1
3. Work in Hazardous or High Liability Areas	Page 6-1
4. Glossary of Terms	Page 6-2
5. Relevant Campus Phone Numbers	Page 6-3

Appendix A –

UTA Standards Parts List	Page A-1 thru A6
Belden	Page A-1
Chatsworth	Page A-1
Commscope	Page A-1
Corning connectors	Page A-1
Corning enclosures/connector panel	Page A-2
Corning cable & accessories	Page A-2
Erico	Page A-2
Hilti	Page A-2
Panduit network jacks	Page A-3
Panduit termination tools	Page A-3
Panduit face plates	Page A-3
Panduit patch panels	Page A-3
Panduit cable management	Page A-3
Panduit wall rack units	Page A-4
Panduit jack/cable labels	Page A-4
Panduit LD raceway & fittings	Page A-4
Panduit miscellaneous items	Page A-4
Siemons	Page A-4
Snake Tray	Page A-4
Specseal	Page A-5
Unique Fire Stop Products	Page A-5
Miscellaneous	Page A-5



List of Diagrams, Figures, Tables, and Photos

List of Diagrams

Item/Description	Page Number	Effective Date	Revision Number
Diagram 1 – way to assign circuit ID	1-1	10/1/07	23
Diagram 2 – Cat 5e for phone layout	1-12	10/1/07	23
Diagram 3 – multiple phone circuits	1-13	10/1/07	23
Diagram 4 – way to assign circuit ID	2-9	10/1/07	23
Diagram 5 – faceplate configuration	2-12	2/20/09	23.1
Diagram 6 – fiber bulkhead layout	3-5	10/1/07	23
Diagram 7 – 2 piece coupling unit	3-8	10/1/07	23
Diagram 8 – Quazite fiber slack enclosure	3-9	10/1/07	23

List of Figures

Item/Description	Page Number	Effective Date	Revision Number
Figure 1 – T568A pin-out	1-18	10/1/07	23
Figure 2 – T568B pin-out	1-19	10/1/07	23
Figure 3 – Cross-over pin-out	1-19	10/1/07	23
Figure 4 – T568A pin-out	2-8	10/1/07	23
Figure 5 – T568B pin-out	2-8	10/1/07	23

List of Tables

Item/Description	Page Number	Effective Date	Revision Number
Table 1 – Conduit Fill Chart	1-2	10/1/07	23
Table 2 – 25 Pair Telephone Color Code	1-14	10/1/07	23
Table 3 – Corning Populated Bulkheads	3-3	10/1/07	23



List of Photos

Item/Description	Page Number	Effective Date	Revision Number
Photo 1 – two rows mounted chatsworth rack	1-9	10/1/07	23
Photo 2a – 66 style IDC punch down block	1-10	10/1/07	23
Photo 2b – blow up of 66 style IDC block	1-10	10/1/07	23
Photo 3 – proper use of cable management (Fr)	1-15	10/1/07	23
Photo 4 – proper use of cable management (Bk)	1-16	10/1/07	23
Photo 5 – properly supported ladder rack	1-16	10/1/07	23
Photo 6 – proper use of waterfall management	1-17	10/1/07	23
Photo 7 – transition of cable between floors	1-17	10/1/07	23
Photo 8 – cable trauma, kink	2-1	10/1/07	23
Photo 9 – cable trauma, bent	2-1	10/1/07	23
Photo 10 – cable trauma, loop	2-1	10/1/07	23
Photo 11 – cable trauma, smashed	2-1	10/1/07	23
Photo 12 – proper use of j-hook	2-2	10/1/07	23
Photo 13 – cable tray	2-3	10/1/07	23
Photo 14 – j-hook attached to grid	2-4	10/1/07	23
Photo 15 – cable branching wrong	2-4	10/1/07	23
Photo 16 – cable attached to electrical conduit	2-4	10/1/07	23
Photo 17 – cable attached to grid wire	2-5	10/1/07	23
Photo 18 – exposed raceway, mounted to pillar	2-7	10/1/07	23
Photo 19 – raceway mounted to hollow wall	2-7	10/1/07	23
Photo 20 – LD3 Drop Ceiling Fitting	2-7	10/1/07	23
Photo 21 – 4 port surface mount box	2-11	10/1/07	23
Photo 22 – single gang mounted to power pole	2-11	10/1/07	23
Photo 23 – Faceplate Configuration	2-12	2/20/09	23.1
Photo 24 – surface mount on power pole	2-13	10/1/07	23
Photo 25 – modular furniture top-caps	2-13	10/1/07	23
Photo 26 – top cap end view	2-13	10/1/07	23
Photo 27 – 106 duplex module	2-14	10/1/07	23
Photo 28 – style of floor penetrations	2-14	10/1/07	23
Photo 29 – K1 power up module	2-15	10/1/07	23
Photo 30 – Keystone jack and adapter	2-15	10/1/07	23
Photo 31 – 24 port enclosure, slack enclosure	3-2	10/1/07	23
Photo 32 – Corning CamSplice	3-4	10/1/07	23
Photo 33 – properly installed ground straps	4-2	10/1/07	23
Photo 34 – Grounding bus bar	4-3	10/1/07	23
Photo 35 – properly fire-stopped conduit	5-2	10/1/07	23

Chapter 1 – General Specifications & Material

1. General Network Drop Requirements

Note: *TIA/EIA 568B Wiring Standards* are the foundation of UTA's network practices. The following are specific parts and techniques used in conjunction with the *TIA/EIA 568B Cabling Standard*. We require that installers be *BICSI Commercial Installer Level 1 Certified* and follow *BICSI Telecommunication Cabling Installation Procedures*, as well as the *TIA/EIA 568B Cabling Standard*.

A. Number of Drops per Room

A standard drop for a new installation will consist of (3) Cat 5e/6 cables unless specified by the UTA representative. Two of these cables will be terminated with a blue jack, denoting use as a data cable. The third Cat 5e/6 cable will be terminated with a yellow jack, denoting use as a telephone jack.

- ★ **Faculty/Staff Offices** - A minimum of one standard drop will be installed for each 100 square feet in each office. Additional drops may be installed on a case by case basis.
- ★ **Lab Space** – A minimum of 1 standard drop will be installed in each room. Additional wiring infrastructure to be determined on a case by case basis (i.e. Computer Lab).
- ★ **General Space Utilization** – A minimum of 1 standard drop will be installed in any room that is capable of being utilized as office space.
- ★ **Classrooms/Conference Rooms** - A minimum of one standard drop will be installed in each room. Additional drops will be installed as required.
- ★ **Telecommunication Room Cross-Connects** - A minimum of (2) Cat 5e/6 cross-connect cables will be installed between telecommunication rooms as stipulated by UTA. These cables will be terminated with orange jacks.

To determine Drop Locations Circuit ID numbers, stand at the rooms' main doorway. Label the proposed drops sequentially from the left and moving around the room in a clockwise fashion. See **Diagram 1**.

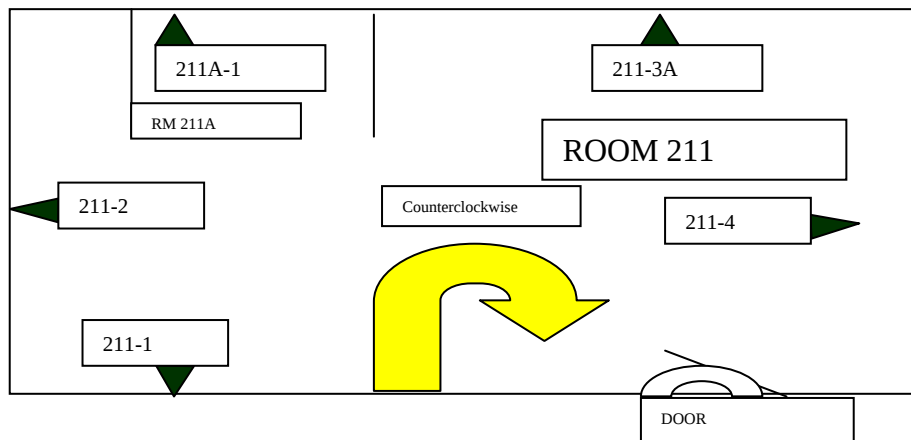


Diagram 1: The proper way to assign Circuit ID numbers in the room where cable drops are being installed.

B. Network Data Cable

- ★ All cable used for Data Network will be Category 5e, BELDEN, **Datatwist350-1701A** (for plenum installations or as instructed by UTA personnel) and **Datatwist350-1700A** (non-plenum) or BELDEN Category 6, (plenum **Datatwist-7882A**) (non-plenum **Datatwist-7881A**).
- ★ Unless specifically stated otherwise by UTA, plenum rated cable will be **Yellow** in color and non-plenum rated cable will be **Blue** in color.
- ★ The Belden Cat 5e/6 cable will be installed under the Belden guidelines for that particular cable.
- ★ The cable will be in reels of 1000' minimum when cable is purchased for the bid project.
- ★ Subsequent shorter runs on the same project will take advantage of leftover short spools of cable.
- ★ A minimum of three (3) Cat 5e/6 cables will be run to each room.
- ★ Cable must be Plenum rated unless specifically stated otherwise by UTA.
- ★ Below is the recommended fill chart for Cat 5e BELDEN **Datatwist350 (1701A)** and Cat 6 BELDEN **Datatwist-7882A** cables in areas where conduits are used.

Note: These numbers are only valid for cables with outside diameters of approximately 0.200 inches for Cat 5e or 0.220 inches for Cat 6. The below chart is based on the NEC at a 40% fill ratio.

Conduit Fill Chart for twisted pair copper cabling

	Cat 5e	Cat 6
Trade Size	Number of Cables	Number of Cables
¾"	6	5
1"	10	9
1-1/4"	19	15
1-1/2"	25	21
2"	42	35
2-1/2"	74	61
3"	112	93
3-1/2"	147	121
4"	187	155

Table 1 – Conduit Fill Chart

C. Telephone Cable

- ★ All cable used for telephones will be Category 5e BELDEN, **Datatwist350-1701A** (for plenum installations or as instructed by UTA personnel) and **Datatwist350-1700A** (non-plenum) or BELDEN Category 6, (plenum **Datatwist-7882A**) (non-plenum **Datatwist-7881A**).
- ★ Unless specifically stated otherwise by UTA, plenum rated cable will be **Yellow** in color and non-plenum rated cable will be **Blue** in color.
- ★ The cable will be in reels of 1000' minimum when cable is purchased for the bid project.
- ★ Subsequent shorter runs on the same project will take advantage of leftover short spools of cable.
- ★ A minimum of one (1) Cat 5e/6 cable run to each room will be designated for telephone.
- ★ Cable must be plenum rated unless specifically stated otherwise by UTA.

D. Telephone Trunk Cables

All telephone trunk cables of 25 pair and up shall be 24 awg, solid conductor cables. Cables shall be in standard increments of 25, 50, 100, 300, 600, 800, 1000 or 1200 pair. The cables will be punched down on 66 style punch down blocks. Punch-down order should follow traditional USOC color code order for multi-pair telephone cables punched down on 66-50 Blocks. ***See Table 2, 25 Pair Telephone Cable Color Codes and Breakdown on page 1-14.***

Any left over cable will be turned over to the UTA Network Group upon completion of the project.

2. General Telecommunication Equipment Room Overview

When ever a new building needs to be wired for data/telecomm services, or an existing building is re-wired, provisions for telecommunication closets need to be incorporated into the design of the building. These telecommunication closets are where the cable distribution system connects to the electronics distribution portion of the overall telecommunications infrastructure. In addition to the closets themselves pathways between the closets, as well as all or part of the actual cable pathway system need to be considered in the overall design.

A. Size Requirements

- ★ In general the closet size should not be smaller than 10 X 10 feet or, 100 square feet. An average used to calculate total closet requirements is 100 square feet of closet space for every 15,000 square feet of assignable space.
- ★ Space savings can be achieved by having fewer closets at the price of having less flexibility of where the closets are located in the building structure. The main constraint determining an acceptable location being that all work outlets be reachable within a maximum of 90 meters of actual cable path. This is mandated by the standards that the data communications network equipment is designed to work with.
- ★ Larger areas may require larger telecommunications closets, or more than one closet per floor spread apart to accommodate the wiring distance constraint.
- ★ Even if the customer does not anticipate any growth, the telecommunications closet should include adequate space to support equipment changes with minimal disruption.

B. Location

- ★ In general the raw distance from the hub room to any desired service location should be no greater than 250 ft. To minimize the horizontal cable lengths (with a maximum of 90 m [295ft.], locate the telecommunications closets as close as possible to the center of, and on the same floor as the area it is intended to serve. This distance must allow for the path to the cable and required cable slack loops (about 10 feet).
- ★ In cases of structures having multiple floors, these telecommunications closets should be stacked on top of each other to facilitate inter-connecting cabling.

- ★ If there needs to be more than one closet per floor they should be as symmetrically located as possible depending on the building design, hopefully using the same criteria on each floor to achieve stacked rooms.
- ★ Ensure that telecommunication closets are accessible from the hallway.
- ★ There should be at least one telecommunications closet per floor, unless the design of the building is such that all work area outlets can be reached within the maximum distance constraint from one closet.
- ★ In residential buildings where there are typically no false ceilings installed, it is best to design the system so that the outlets on each floor are stacked on top of each other. This allows for a vertical conduit pathway from the attic to each outlet.

C. Unacceptable Locations

- ★ Avoid locating equipment in any place that may be subject to:
 - ★ Water infiltration
 - ★ Steam infiltration
 - ★ Humidity from nearby water or steam
 - ★ Heat (e.g., direct sunlight)
 - ★ Any other corrosive atmosphere or environmental conditions

Caution: Avoid locations that are below water level unless preventive measures against water infiltration are employed. The room must be free of plumbing and electrical utilities that are not directly required to support the telecommunication function. A floor drain is required if there is a risk of water entering the facility.

- ★ Shared use of telecommunications closet space with other building facilities should be avoided. Locations that tend to be unsatisfactory for telecommunications closets include space in or adjacent to:
 - ★ Boiler rooms
 - ★ Washrooms
 - ★ Janitor's closets
 - ★ Storage rooms
 - ★ Loading docks
 - ★ Any space that contains:
 - ★ Sources of excessive EMI
 - ★ Hydraulic equipment and other heavy machinery that caused vibrations
 - ★ Steam pipes
 - ★ Drains
 - ★ Clean-outs
- ★ Avoid using the telecommunications closet as a means of accessing the spaces listed above.

D. Environmental Factors

- ★ Temperature 64 degrees F to 80 degrees F
- ★ Relative Humidity 30 percent to 55 percent
- ★ Heat Dissipation 750 to 5000 BTUs per hour per cabinet

E. Other Uses

- ★ Telecommunications closets should be dedicated to the telecommunication function and related support facilities.
- ★ Equipment not related to the support of the telecommunications closet such as piping, duct work, and distribution of building power should not be located in, or pass through, the telecommunication closet.
- ★ The telecommunication closet should not be shared with building or custodial services that may interfere with telecommunication systems. For example, slop sinks and cleaning materials such as mops, buckets, or Solvents must not be located or stored in the telecommunications closet.

F. Power

- ★ Branch circuits for equipment power should be dedicated 20A 3-wire 120V AC duplex circuits. Each telecommunication closet should have a minimum of two of these outlets. It is preferred that these circuits should be split between two load centers to allow for redundancy. It is recommended that all Isolated Ground circuits originate from power panels dedicated exclusively for Isolated Ground circuits in order to be isolated from other noisy in house circuits.
- ★ A convenience outlet should also be included in each telecommunication closet.

G. Fire Protection

- ★ Provide fire protection for the telecommunications closet if required by applicable codes.
- ★ If sprinkler heads are provided, install wire cages to prevent accidental operation.
- ★ For wet pipe systems, drainage troughs are recommended to protect equipment from any leakage that may occur.
- ★ To prevent water damage, consider using “dry” sprinkler systems.

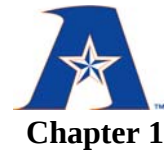
H. Grounding

- ★ Each telecommunications closet should be provided with a #6 building ground wire. The telecommunications contractor will use this ground wire to ground equipment racks and electronic equipment.

I. Pathways

- ★ To avoid electromagnetic interference (EMI), all pathways should provide clearances of at least:
 - ★ 4 feet from large motors or transformers
 - ★ 1 foot from conduit and cables used for electrical power distribution
 - ★ 1 foot from fluorescent lighting

Standards of Installation for Network Cabling at UTA



- ★ Access between hub rooms is typically provided by several 4 to 6 inch conduits with appropriate sleeves and fire-stop material.
- ★ Vertical cable pathway is typically provided by conduit in walls for work outlets and to provide access between telecommunication closets on different floors.
- ★ In the case of an area that has a false ceiling there should be a conduit stubbed out in the ceiling for each work area outlet. These conduits should be $\frac{3}{4}$ inch in diameter, and the work area outlet should be no further than 10 feet from the electronic equipment they serve. There should be no more than two elbows in a conduit run before an accessible junction box is installed. It is preferred that use of conduit be minimized and is only required to provide access from the work area outlet to some accessible area such as above a false ceiling or similar access point. If an area has a firewall between it and the hallway area there needs to be provisions for penetrating the firewall. All penetrations will be sealed with appropriate material to meet fire safety code requirements.
- ★ In cases where the pathway between the closet and the work area outlet is not entirely constructed of conduit it is preferred that the pathway from the closet to where the conduit is provided for each individual work outlet be installed by the owner as part of the cable system.
- ★ Current recommendations for overhead cable pathway involve use of J-Hooks and cable support bags suspended from grid wires. We prefer that pathway and cable be installed after the building ceiling infrastructure has been completed but before the ceiling is installed. Since cable pathway of this type has some inherent flexibility it provides the benefit of being able to work around piping, ventilation, and other obstructions that might not have as much location flexibility. This method will more easily allow for available space considerations.
- ★ Buildings that have no false ceilings or alternate access methods present special challenges that are probably best addressed on a case-by-case basis. In existing buildings there are wall mounted external raceway or conduit systems that can be used in conjunction with boring techniques to retrofit a usable distribution system.
- ★ In a newly constructed building one method is to have conduit installed when the walls are built. These conduits should be $\frac{3}{4}$ inch in diameter, and the work area outlet should be no further than 10 feet from the electronic equipment they serve. There should be no more than two elbows in a conduit run before an accessible junction box is installed. This method will result in a conduit from each work area outlet back to the telecommunications closet or most convenient accessible location. This method can be modified depending on the availability or lack of special access areas.
- ★ Another method in a newly constructed building involves special coordination efforts between the building contractor and the telecommunications installation contractor. This basically involves coordinating the installation of the wiring with the building of the walls and other support structures. While this method can work there are several problems that may arise with this approach that may render some of the wiring plant unusable. Since the wiring is not protected by conduit and is installed before the construction is finished there is opportunity for damage to the cable caused by standard construction techniques. The potential for cable damage combined with the prohibitive cost of cable repair post construction tend to offset the cost of the preferred method of installing a conduit system during construction.

3. Telecommunication Equipment Room Requirements

A. Room Design and Requirements

- ★ All telecommunication rooms use designators in accordance with *BICSI TDMM Ch. 7 Equipment Rooms* and *TIA/EIA 568B Procedures and Guidelines*.
- ★ Where possible, telecommunication rooms shall have direct access to the hallway or other such corridor and should not be shared with other building services, such as Electrical (i.e. electrical distribution panels or transformers) or Mechanical (i.e. air handlers). Supporting codes are found in both BICSI TDMM and the EIA/TIA 568A wiring standard unequivocally against multi-use closets.
- ★ Telecommunication rooms shall not contain any type of sink, be used as Custodial supplies storage or be used as general storage areas (books, furniture, etc.).
- ★ Floors in telecommunication rooms shall be sealed concrete or tile. Due to the threat of static electricity and resultant potential damage to network distribution equipment, we prefer to avoid carpeted flooring.
- ★ Each telecommunication room will have sleeved core holes between floors as requested by UTA.
- ★ Empty core holes will be properly fire-stopped, preferably with fire pillows.
- ★ A minimum space of 10' X 10' is required for all single floor telecommunication rooms.
- ★ A minimum space of 10' X 15' is required for all multi-floor telecommunication rooms.
- ★ At least one long wall of a telecommunication room will be covered from floor to ceiling in ¾" fire-rated plywood or plywood which is painted with at least two coats of flame retardant white paint.
- ★ All telecommunication rooms will be equipped with a grounding bus bar that is tied back to the building's ground. The grounding conductor will be attached to an approved electrode per *NEC 1999 standards*, as referenced in *TIA 607*.
- ★ Each telecommunication room will be equipped with a minimum of two (2) 120V-20 amp duplex outlets with independent circuits (with isolated-ground if possible) on the wall where the plywood is mounted.

Note: All installers must be BICSI Commercial Installer Level 1 certified and properly trained to install jacks according to PANDUIT specifications. New installations are wired with Cat 5e/6 unless otherwise specified by UTA.

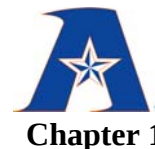
B. Cat 5e Termination

- ★ Standard Data Termination – **Blue** PANDUIT Brand Cat 5e data jacks **P/N CJ5E88TGBU**.
- ★ Cross-Connect Termination – **Orange** PANDUIT Brand Cat 5e data jacks **P/N CJ5E88TGOR**.
- ★ Telephone/voice Termination – **Yellow** PANDUIT Brand Cat 5e jacks **P/N CJ5E88TGYL**.

Note: Cat 5e terminations will use either T568A or T568B wiring scheme which will be determined on a case by case basis.

C. Cat 6 Termination

Standards of Installation for Network Cabling at UTA



- ★ Standard Data Termination – **Blue** PANDUIT Brand Cat 6 data jacks **P/N CJ688TPBU**.
- ★ Cross-Connect Termination – **Orange** PANDUIT Brand Cat 6 data jacks **P/N CJ688TPOR**.
- ★ Telephone/voice Termination – **Yellow** PANDUIT Brand Cat 6 jacks **P/N CJ688TPYL**.

Note: Cat 6 terminations will use only T568B wiring scheme.

D. UTP Patch Panels / Wall Brackets

- ★ Patch Panel - PANDUIT brand 24 port **P/N CPP24WBLY** or 48 port **P/N CPP48WBLY**.
- ★ **P/N CPP24WBLY** will allow the termination of up to 24 Mini-Com TX style modular jacks.
- ★ **P/N CPP48WBLY** will allow the termination of up to 48 Mini-Com TX style modular jacks.
- ★ Wall Mount Bracket – PANDUIT Brand **P/N WBH2** (2 space) or **P/N WBH4** (4 space) bracket.

E. Patch Panel Jack Labels

Labels follow practices set forth in **ANSI/TIA/EIA – 606A ADMINISTRATION**.

The contractor will generate labels for both the Office/Classroom and telecommunication rooms according to the following criteria:

- ★ The Mini-Com jack label is PANDUIT Brand **White** label (**P/N C138X019FJJ**). The font for this label is an Arial 10 point (**102A-1A**, **102A-1B**, **102A-1VA**, etc.; the “V” in front of a jack letter represents a voice circuit (i.e. **102-1VA**). Use smaller fonts to fit longer circuit ID numbers.
- ★ Jack labels will be wrapped around the jacks properly.

Note: Installers will not cut or tear ends off and stick jack labels on while they are snapped in the panel or faceplate. These labels must be installed centered, then wrapped around the jack. Failure to properly install these labels will be repaired by the contractor who will provide replacement labels.

- ★ Each end of the Cat 5e/6 cable will be labeled at approximately 3 to 6 inches from the network data jack with a PANDUIT Brand clear cable label (**P/N S100X125YAJ**) using Arial 12 point font.

F. Equipment Racks

Depending on the scope of the job, equipment will be installed in either a floor mount rack, a wall mount bracket or a wall mount enclosure.

- ★ **Floor Rack** – Black 7' CHATSWORTH Brand **P/N 55053-703** will be used for floor mount installations. The rack should be anchored at all four points using a CHATSWORTH Brand **P/N 40604-001** Concrete Floor Kit of either a $\frac{1}{2}$ " or $\frac{5}{8}$ " size. The bolts should be flush to the base plate of the rack. Also, a black CHATSWORTH Brand **P/N 10250-712** ladder-style cable raceway should be secured to the rack via a black CHATSWORTH Brand **P/N 10595-712** rack-to-raceway mounting plate and secured to at least one wall via a black CHATSWORTH Brand **P/N 11421-712** wall angle support unit. Any exposed ends of the ladder-style cable raceway should be covered with CHATSWORTH Brand **P/N 10642-001** end caps. At the discretion of UTA, one or both sides of the rack should have a black PANDUIT **P/N WMPV45E** NetRunner Vertical Cable Management Front/Back 45RU cabling management section installed. Installers should follow Panduit's published Installation Instructions.



Photo 1
Two rows of properly mounted Chatsworth racks.

Note: Ladder-style cable raceway attached to wall to provide support and a cable path between racks.

- ★ **Wall Mount Enclosure** – Clear aluminum CHATSWORTH Brand **P/N 11348-519** will be used for wall mount installations. The unit will be mounted onto a sheet of $\frac{3}{4}$ " plywood which is securely fastened to the wall studs and will be secured using #6 - 1" to 1 $\frac{1}{4}$ " screws, or larger, in all of the rack's mounting holes. Reference Chatsworth's published Installation Instructions.

- ★ **Wall Mount Enclosure, Secured** – Computer white CHATSWORTH Brand **P/N 11685-219** with a CHATSWORTH Brand **P/N 11755-003** fan unit will be used in those situations where UTA determines that a lockable enclosure is warranted. The unit will be mounted on a sheet of $\frac{3}{4}$ " plywood which is securely fastened to the wall studs and will be secured using #6 - 1" to 1 $\frac{1}{4}$ " screws, or larger, in all of the rack's mounting holes.
- ★ **Wall Mount Bracket** – Clear aluminum CHATSWORTH Brand **P/N 11583-519** wall mount bracket will be used in situations where UTA determines that a smaller rack is suitable.
- ★ **Grounding** – The equipment rack will be properly grounded as specified on *page 4-1, Chapter 4 - Grounding*, of this document, braided grounding straps will be used to connect separate pieces of ladder-style cable raceway and equipment racks to form a continuous ground that connects to the telecommunication rooms grounding bus bar.

G. 66-Block Telephone Termination

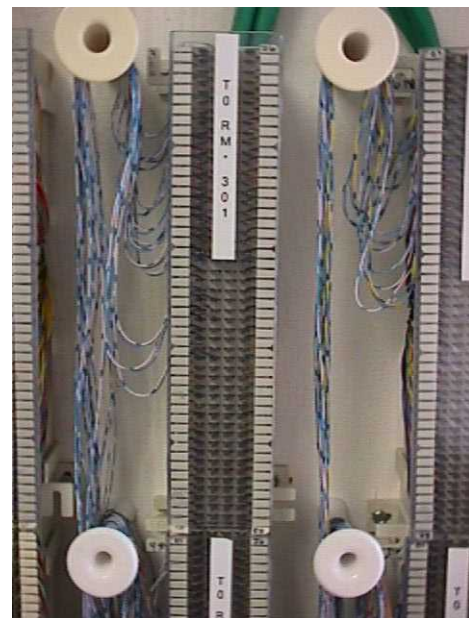
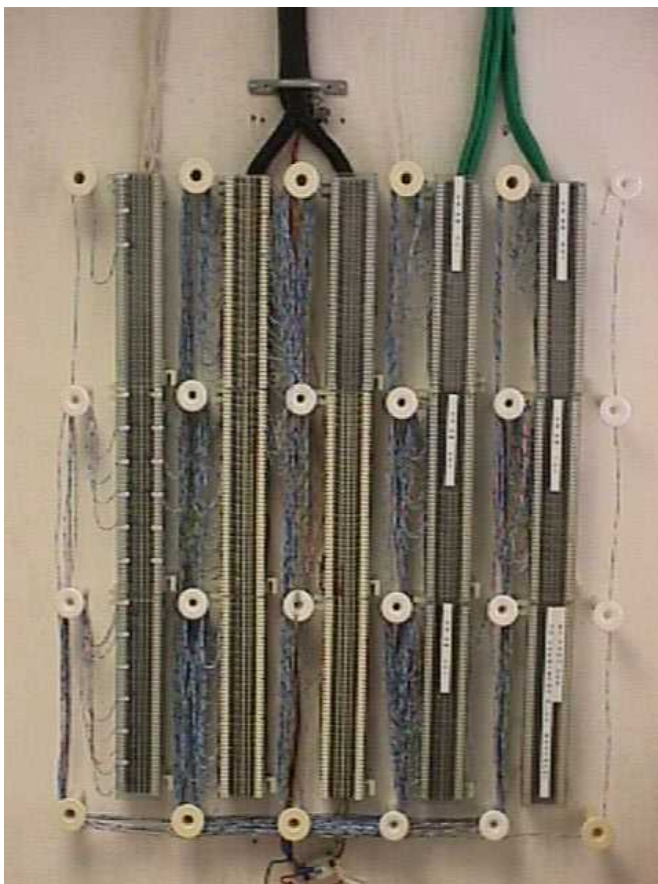
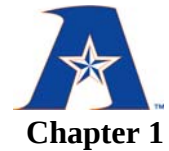


Photo 2a: 66 style IDC blocks mounted on plywood backboard.

Photo 2b: Blow-up of 66 style block with clear plastic block covers.

Standards of Installation for Network Cabling at UTA



- ★ The standard punch down block for the Office/Classroom telephone cables is a SIEMON Brand pre-wired 66-50 termination block (**P/N M2-5T-128LR-TP**).
- ★ The standard punch down block for the telephone feeder cable is a SIEMON Brand 66-50 termination block (**P/N 66M1-50**) with a SIEMON Brand wall mount bracket (**P/N S-89B**).
- ★ Telephone building feeder cables that enter the building from tunnels or outside of the building shall be properly ground per *NEC-1999 Article 800*.
- ★ Wire Routing Spools (a.k.a. Mushrooms) will be mounted at all four corners of the 66-blocks to allow easy routing of jumper wire between the Building Feeder cables and the Office/Classroom Work Area Outlet (W.A.O.) cables.
- ★ Label the Circuit ID on the telephone blocks with a fine point, permanent marker pen on blocks for the Office/Classroom (W.A.O.) cables.
- ★ Cover finished blocks with plastic 66 block covers. Use PANDUIT Brand labels (**P/N C138X019FJJ**) to print Circuit ID and attach covers.
- ★ When installing Outside Plant (OSP) cable that is filled with water repellent gel in a telecommunication room, the contractor will properly use cleaning agents (ex. *D-gel*) to remove the gel filling from the individual cable pairs. Also, any residue or damage incurred during the termination and clean up of the gel filled trunk cables will be performed by the Contractor before the scope of work is considered complete, to the original or better condition. 66-Blocks will be free of any (*ikky-pic*) gel or D-gel residue.

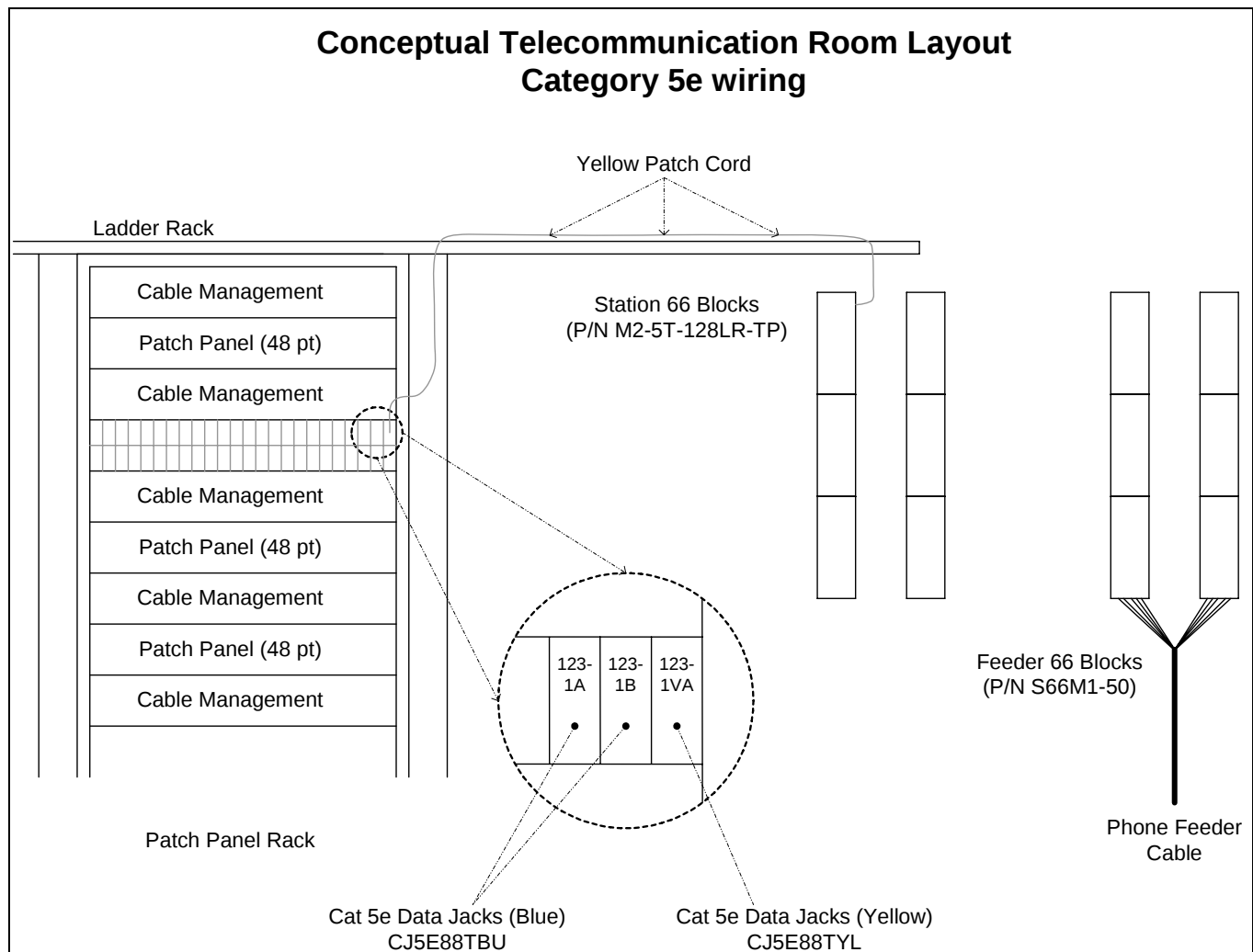


Diagram 2:

Conceptual Drawing using Cat 5e/6 for the phone, terminated into the equipment rack patch panel.

- ★ **Diagram 2** indicates that the designated phone wires will be terminated via a yellow Panduit jack and connected to the 66 punch down block via a yellow patch cord of the appropriate length.
- ★ The 66 punch down blocks will be located on a suitable wall, mounted to plywood appropriately painted with flame retardant paint or sealed with flame retardant.

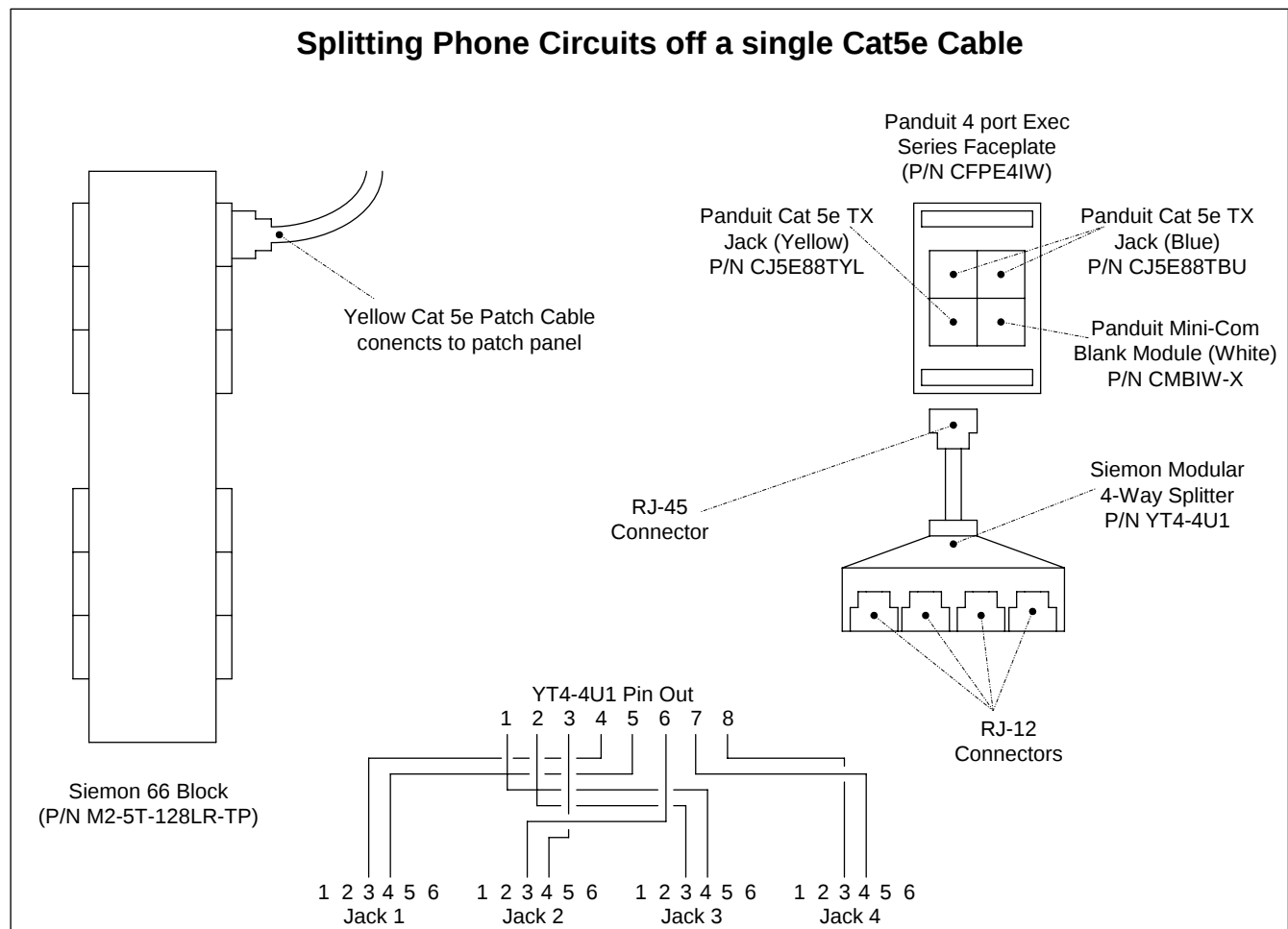


Diagram 3:
Detail for running multiple phone circuits via a single Cat 5E/6 wire.

- ★ **Diagram 3** details the methodology for running up to four independent phone circuits via one Cat 5e/6 cable.

Terminate punch down blocks following traditional telephone color code order.

25 Pair telephone cable (Colors are main color - strip color)

Pair#	Ring Color	Tip Color
1	White-Blue	Blue-White
2	White-Orange	Orange-White
3	White-Green	Green-White
4	White-Brown	Brown-White
5	White-Slate	Slate-White
6	Red-Blue	Blue-Red
7	Red-Orange	Orange-Red
8	Red-Green	Green-Red
9	Red-Brown	Brown-Red
10	Red-Slate	Slate-Red
11	Black-Blue	Blue-Black
12	Black-Orange	Orange-Black
13	Black-Green	Green-Black
14	Black-Brown	Brown-Black
15	Black-Slate	Slate-Black
16	Yellow-Blue	Blue-Yellow
17	Yellow-Orange	Orange-Yellow
18	Yellow-Green	Green-Yellow
19	Yellow-Brown	Brown-Yellow
20	Yellow-Slate	Slate-Yellow
21	Violet-Blue	Blue-Violet
22	Violet-Orange	Orange-Violet
23	Violet-Green	Green-Violet
24	Violet-Brown	Brown-Violet
25	Violet-Slate	Slate-Violet

Binder#	Color
1	White-Blue
2	White-Orange
3	White-Green
4	White-Brown
5	White-Slate
6	Red-Blue
7	Red-Orange
8	Red-Green
9	Red-Brown
10	Red-Slate
11	Black-Blue
12	Black-Orange
13	Black-Green
14	Black-Brown
15	Black-Slate
16	Yellow-Blue

Table 2 – 25 pair telephone cable color codes and breakdown.

H. Wire Management

- ★ **Vertical Wire Management** – Black PANDUIT Brand **P/N WMPV45E** shall be used as previously defined on *page 1-9, Chapter 1, paragraph 3.F. Equipment Racks* under the bullet “*Floor Rack*”.

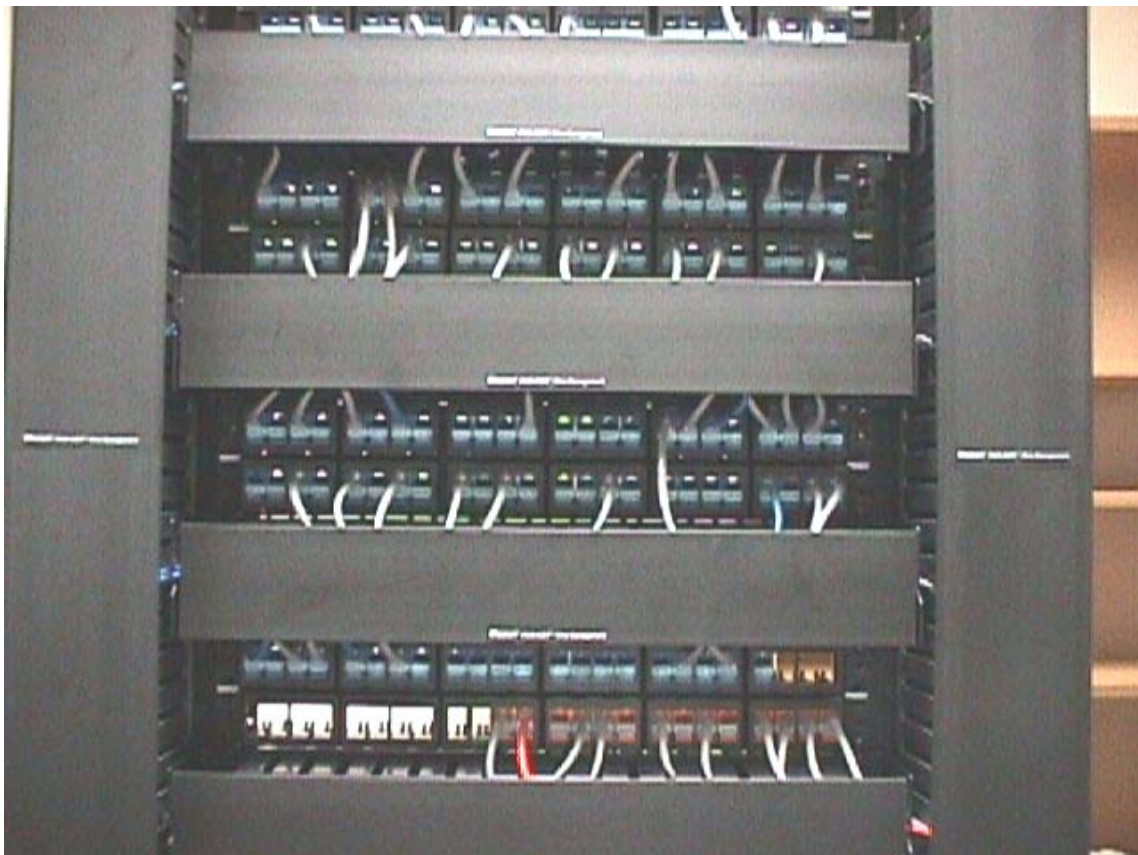


Photo 3: *Proper use of both Vertical and Horizontal Cable Management*

- ★ **Horizontal Wire Management** - Black PANDUIT Brand **P/N WMPSEY** and **P/N WMP1EY** is used where single or double spaced, double-sided management is required. The back wire management ensures proper bend radius compliance. For cables coming from the Office/Classroom, the front side is used to manage patch cords from the horizontal cabling to the Network Equipment.
- ★ **Horizontal Wire Management** – Black PANDUIT Brand **P/N WMPFSEY** and **P/N WMPF1EY** is used where single or double spaced, front only management is required. This is primarily used to manage patch cords connecting to the network distribution equipment.

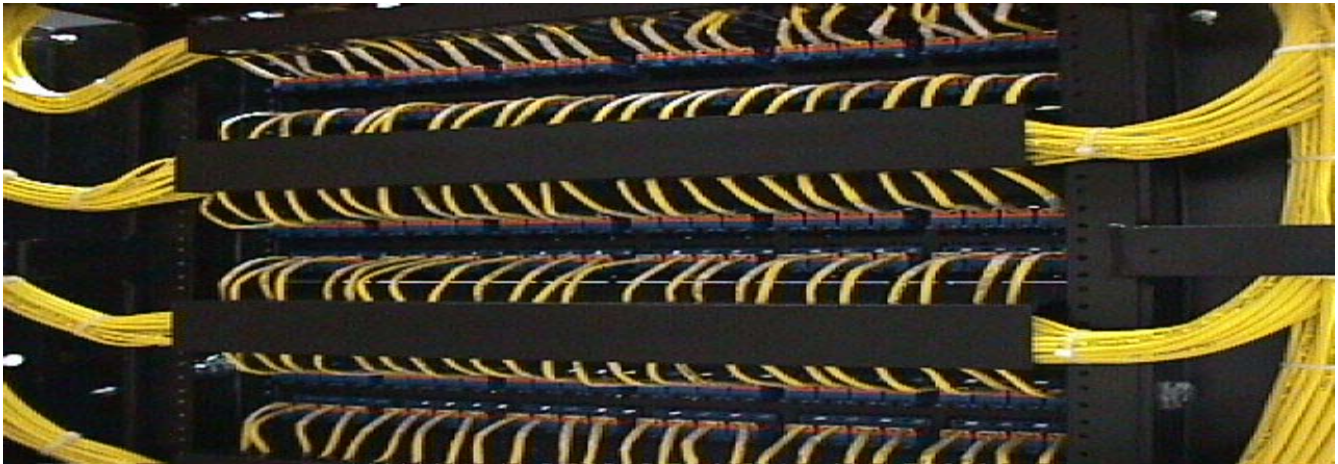


Photo 4: *Cables routed properly from the back of a WMPSE to ensure the Cat 5e/6 Bend Radius*

- ★ **Cable Runway** - Black CHATSWORTH Brand P/N 10250-712 ladder-style cable raceway shall be used.
- ★ **End Caps** – Black CHATSWORTH Brand P/N 10642-001 end caps should be used on all exposed ends of the ladder-style cable raceway. All ends shall be filed down to remove any sharp edges before caps are installed.
- ★ Metal Rack and raceway mounting hardware shall all be CHATSWORTH Brand fittings.



Photo 5.
*Properly supported ladder
rack. Allowing cable
transition between floors.*

- ★ Velcro straps are preferred to plastic tie straps in Telecommunication rooms wherever practical when securing cabling to cable runway. Velcro should be of sufficient length to wrap around cable bundle twice to accommodate future expansion.
- ★ Tie straps used to dress cable will not be over tightened. Tie straps that deform the outer cable jacket and that can't be slid easily along the length of the cable bundle are too tight.
- ★ Tie straps used in plenum airways must be plenum rated.

I. Transition Between Floors

Standards of Installation for Network Cabling at UTA

- ★ When cables come off a 7 ft. rack and over a ladder way and are ran down vertically, they must be properly secured to the vertical section of ladder rack covering the entire vertical span of the run. Use a rounded transition fitting (water-fall, slide) bracket to ensure proper cable management and bend radius.



Photo 6. Proper use of waterfall (rounded transition) fittings for cable changing from a horizontal path to a vertical one. This maintains the minimum bend radius for Cat 5e/6 cable.



Photo 7. Proper transition between floors. Bundles are correctly secured to vertical ladder sections by cable ties or Velcro straps.

- ★ Also cables going through risers between floors must be properly supported for their weight, especially for high pair-count telephone feeder cables and large cable bundles. ERICO Brand **P/N #CAT600WM** wall mount support or **#CAT600R** strut mount support is required.
- ★ When pulling a cable in conduits between floors, replace the pull string or rope for future use and properly fire-stop the conduits.

J. Patch Cord Colors in Telecommunication Rooms

- ★ **Standard Hub Rooms:** use Blue patch cords for new installations. For existing installations, match the color currently in use in the telecommunication room.
- ★ **Special Cases:** UTA may request that patch cords of differing colors be used to denote special areas (differing labs, differing floors, servers, etc.)

Available colors are: **Green Purple Red**

- ★ **Cross-connect Cables:** use **Orange** patch cords for connections between telecommunication rooms.
- ★ **Telephone Cables:** use **Yellow** patch cords for connections between patch panels and telephone blocks.
- ★ **Cross-over Cables:** **Black** cables are pinned out so that 1 & 3 and 2 & 6 are swapped. These cables are used to inter-connect the network distribution equipment.

K. Patch Cord Specifications and Pin-Outs

Below is the pin assignment for **TIA/EIA 568A** compliant patch cords. All patch cords should be made from a minimum of 4 pair 24AWG stranded cable Cat 5e/6.

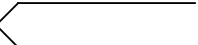
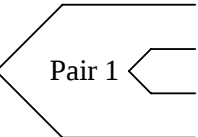
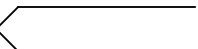
		<u>Pin</u>	<u>Wire Color</u>		
Pair 3		T3	1	White/Green	
		R3	2	Green	
Pair 2		T2	3	White/Orange	
		Pair 1 	R1	4	Blue
			T1	5	White/Blue
		R2	6	Orange	
Pair 4		T4	7	White/Brown	
		R4	8	Brown	

Figure 1 – Standard EIA/TIA T568A pin-out

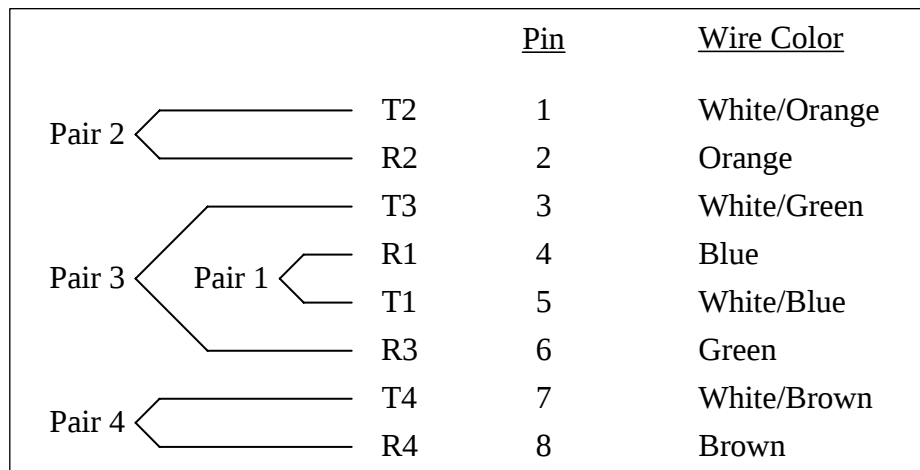


Figure 2 – Standard EIA/TIA T568B pin-out

Cross-over Cable Pin-out (RJ-45 between network distribution equipment)

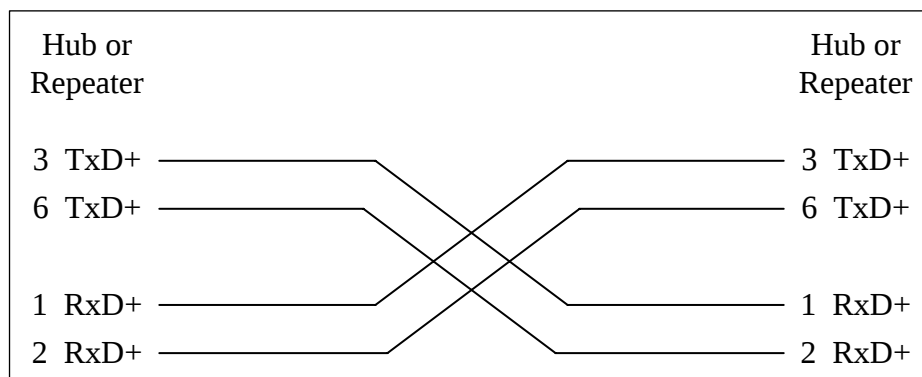


Figure 3 – Cross-over patch cord pin-out

Note: All other pins are terminated straight through.

This Page Intentionally
Left Blank

Chapter 2 - Copper Cabling Installation Procedures

1. Network Data - Horizontal Cable

A. Cable Trauma

Twisted pair cable can easily be damaged and the twisted pair unraveled that prevents them from passing Cat 5e or Cat 6 certification. The cable installers are expected to prevent twisting and kinks during installation. Remember the maximum tension allowed on a twisted pair cable is 25 foot/pounds of force. Above that amount and the cable has been damaged.

Four examples of unacceptable cable trauma.

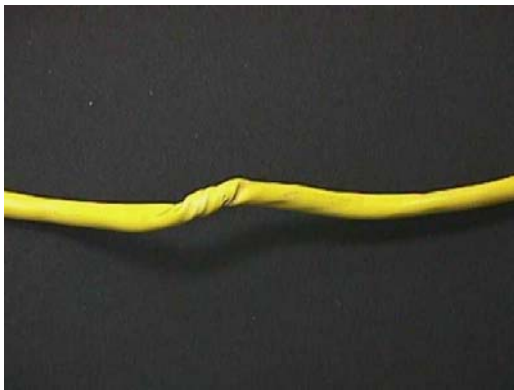


Photo 8: A kink that has been pulled through with excessive force.



Photo 9: A cable that has been bent back upon itself.



Photo 10: Another example of a loop in the cable that has been forced straight, causing severe cable trauma



Photo 11: A cable that has been smashed or crushed.
Note the cuts in the outer cable jacket

B. Cat 5e/6 Cable Installation Specifications

- ★ All Belden cable shall be installed according to BELDEN specifications. Cable shall be installed when possible in multiple runs from reel jacks designed for the purpose or by pay-out boxes.
- ★ Care shall be taken to prevent nicks, abrasions, burning, and scuffing of cable during installation. Cables found to be damaged will be replaced at the contractor's expense regardless of the test results of the cable. See page 2-1, Paragraph 1.A. - *Cable Trauma* from this chapter.

C. Cable Pathways

- ★ Cables shall follow pre-designed, UTA approved pathways. Design of the pathway will follow the standards set forth in the *TIA/EIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces* document. Where possible, these pathways will be constructed from Erico brand **P/N CAT324Z34** J-hooks hung from ceiling grid wire installed with powder-actuated (ex. Hilti gun) devices. J-Hooks shall be attached to independent grid wire and not attached to the existing drop ceiling grid wiring as the added weight from the cables can cause distortion to the existing grid system. Refer to Photo 12.



Photo 12: Proper use of CADDY J-Hooks.

- ★ Erico **P/N CAT425WM** Adjustable Cable Support (Caddy Bags) will be used on higher cable count runs, properly mounted per product specifications. They will be secured to the ceiling by all-thread or attached to I-beams.

Caution

Grid wire cannot and must not be used with Caddy-Bags due to the cable's weight. Use all-thread or similar attached to building concrete.

- ★ Cable Tray systems will be used at UTA's discretion. Specifics to be determined by the UTA personnel on case by case basis.



Photo 13. Cable tray installed above drop ceiling.

Note photo above:

Finished section going into conduits that has been properly bundled to ladder tray with velcro strips. Conduit bushings were installed on the end of the conduits to prevent the cable being nicked or abraded on rough conduit edges during pulling.

- ★ Some buildings on Campus use ceiling run or slab run conduit systems. When using this type of system, be sure to pull a new pull string with the cabling. Do not tie-strap the pull string in the cable bundle.
- ★ J-Hooks secured to the concrete deck is the preferred method of installation. Ceiling support shall be at a maximum of four (4) foot intervals and should be placed as close to the deck as possible. Cable pathways shall be so configured to avoid **EMF** and **RFI** interference. Common causes of this interference are fluorescent lighting fixtures, air handling motors and many kinds of electrical controls including starters and power distribution panels.

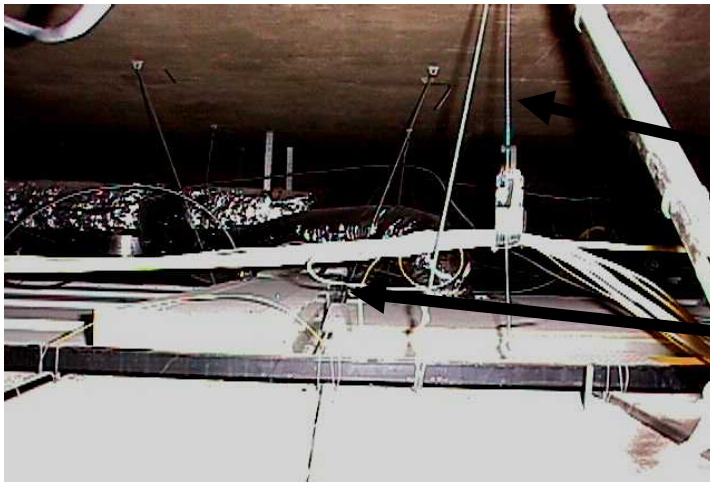


Photo 14.
Multiple problems.

1st J-Hooks are attached to ceiling grid.

2nd the cable bundle is practically laying on the fluorescent light.

Caution:

All cable runs must be a minimum of 12" from all florescent lights and EMF sources. Any violations of this rule will be corrected at the contractor's expense.

- ★ Always follow proper procedure to assure the bend radius is not exceeded when branching off to other areas along a pathway. Always make a branch off immediately after the nearest j-hook.

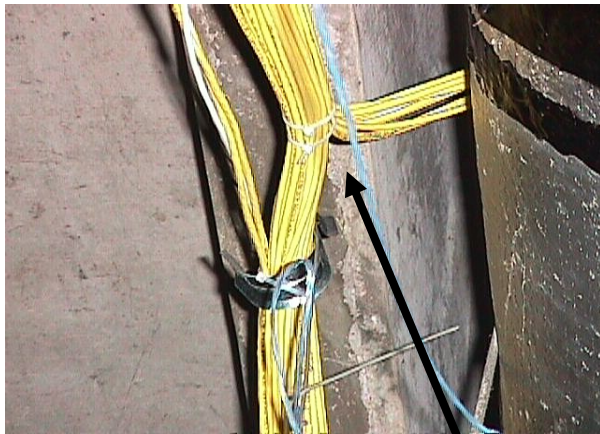


Photo 15. Wrong:

Cables should never branch out away from a supporting J-hook. This places undue stress on the cable that might result in future cable failures.

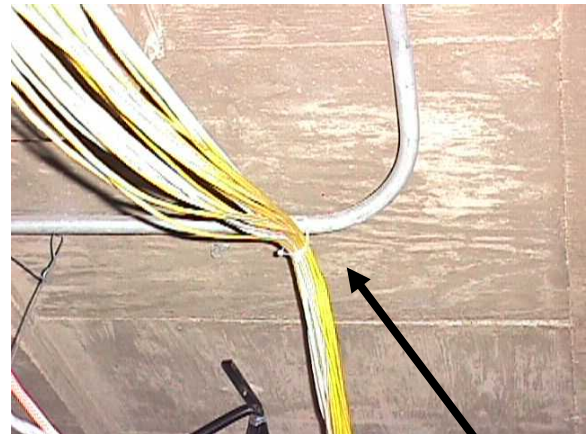


Photo 16. Wrong:

Cables should never be attached directly to electrical conduits or by only using a tie strap. Shoot a grid wire and attach a J-Hook.

- ★ Avoid running cable parallel to electrical conduits and never use conduits or piping as cable supports.
- ★ Every cable shall be properly supported by a dedicated series of grid wires with attached J-Hooks, creating an independent cable pathway system.
- ★ ***Never use the ceiling grid wire system or wrap bare grid wire around the cable bundle for support.***
- ★ All cable pathways shall keep the cable bundle at least one foot (12 inches) above the ceiling grid system. **UTA Network Project Coordinator must approve exceptions.**
- ★ Wherever possible, cables shall be grouped together in pathways. Always leave at least a ten (10) foot service loop at each work area outlet. **UTA Network Project Coordinator must approve exceptions.**
- ★ Never cinch plastic cable ties overly tight. If it deforms the outer cable jacket it is too tight. The ties should be trimmed flush of any excess length and be snug only. **The use of mechanical or powered cable tightening devices is strictly prohibited.** Avoid trimming cable ties at an angle and creating a sharp point.
- ★ Always use a J-hook. Never attach cables directly to grid wire with tie straps.
- ★ Cables should be properly supported and not sag between J-hooks. If the cable does sag it means that an additional grid wire and J-hook is required for proper support.



Photo 17. Wrong

1st - Never attach cables directly to grid wire. Also the cable has stress at the point due to the cable tie violating the minim bend radius.

2nd - Notice this is a ceiling grid wire. An independent grid wire will be installed with a J-Hook attached.

2. Vertical Wall Drops

A. Concealed (in-wall) or Flush Mounted

- ★ Terminate all jacks according to 568A and PANDUIT PAN-JACK guidelines.
- ★ Concealed (in-wall) drops should be restricted to hollow wall spaces that are made up of sheet rock on at least one side with no fire blocks. Wall openings shall have an ERICO Brand **P/N MPLS** single gang bracket installed for the purpose of mounting the faceplate. The bracket shall be securely fastened to the opening by means of sheet rock screws and bracket anchor points at both top and bottom of the bracket to ensure a snug fit. ***Levels should be used to ensure that faceplates are mounted correctly.*** Faceplates should be mounted at the same height from the floor as electrical outlets, unless otherwise specified.
- ★ Electronic stud finders will be used at all times and before holes are cut in the sheet rock. This will eliminate the hitting of wall studs or problems due to in-wall cross bracing. ***This will also prevent the installer from cutting into possibly Asbestos containing wall joint compound.***

B. Exposed or Surface Mounted

- ★ Exposed pathways down walls or columns shall be installed with PANDUIT Brand latch ducts of the appropriate size that will sufficiently accommodate the cables being routed.
- ★ Care should be taken to ensure that cables are not exposed anywhere along the pathway. This means that proper fittings are required for all transition points. (I.e. splice covers and drop ceiling fittings.)
- ★ Double-sided tape alone is ***not sufficient*** to hold the duct and should only be used in conjunction with ¼” anchoring devices mounted at the top and bottom and a minimum of every (6) six feet in between.
- ★ A Minimum of Two (2) - ¼” anchors shall also be used at every device and/or junction box. Also use # 6 screws that are at least ¾” long.
- ★ **Failure to comply with the above guidelines will be corrected at the Contractor’s expense.**



Photo 18: Example of exposed raceway application. Attached to the pillar.



Photo 19: Example of exposed raceway application. Mounted on a non-hollow wall above the level of the modular furniture.

- ★ ¼" anchors shall be used on all fittings for PANDUIT Brand **LD-3**, **LD-5** and **LD-10** latch duct at a **minimum of 2 foot intervals**. Failure to comply will be corrected at the Contractor's expense.
- ★ A PANDUIT Brand **P/N DCF3IW-X**, **DCF5IW-X** or **DCF10IW-X** ceiling grid/drop ceiling fitting will be used on all new exposed or surface mounted installations.



Photo 20:
An example of a
Panduit LD-3 Drop
Ceiling Fitting.

C. Copper Terminations

1) RJ-45 Type

- ★ All Cat 5e jacks shall be terminated either *TIA/EIA T568A* or *TIA/EIA T568B* and be determined by UTA personnel on a case by case basis.
- ★ All Cat 6 jacks shall be terminated using only *TIA/EIA T568B*.

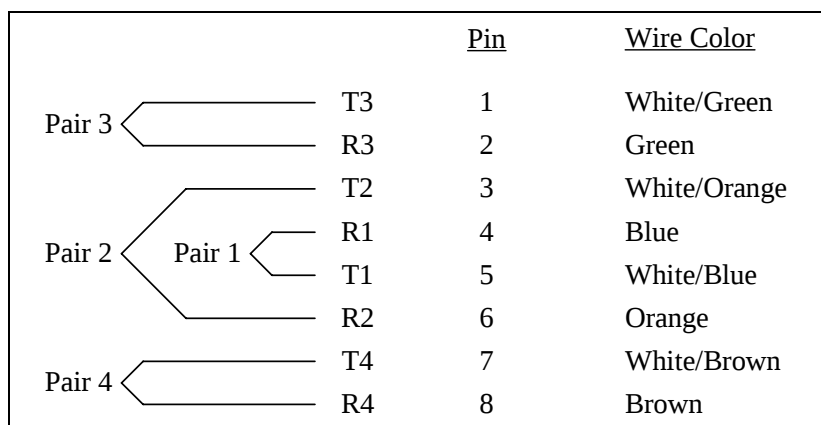


Figure 4 – Standard EIA/TIA T568A pin-out

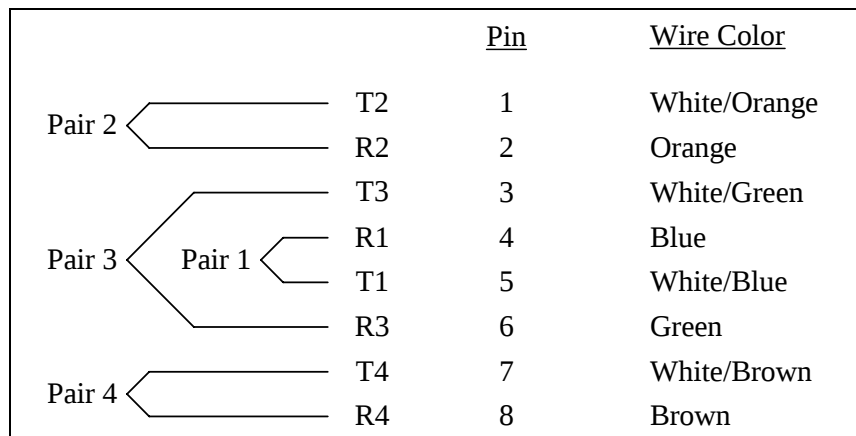


Figure 5 – Standard EIA/TIA T568B pin-out

2) Jack Colors

- ★ Standard Category 5e/6 data jacks shall be **blue** in color.
- ★ Voice/telephone Category 5e/6 jacks shall be **yellow** in color.
- ★ Backbone Category 5e/6 data jacks shall be **orange** in color (between telecommunication rooms).
- ★ Blank Inserts shall be **international white** in color.

3. Work Area Outlet (WAO) – Office/Classroom

To determine drop locations circuit ID numbers, stand at the rooms' main doorway. Label the proposed drops sequentially from the left and moving around the room in a clockwise fashion.

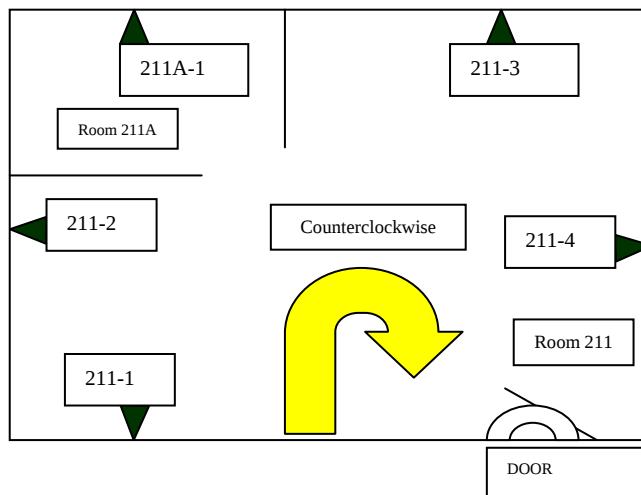


Diagram 4: The proper way to assign Circuit ID Numbers in the room where cable drops are being installed.

A. New Installations

Note: All installers must be BICSI Commercial Installer Level 1 certified and properly trained to install jacks according to PANDUIT specifications. New installations are wired with Cat 5e or Cat 6 unless otherwise specified by UTA.

- 1) For Cat 5e installations, use these parts:
 - ★ Standard Data Termination – **Blue** PANDUIT Brand Cat 5e network data jacks (P/N CJ5E88TGBU).
 - ★ Cross-Connect Termination – **Orange** PANDUIT Brand Cat 5e network data jacks (P/N CJ5E88TGOR).
 - ★ Telephone/voice Termination – **Yellow** PANDUIT Brand Cat 5e jacks (P/N CJ5E88TGYL).
 - ★ Faceplate – **International white** PANDUIT Brand Executive Series 4 port faceplate (P/N CFPE4IWY) on in-wall installations, PANDUIT Brand Executive Series 6 port (P/N CFPE6IWY) or 10 port (P/N CFPE10IW-2GY) faceplate may be used where 4 ports is insufficient.
 - ★ Surface Mount – **International white** PANDUIT Brand Surface Mount Box (P/N CBX4IW-AY) on surface installations, PANDUIT Brand Surface Mount Box (P/N CBXD6IW-AY) or 12 port (P/N CBX12IW-AY) surface mount may be used where 4 ports is insufficient.

2) For Cat 6 installations, use these parts:

- ★ Standard Data Termination – **Blue** PANDUIT Brand Cat 6 network data jacks (**P/N CJ688TGBU**).
- ★ Cross-Connect Termination – **Orange** PANDUIT Brand Cat 6 network data jacks (**P/N CJ688TGOR**).
- ★ Telephone/voice Termination – **Yellow** PANDUIT Brand Cat 6 jacks (**P/N CJ688TGYL**).
- ★ Faceplate and Surface Mount parts as specified under the Cat 5e installations section above.

B. In-Wall / Concealed

- ★ In areas such as offices that get two data lines and a telephone the faceplate shall be a (4) four port PANDUIT Brand Executive style Mini-Com faceplate (**P/N CFPE4IWY**) unless specified elsewhere.
- ★ In areas where a faceplate needs to be larger than 4 ports and up to 6 ports, a six port PANDUIT Brand Executive style Mini-Com faceplate (**P/N CFPE6IWY**) may be used.
- ★ When more than 6 ports are required at a location one of the following is acceptable:
 - ★ Install a second faceplate with the adequate openings required for the number of drops.

<i>Note-Remember this second faceplate will have a separate circuit ID number.</i>
--

- ★ When either a double gang outlet box or a double gang ERICO Brand bracket (**P/N MPLS2**) has been installed, a PANDUIT Brand Mini-Com 10 port Executive faceplate (**P/N CFPE10IW-2GY**) may be used.

C. Outside Wall / Exposed (Possible solutions for exposed Panduit installations)

- ★ A four (4) port Mini-Com surface mount box (P/N CBX4IW-AY).
- ★ A six (6) port Mini-Com surface mount box (P/N CBXD6IW-AY).
- ★ A twelve (12) port Mini-Com surface mount box (P/N CBX12IW-AY).
- ★ Use a PANDUIT one-piece deep surface mount box (P/N JB1IW-A) with a standard four (4) port executive style faceplate (P/N CFPE4IWY).



Photo 21: Example of 4-port PANDUIT surface mount box (P/N CBX4IW-AY).

NOTE: The UTAnet and Circuit ID labels have been made with a P-Touch label maker.



Photo 22: Example of one-piece single gang junction box (P/N JB1IW-A) mounted to a power pole to feed the top caps of modular furniture. Junction boxes are faced with PANDUIT Brand Executive style Mini-Com faceplate (P/N CFPE6IWY).

D. Faceplate Labels

Labels follow practices set forth in *ANSI/TIA/EIA – 606A ADMINISTRATION*.

The Contractor will generate labels for both the Office/Classroom and telecommunication rooms according to the following criteria:

- ★ The upper window is a downloadable custom designed Campus Network Services logo and will be provided by the UTA personnel.
- ★ The lower window is always an Arial bold 22 point font (ex. **102A-1**). Template available for download.
- ★ The jack label is PANDUIT Brand white label (**P/N C138X019FJJ**). The font for this label is an Arial 10 point (**102A-1A, 102A-1B, 102A-1VA**, etc. the “V” in front of a jack letter represents a voice circuit (i.e. 102-1VA). Use smaller fonts to fit longer circuit ID numbers on the label.
- ★ Jack labels will be wrapped around the jacks properly.

Note: Installers will not cut or tear ends off and stick jack labels on while they are snapped in the panel or faceplate. These labels must be installed centered then wrapped around the jack. Failure to properly install these labels will be repaired by the contractor who will provide replacement labels.

- ★ Each end of the Cat 5e/6 cable will be labeled at approximately 3 to 6 inches from the network data jack with a PANDUIT Brand clear cable label (**P/N S100X125YAJ**) using Arial 12 point font.
- ★ If an office or classroom requires more than a four (4) port faceplate, jacks shall be labeled from upper left to upper right, then lower left to lower right.

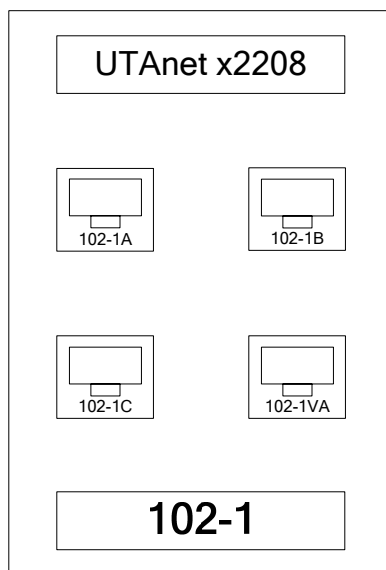


Diagram 5
Faceplate Configuration



Photo 23:
Picture of Proper Faceplate Configuration

E. Zone Cabling

- ★ Follow rules outlined in *EIA/TIA 568B* for consolidation points and multi-user telecommunications outlets for open office areas using modular furniture.
- ★ In the refurbished steel-case style furniture the extended TOP-CAPS must be used to separate the data from the bottom channel that contains the AC power for the cubicles. The Network connections will terminate on a power pole or column common to the walls of the modular furniture or on a wall above the top of the furniture, 70" from the floor to provide clearance for the removable TOP-CAPS.



Photo 24: Example of single gang surface mount boxes with executive faceplates mounted on a power pole feeding top-caps.

- ★ Patch cords will be used to connect the data jacks to the customer's workstation, hopefully hidden under the Top-Cap and vertically by plastic modular furniture raceway strips supplied by Steel-Case.



Standards of Installation for Network Cabling at UTA

Photo 25: Example of Modular Furniture top-cap install.

Photo 26: Example of top-cap's end view.

F. Floor Boxes

- ★ When installing PANDUIT data or telephone jacks in a floor box that was originally intended for mounting a 110V duplex power outlet a PANDUIT Brand MINI-COM 106 Duplex Module Frame (P/N CF1064IWY) will be used to secure the jacks. This frame will accommodate up to four (4) Mini-Com jacks. Standard color pattern will be used to denote telephone (**yellow**) and data (**blue**).



Photo 27: Mini-Com “106” Duplex Module Frame PANDUIT Brand P/N CF1064IWY.

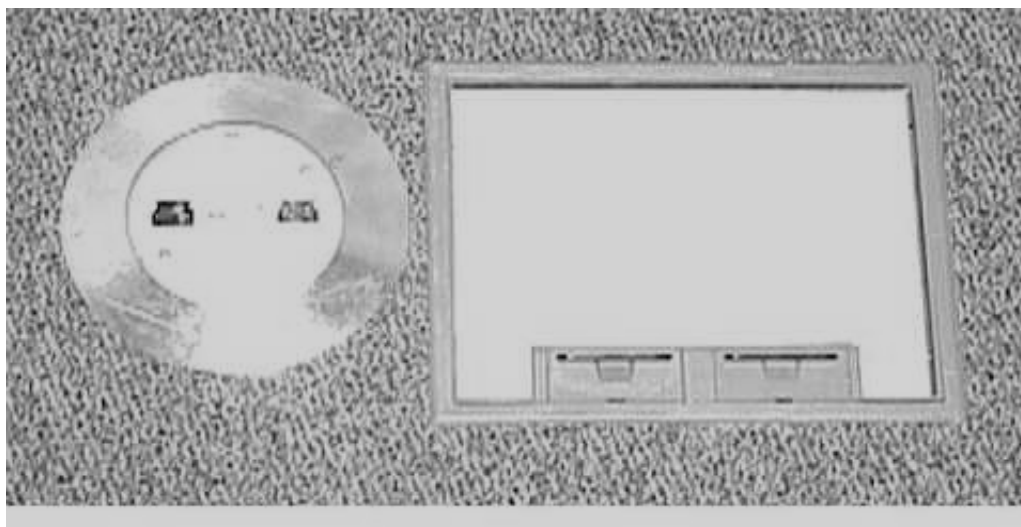


Photo 28:

Two different styles of floor boxes. The one on the left is a round Hubble Poke Through system. The one on the right is a flip up square floor box with conduits coming from the floor below. Inside the square box on the right a 106 adapter.

G. Modular Furniture Connector Installation

- ★ **Keystone Termination (Data)** – **Blue** PANDUIT Brand Cat 5e network data jacks (P/N NK5E88MBUY) or Cat 6 (P/N NK688MBU) shall be used to terminate into appropriate modular furniture using the custom made metal adapter fitting as needed.
- ★ **Keystone Termination (Phone)** – If telephone jacks are required, **Yellow** PANDUIT Brand Cat 5e network data jacks (P/N NK5E88MYLY) or Cat 6 (P/N NK688MYL) shall be used to terminate into appropriate modular furniture using the custom made metal adapter fitting as needed.



Photo 29: KI PowerUp Module with Panduit Keystone jacks installed.

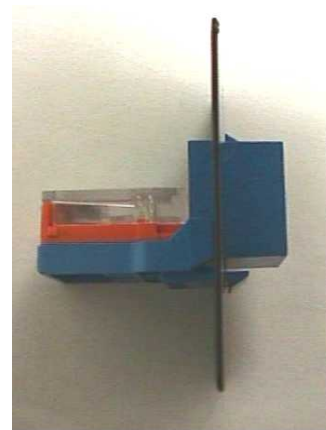


Photo 30: Panduit Keystone Jack in Metal KI PowerUp adapter plate (side view).

4. Testing and Documentation

- ★ Testing cabling both-ways per *TIA/EIA TSB # 67*, Test Chapter Reference in 568A with documentation is mandatory. All testing will adhere to the *TIA TSB 67* for certifying installations or the installed medium's required CATEGORY certifications test requirements (i.e. 5e or Cat 6).
- ★ See your UTA project manager for tester set-up instructions.
- ★ Test results and documentation will be provided to UTA in both hard copy and electronic versions.

This Page Intentionally
Left Blank

Chapter 3 - Fiber Optic Cable Requirements

Note: The TIA/EIA 568A wiring standards are the foundation of UTA's Network installation requirements. The following are specific parts and techniques used in cooperation with the TIA/EIA 568A cabling standard, including the changes introduced by TIA/EIA TSB-72.

Caution

Remember that fiber optic systems can employ the use of lasers. Never look directly into the end of a fiber system under power. Take all recommended safety precautions for the installation and testing of fiber optic systems, including the proper disposal of all fiber shards and related debris.

1. Fiber Optic Cable Construction

- ★ The standard fiber optic cable for UTA is **Corning**. The UTA Network representative must approve substitutes.
- ★ The installation of an outside plant (OSP) cable will have each buffer tube of separate color, following the standard order for fiber colors as set forth in TIA/EIA 568A. The first set of buffer tubes will contain the Single Mode fibers and the last set of buffer tubes will contain the Multi-Mode fibers.
- ★ Multi-Mode fiber shall be 62.5 x 125 micron FDDI grade, 3.0 dB/km @ 850 nm
0.7 dB/km @ 1300 nm
- ★ Single-Mode fiber shall be 9.0 x 125 micron, 0.35 dB/km @1310 nm 0.25 dB/km @1550 nm

Note: 1000Base-SX Multi-Mode Giganet (Gigabit) circuits have a loss budget that will not exceed 7.5 dB and a maximum length of 220 meters.

A. Fiber Optic Outside Plant Cable

- ★ The only UTA acceptable manufacturer of fiber optic cable is **Corning**.
- ★ The OSP cable will be of a loose tube type with each tube having an outside diameter of 3.0 mm.
- ★ Each buffer tube will be filled with water blocking gel or dryblock.
- ★ The cable will be flooded with a water blocking gel or use a water-swelling compound system.
- ★ The cable will have a polyethylene outer jacket.
- ★ Multi-mode will be 62.5/125 μ m graded index and at least FDDI grade fiber.
- ★ Single-mode will be 9.0/125 μ m fiber.
- ★ Also, all outside plant (OSP) fiber cable will be armored.
- ★ The cable will come with at least one rip cord, preferably two rip cords.
- ★ The cable will have an operating range of -40 to 70 degrees Celsius.

Note: The newer water swelling tape or powder cables can be used if they can properly demonstrate at least the same amount of water protection provided by traditional gel filled OSP cables

B. Exclusions: Fiber Optic Cable Specifications Not Allowed At UTA

- ★ Central tube construction is not used at UTA.
- ★ 50/125 μ m multi-mode fiber is not used at UTA.

C. Indoor Fiber Optic Cable

- ★ The standard for UTA is Corning. UTA Network personnel must approve substitutes.
- ★ Fiber cable will be PLENUM rated unless otherwise noted by UTA Network personnel.
- ★ Each separate fiber will be 900µm tight-buffered 250µm fiber.
- ★ Multi-mode will be 62.5/125 µm graded index and at least FDDI grade fiber.
- ★ Single-mode will be 8.3/125 µm fiber.
- ★ Must come with at least one ripcord.
- ★ No inner-duct required if using MIC interlocking armored plenum cables.

D. Standard Fiber Optic Cable Strand Counts

- ★ FOUR basic fiber strand count cables are used at UTA. They are:
 - ★ CORNING **six (6)** fiber Multi-Mode plenum rated
 - ★ CORNING **Twelve (12)** Single-Mode/**twelve (12)** Multi-Mode Plenum Rated Fiber
 - ★ CORNING **Twelve (12)** Single-Mode/**eighteen (18)** Multi-Mode OSP Rated Fiber
 - ★ CORNING **Twelve (12)** Single-Mode/**twenty-four (24)** Multi-Mode OSP Rated Fiber

2. Fiber Optic Cable Wall Mount Enclosures

The standard for UTA Wall Mount Fiber Enclosure is **Corning**. Inner-duct will connect the Slack Enclosure to the Wall-Mount Fiber Box in installations where a Wall-Mount Fiber Box is required. Refer to **Photo 31** below.

- ★ Wall Mount Fiber Enclosures used at UTA are:
 - ★ 2 slot - Corning **P/N WCH-02P** enclosure
 - ★ 4 slot - Corning **P/N WCH-04P** enclosure
 - ★ 6 slot - Corning **P/N WCH-06P** enclosure
 - ★ 12 slot - Corning **P/N WCH-12P** enclosure



Photo 31: 24 port Wall Mount Enclosure and Spare Fiber Enclosure.

- ★ Wall mount enclosures will be populated with the appropriate Corning brand bulkheads listed below.

Type	Multi-Mode	Single- Mode
ST	CCH-CP06-15T	CCH-CP06-19T
ST	CCH-CP12-15T	CCH-CP12-19T
SC	CCH-CP06-91	CCH-CP06-59
SC	CCH-CP12-91	CCH-CP12-59
LC	CCH-CP06-A7	CCH-CP06-A9
LC	CCH-CP12-A7	CCH-CP12-A9
LC	CCH-CP24-A7	CCH-CP24-A9

Table 3 – Corning Populated Bulkheads

3. Fiber Optic Cable Rack Mount Enclosures

- ★ Fiber Distribution Centers shall be installed rack mounted where possible; otherwise a wall mount enclosure will be suitable.
- ★ All wall mount enclosures will be installed on plywood backing unless specifically designated otherwise.
- ★ For each cable in an enclosure the Single Mode bulkheads are installed first from left to right followed by the Multi-Mode bulkheads. In situations where there are multiple cables, the next set of Single Mode bulkheads go in after the preceding cables Multi-Mode bulkheads.
- ★ Be sure to properly secure the fiberglass center member to the designed anchor points inside the enclosures according to the products design.
- ★ Rack Mount Fiber Enclosures used at UTA are:
 - ★ 2 slot - Corning **P/N CCH-01U** enclosure
 - ★ 4 slot - Corning **P/N CCH-02U** enclosure
 - ★ 6 slot - Corning **P/N CCH-03U** enclosure
 - ★ 12 slot - Corning **P/N CCH-04U** enclosure
- ★ Rack mount enclosures will be populated with the appropriate Corning bulkheads. Refer above to *Table 3 – Corning Populated Bulkheads* listed on page 3-3.

4. Fiber Optic Cable Slack Enclosures

A Fiber slack enclosure will be mounted above the wall-mount fiber boxes or on the wall near the rack-mount fiber enclosures to protect the minimum required amount of slack (25-50 ft.) at each end. ***There will be no exceptions to this minimum fiber slack length.*** Be sure to properly secure the fiberglass center member to the enclosures designed anchor points according to products design.

5. Fiber Optic Cable Splices and Splice Enclosures

A. Fiber Optic Cable Splices

CORNING CamSplice mechanical splices (**P/N 95-000-04**), require Splice Trays (**P/N M67-031, M67-053, M67-061, M67-070, UST-024**) with Closet Splice Housing (CSH) or Closet Connector and Splice Housing (CCS)



Photo 32: Corning CamSplice (P/N 95-000-04)

B. Fiber Optic Cable Splice Enclosure

- ★ The specific CORNING Splice Enclosure will be determined by UTA on a case by case basis.

***Note:** Mechanical Splices will only be allowed if express permission is given by UTA. Otherwise, the use of mechanical splices is prohibited.*

6. Fiber Optic Cable Connectors

- ★ CORNING brand (**P/N 95-101-41**) for Multi-Mode terminations for SC connections
- ★ CORNING brand (**P/N 95-201-41-SP**) for Single-Mode terminations for SC connections
- ★ CORNING brand (**P/N 95-101-51**) for Multi-Mode terminations for ST connections
- ★ CORNING brand (**P/N 95-201-51**) for Single-Mode terminations for ST connections
- ★ CORNING brand (**P/N 95-101-98**) for Multi-Mode terminations for LC connections
- ★ CORNING brand (**P/N 95-201-98**) for Single-Mode terminations for LC connections

***Note:** These connectors will be polished according to the guidelines outlined by CORNING for polishing. The end will have a mirror finish and the raw pedestal tip will be completely polished away.*

7. Fiber Optic Cable - Terminating Connectors

- ★ Fiber shall be terminated by or under close supervision of a certified Fiber Optic Installer. The preferred certification is the *CORNING S-07 or S-07+*. Proof will be required upon request.
- ★ Fiber shall be terminated with SC style connectors unless otherwise specified.
- ★ All loose buffer tube gel filled cables will have CORNING Brand fan-out kits installed (**P/N FAN-OD25-12**) (*No Substitutions*).
- ★ *A fan out kit will always be used, never install fiber terminators directly onto the loose tube fiber. Failure to comply will be corrected at the contractor's expense.*

- ★ All armored fiber optic cables will have grounding kits (Corning brand **P/N FDC-CABLE-GRND** Armored Cable Grounding Kit) installed at both ends and be properly grounded in the

telecommunication rooms per the *TIA/EIA 607 Grounding and Bonding* procedures. Also these cables will be grounded per the guidelines set forth in *Article 250 Grounding and Article 770-33 Fiber Optic Building Entrance Point Grounding* located in the 1999 edition of the *National Electric Code (NEC)*. Also refer to *page 4-1, Chapter 4 - Grounding* of this document for further information.

8. Fiber Optic Cable - Labeling

- ★ Labeling on cabinets shall be accomplished by a P-touch (Brother labeler) or similar machine.
- ★ Use black on white tape.
- ★ Labels shall identify the far end location, each bulkhead shall be individually lettered A, B, C, D, etc.
- ★ Labels shall also include the Building and Strand count (refer to Diagram 6, page 35).
- ★ A plastic self laminating 2" X 3.5" tag (PANDUIT Brand **P/N PST-FO**) with the legend "**CAUTION FIBER OPTIC CABLE**" will also be placed approximately 2 feet from each end of the fiber cable, outside of the fiber termination box. The proper fiber information (end location to end location and fiber strand count) will be written on the tag with a permanent marker.

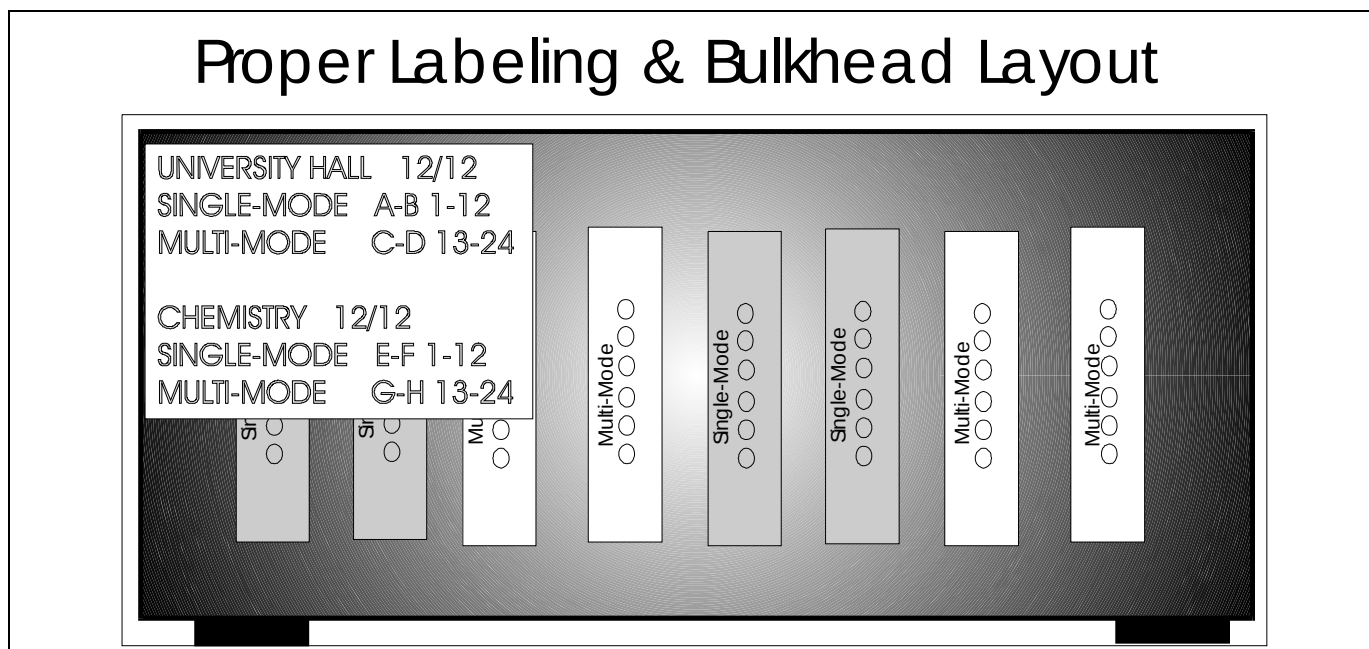
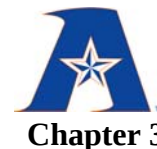


Diagram 6: Notice the order of the Bulkheads in the enclosure.

9. Fiber Optic Cable – Testing and Documentation

- ★ Every fiber shall be tested and documented.
- ★ Every fiber shall be tested with a light source tester; OTDR testing may be required at the UTA Network personnel's discretion. Testing with either a light source meter or an OTDR shall be done in both directions.
- ★ Locations of any mechanical or fusion splice should be noted in the OTDR information.

Standards of Installation for Network Cabling at UTA



- ★ Light meter tests for Multi-mode will be Dual wavelength (850nm, 1300nm).
- ★ Light meter tests for Single mode will be Dual wavelength (1310nm, 1550nm).
- ★ All tests should be received by UTA in both a hard copy and electronic version of the file.
- ★ All information should be delivered to the UTA Campus Network Services department in an accurate and timely manner.
- ★ A general rule of thumb for acceptable losses are 0.5db for a multimode termination, 0.3db for a single mode termination and 0.1db for each splice. However, please see below, paragraph 9.A. *Fiber System Loss Budget Calculation* as to the preferred method of calculating an acceptable db loss for a circuit.

A. Fiber Optic Cable - System Loss Budget Calculation

- ★ Acceptable Fiber Attenuations:

Wave Length 850nm	3.50db/km
Wave Length 1300nm	1.00db/km
Wave Length 1310nm	0.40db/km
Wave Length 1550nm	0.30db/km
- ★ Acceptable Connector Attenuation: 0.75db/connector link
- ★ Acceptable Splice Attenuation: 0.10db/splice
- ★ Formula for calculation:
 - ★ $(\text{Cable Footage} * \text{Fiber Attenuation} / 3281 \text{ ft}) + (\# \text{ of connector pairs} * 0.75\text{db}) + (\# \text{ of splices} * 0.10\text{db})$
 - ★ Cable Footage is the actual length of the fiber run in feet.
 - ★ Fiber Attenuation / 3281 ft is the Acceptable Fiber Attenuation reference for the wavelength being tested divided by 3281 to convert the measurement from kilometers to feet.
 - ★ # of connector pairs indicate the number of patch panel connection points. This will be 2 unless the strand of fiber contains multiple hops.
 - ★ # of splices indicate the number of splices of any type, if any, in the fiber path
- ★ Example Calculation:
 - ★ The job calls for a fiber optic run of 3000 ft.
 - ★ We wish to test it at the 850nm wavelength.
 - ★ This is a single hop test, so there are only 2 connection points, one at either end of the run.
 - ★ There are no splices in the fiber run.
 - ★ The acceptable db loss for this test would be 4.70db.
 - ★ The calculation would be:

$$\begin{aligned} &= (3000\text{ft} * 3.5\text{db} / 3281\text{ft}) + (2 [\text{connector pair at either end}] * 0.75\text{db}) + (0 [\text{no splices}] * 0.10\text{db}) \\ &= (3.20\text{db}) + (1.50\text{db}) + (0\text{db}) \\ &= 4.70\text{db} \end{aligned}$$

★ Result

- ★ If the fiber optic cable installation in this instance is over 4.70db loss when testing at 850nm wavelength, the cable installation does not meet UTA minimum standards. Whatever is required to bring the test results up to UTA minimum standards is at the contractor's expense.

10.Fiber Optic Cable - Splicing Procedures

Only qualified technicians using the proper tools and products rated for the job will perform fiber optic cable splicing at UTA. All splices will be properly tested and documented, noting the point of the splice in all documentation. Technicians will supply all the equipment required to professionally and properly complete the splicing work.

- ★ On a composite cable, containing both multi-mode and single mode fiber, the contractor will provide the proper test equipment to completely test both types of fiber.
- ★ This test equipment will be on-site ready for use as soon as the splice has been completed.
- ★ When finished with the splicing work the technician will test the impacted fiber according to the listed documentation and test requirements listed in paragraph 10.B. for standard fiber testing at UTA.
- ★ Test results will be provided to the UTA Campus Network Services department in both a hard copy and electronic version.

Caution

Remember that fiber optic systems can employ the use of lasers. Never look directly into the end of a fiber system under power. Take all recommended safety precautions for the installation and testing of fiber optic systems, including the proper disposal of all fiber shards and related debris.

A. Fiber Optic Cable - Outside Plant Splice Enclosures

- ★ Outside Plant fiber splice enclosures will be watertight and properly installed to ensure that the product remains watertight.
- ★ Spliced fiber will be properly secured in splice trays to ensure reliable operation.
- ★ The remaining slack fiber cable from OSP pull vaults will be properly coiled and replaced into vault.
- ★ Any grounding system disconnected or cut during the course of splicing will be repaired and reconnected. This includes where the metal foil of an armored cable has been cut apart to perform the required splice. It must be restored with its original grounded state. If a cable was not properly grounded to start with, the contractor should bring this immediately to the UTA Network Representative or said contractor **WILL** be held responsible for its repair.

B. Fiber Optic Cable - Testing and Required Documentation for Splices

The requirements for testing and documenting the fiber splices are the same as those found on *page 3-5, Chapter 3, paragraph 9 - Fiber Optic Testing and Documentation.*

11.Fiber Optic Cable - Outside Plant

Standards of Installation for Network Cabling at UTA

All Outside Plant Work will follow the guidelines set forth in *TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Cabling Standard*.

A. Fiber Optic Cable - Outside Plant Pathways

- ★ All outside plant fiber optic cables shall be installed in inner-duct rated for outside burial.
- ★ All outside plant inner-duct is to be orange, schedule 40 or better and a minimum size of 2" diameter.
- ★ A minimum of two spare inner-ducts shall be placed with the inner-duct being used, for future use.
- ★ All spare conduits and inner-ducts will have mule-tape or a pull string provided for future use.
- ★ At points where the inner-duct needs to be spliced proper fittings will be used, either a threaded screw on watertight splice or heat fusion type splice. See **Diagram 7** below.

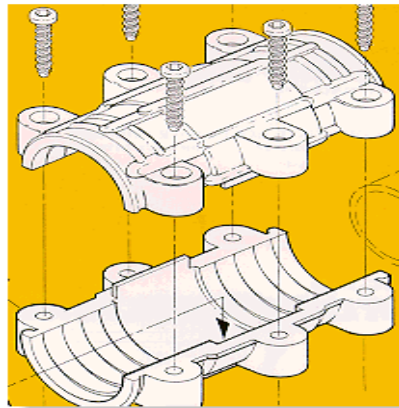


Diagram 7: Cabletec's 2 piece coupling unit (P/N PE1.660) used for 1.25" inner-duct

- ★ All unused conduits in outdoor pull boxes will be properly plugged with removable watertight plugs.
- ★ At UTA, we have an extensive underground tunnel network. In these locations PVC inner-duct 1.25" trade size of orange coloring shall be used. This inner-duct shall be supported at a minimum of 4 feet intervals.
- ★ All OSP work will be properly documented and the Auto-CADD information including cable depths and accurate routing will be provided to UTA in both electronic and hard copy version.

B. Fiber Optic Cable - Outside Plant Outdoor Pull Points

- ★ Cable service loops are required at each hand-hold opening and shall be installed within proper distances: 100' loop per opening between hand holes.
- ★ Pull points shall be strategically designed and placed to permit the installation of fiber cables within the manufacturer specifications. Pull points will be no further than 400 ft. apart.
- ★ Pull points shall be designed to use a Newbasis Greenline or Quazite hand-hole no smaller than 30" X 48" X 20" deep with a wire screen bottom. They shall be load rated to 20,000 lb. with

bolt down two-piece lids. They shall have a 6" minimum of medium wash rock base. See **Diagram 8** below.

- ★ Where a pathway enters a building above ground there may be placed a 24" X 24" X 12" minimum weather-tight junction box to accommodate the transition and provide pulling access.
- ★ During the pulling of OSP fiber optic cable, the Contractor will use proper figure-8 technique to stage the slack fiber cable between pull points. This shall be done to insure the cable does not get damaged during installation.
- ★ Contractors will use breakaway swivels rated at no greater than 600 lbs.

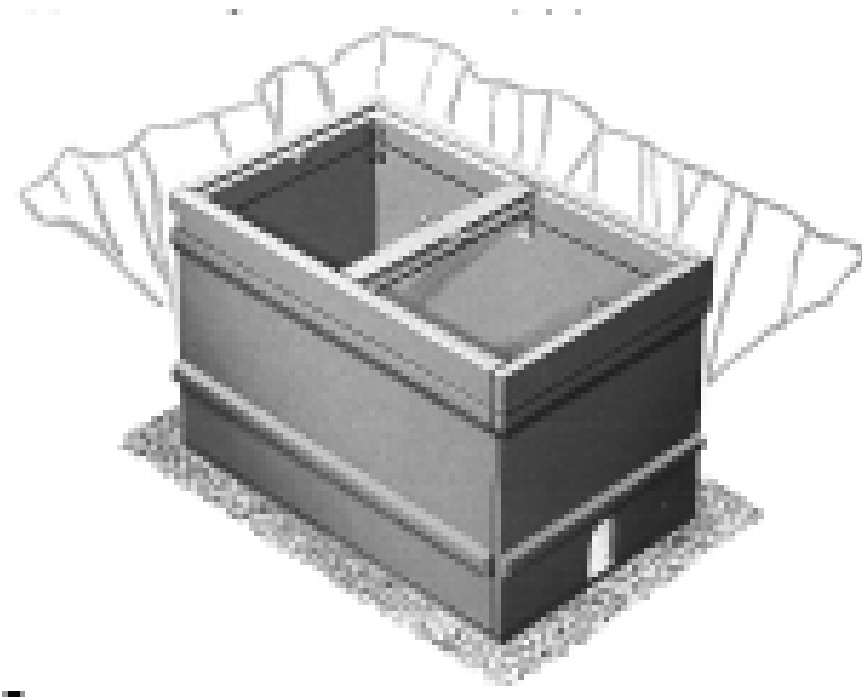


Diagram 8: *Illustration of a Quazite fiber slack enclosure. It is also used as an outdoor pull point.*

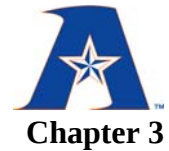
C. Fiber Optic Cable - Outside Plant Conduits and Inner-ducts

- ★ At no place along the pathway should the fiber cable be exposed.
- ★ When outside rated Schedule 40 inner-duct transitions to the thinner wall indoor style inner-duct an outdoor rated, watertight coupler will be used to connect the two types together.
- ★ All conduits shall be reamed and bushed.
- ★ All conduits shall be installed according to the NEC and any local authority having jurisdiction.
- ★ All spare conduits and inner-ducts will have mule-tape or a pull string provided for future use.

12.Fiber Optic Cable - Building Entrance Point and Indoor Fiber Pathways

- ★ A service loop of 50' will be left at every building entrance.

Standards of Installation for Network Cabling at UTA



- ★ At no time shall an Outside Plant rated cable run inside a building further than 50 feet unless it is encased in rigid metal conduit. Otherwise there must be a transition from outside plant cable to a Plenum rated fiber optic cable which will then be run through a Plenum Rated inner-duct. This transition can be accomplished by a fusion splice, a mechanical splice or by a Fiber Wall Mount Enclosure at UTA's discretion.

A. Fiber Optic Cable - Indoor Fiber Pathways

- ★ All pathways will consist of inner-duct, conduit or a combination of both.
- ★ If broken or split, this inner-duct shall be spliced with the proper fittings.
- ★ Inner-duct and fiber cable ran through Plenum airways will be Plenum rated.
- ★ Where it enters a junction box or slack box the inner-duct will be connected to the wall mount box with the proper fitting to securely fasten the inner-duct to the enclosure.
- ★ Cables and inner-duct shall be rated according to TIA/EIA and NEC codes for the environment in which they are installed.
- ★ Support for inner-duct shall be no greater than 4' intervals.
- ★ All spare inner-duct will have a pull string provided for future use.

B. Fiber Optic Cable - Indoor Pull-points

- ★ Pull points shall be installed or used at intervals not to exceed the manufacturer's specifications for the cable being placed.
- ★ No service loops shall be left at indoor pull points.
- ★ Service loops shall be installed only where a cable leaves a building or is terminated. Those loops shall be between 25 and 50 feet in length.

Chapter 4 - Grounding

All telecommunication rooms will adhere to the grounding guidelines set forth in TIA/EIA-607 (Commercial Building Grounding And Bonding Requirements For Telecommunications) plus any applicable codes in Articles 250 – (Grounding) and 800 – (Communications Systems) of the NEC 1999.

- ★ For an explanation of what constitutes a proper ground point for the telecommunications bus bar to which the equipment will be grounded, see *NEC-1999 Article 800-40*. Below are three general possibilities of acceptable ground points. These ground points must meet all the detailed requirements of the above mentioned *TIA/EIA-607 (Commercial Building Grounding And Bonding Requirements For Telecommunications)* as well as any additional codes in Articles (250 – Grounding) and (800 - Communications Systems) of the NEC 1999.
 - ★ Attach to Building or Structure grounding system.
 - ★ Attach to metallic power service raceway or equipment enclosure.
 - ★ Attach to an 8' ground rod properly installed in the earth.
- ★ The surface must be prepared to provide a proper path to ground. Any surface that is to be grounded must be free of paint or other coating that might prevent an effective grounding. Paint should be scraped or filed away until a metallic surface has been exposed. Then the proper grounding component can be attached to complete the system.
- ★ All system components (i.e. ladder-style cable raceway, equipment racks, etc.) will be connected together and will eventually connect to the telecommunication rooms grounding bus bar with at least a #6 solid or stranded copper wire with a green insulation jacket.
- ★ The bus bar will be connected to the building ground system in such a manner so that it meets the above specified requirements set forth in *TIA/EIA-607 (Commercial Building Grounding and Bonding Requirements for Telecommunications)* as well as any additional codes in Articles (250 – Grounding) and (800 – Communications Systems) of the NEC 1999. The telecommunication rooms grounding bus bar will attach to the specified grounding system by a wire that is a minimum of #6 solid or stranded copper wire with a green insulation jacket.

A. Grounding Procedures in Telecommunication Rooms

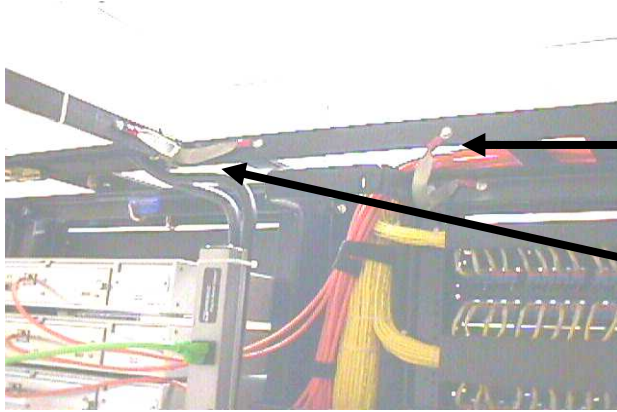


Photo 33:

An example of properly installed ground straps connecting sections of ladder-way and equipment racks together.

- ★ All metallic racks, ladder ways and Network/Telecommunications Equipment will be properly terminated per *TIA/EIA 607* and *NEC 1999* guidelines and procedures.
- ★ This Equipment will eventually be tied back to the telecommunication rooms Grounding Bus Bar that ties back to the Building's Grounding System.
 - ★ The telecommunication room's Grounding Bus Bar shall be equipped with a grounding conductor that is attached to an approved electrode per *NEC 1999* standards by a #6 copper wire with a green colored insulator.
 - ★ The wire jacket will be rated for the environment that it has been installed in, i.e., if the wire runs back to a ground electrode in a path through a plenum return airway then the cable should be plenum rated.
- ★ These procedures are mandatory to the completion of required work in all new Network/Telecommunications installations.

- ★ In existing telecommunication rooms that are not up to the required grounding guidelines, the UTA Network Group will decide if the work will be completed by the Contractor or brought into compliance by UTA Network Group Staff. ***Contractors should bring this question of responsibility up at the time of the project walk-thru.***



Photo 34: Example of a large grounding bus bar in a telecommunications room.

Note the two connections. One goes back to the Building grounding system and the other wire to the grounded ladder-racks.

This Page Intentionally
Left Blank

Chapter 5 – Safety

1. General Safety Practices

- ★ The Contractor shall conform to all applicable Federal, State and Local Regulations and/or standards pertaining to worker safety; including OSHA standards.
- ★ All workers will use proper safety in performing their installation tasks, i.e., wearing safety glasses around eye hazards, ladder safety, wearing dust masks under dusty conditions, etc. Contractor injuries should be reported to their supervisors immediately.
- ★ Workers will wear approved safety harnesses when working at dangerous heights in accordance with the fall protection guidelines defined by the OSHA standards.
- ★ ***All fire or accidents will be reported to the UTA Police Department immediately at (817) 272-3003.***
- ★ To prevent accidents and fire hazards; ***all construction debris will be cleaned up nightly.***
- ★ The Contractor will dispose of all large empty spools of fiber and/or inner-duct in a timely manner (within a week after the job has been completed). ***Spools blocking hallways or doors are a fire hazard and are not permitted. They must be removed immediately.***

2. Asbestos Clearance

- ★ All cabling projects must have an **ASB-1** form submitted and approved by the **UTA (appropriate A Team title here)**. This form will explain any possible asbestos risks along the cable path.
- ★ **All contractors and employees installing network cabling and/or terminating network cabling at UTA MUST complete a mandatory Asbestos Awareness training course BEFORE beginning work at UTA.** This course is provided by UTA (conducted by a **UTA (appropriate A Team title here)** representative) at no charge to the contractor. The contractor is responsible for providing proof of each employee's completion of this training. ***Failure to follow this policy will result in the dismissal of the guilty contractor.***

3. Fire-stopping

- ★ All penetrations into fire-walls or core holes between floor must be properly fire-stopped in accordance with the guidelines in *BICSI TDM 95 Chapter 20. Fig. 11*, and must also conform to any related NEC requirements for Fire-stopping.
- ★ Penetrations in fire rated walls shall be sleeved with the appropriate sized “**Unique Fire Stop Products**” penetrator. (P/N **SP-1, SP-2, SP-4**) Exceptions at UTA's discretion on a case by case basis.
- ★ Proper Fire-stopping should be performed on any hole and/or penetration of a firewall or solid wall. This may include the Contractor installing Mineral Wool in the space between the sheet rock wall and then installing a sheet rock patch on both sides before installing the Fire-Stopping Material.

Standards of Installation for Network Cabling at UTA

- ★ Fire-stop any transitions between floor using or not using conduit or sleeve. When using Fire-stopping Putty in a conduit or sleeves between floors a section of Fire-resistant Mineral Wool must be inserted to create the proper base for the putty. ***Making a form out of cardboard is not acceptable.*** Fire-stopping pillows are also acceptable to seal an opening that may need to be reentered at a later time.



Photo 35: Properly Fire-stopped using SpecSeal™ Intumescent Pillows

4. Environmental Health and Safety - Attachment 1.

Attachment 1: Campus Safety Guidelines

The University Of Texas At Arlington
Environmental Health & Safety

University Construction Site
Procedures For Contractors

Definitions

Pollutant, pollution, hazardous waste, hazardous substance, hazardous material, or contaminant, means any toxic or harmful substance as defined by CERCLA, SARA, and/or any similar federal, state, or local law, rule, or regulation.

Common Problems For Contractors

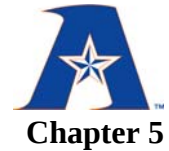
Equipment Cleaning

Equipment should be cleaned in a manner that does not create any discharge of cleaning agents, paints, oil, or other pollutants to a storm sewer or waterway. Soaps and detergents should never be discharged to the ground or off-site. When rinsing painting equipment outside, contain rinse water in a bucket or other container. Water based or latex paint rinse water may be discharged to the sanitary sewer. Oil-based paint wastes, including solvents & thinners, should not be disposed of in the sanitary sewer. They must be collected and disposed of through the contractor's disposal company. Cement handling equipment should be rinsed in a contained area so there is no drainage off-site.

Asbestos Containing Materials

Before beginning work in any UTA campus buildings, the contractor shall verify that no asbestos containing or suspect asbestos containing materials will be damaged or disturbed during any portion of the work to be performed. This can be verified through UTA Environmental Health & Safety (EH&S) Office. If the contractor incidentally damages or disturbs asbestos containing or suspect asbestos containing materials during any portion of the work, the contractor shall immediately stop work in that area, restrict access to the area, and contact EH&S. All personnel working on the campus that may come into contact with suspect asbestos-containing materials must attend a 2-hour asbestos awareness class that will be provided by UTA's Environmental Health & Safety Office. The training will be held on the UTA campus at a location yet to be determined. This awareness training will not meet the OSHA asbestos training requirements for workers removing asbestos containing materials or the training requirements for an asbestos competent person.

Standards of Installation for Network Cabling at UTA



Waste Disposal

Any trash or debris must be cleaned daily, contained on-site and disposed of in a recycling bin or waste receptacle to prevent wind or rain from carrying it off-site into a storm drain or waterway. Petroleum wastes, such as waste oil and used oil filters, should be containerized for recycling or disposed by the contractor. Non-hazardous solid wastes, such as general construction debris can be recycled or disposed of in the trash container. **Never dispose of liquid wastes of any kind in dumpsters.**

Storm Water Management

The University of Texas at Arlington (UTA) has implemented a Storm Water Management Plan covering that portion of the municipal separate storm water system within the corporate boundary of the city of Arlington operated by UTA. Prior to beginning construction, contractors are required to submit a Storm Water Pollution Prevention Plan for review by the EH&S Office and the Storm Water Management (SWM) Team.

Erosion/Sediment Control

Proper erosion and sedimentation controls must be in place to prevent sediment or silt run-off. The Storm Water Quality Best Management Practices (BMPs) for Construction Activities Manual produced by the North Central Texas Council of Governments (NCTCOG) provides appropriate design criteria for permanent and temporary structural controls. Sediment (including cement) should never be rinsed off the site; instead, it should be cleaned up in a manner that does not allow it to reach a storm drain or waterway. Equipment tires may be rinsed before leaving the site to avoid tracking sediment into the roadway or off the site.

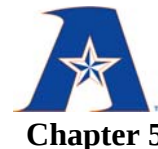
Construction Sites of five (5) or more acres

The contractor will be required to obtain a National Pollutant Discharge Elimination System (NPDES) Permit issued by the Environmental Protection Agency (EPA). Operators of such sites are to implement best management practices (BMPs) to the maximum extent practicable to minimize the quantity of storm water pollutants leaving the site. Details for implementing BMPs on site should be described in the Contractors Storm Water Pollution Prevention Plan. Site operators and managers should stress and enforce such practices upon their work force, subcontractors and material suppliers in order to avoid the generation of pollutants by wind and storm water runoff.

Retain the following documents at the construction site from the date of project initiation to final stabilization.

1. SWPPP – Storm Water Pollution Prevention Plan
2. Reissued NPDES General Permit
3. Plan Certification Statement
4. NOI's
5. EPA NPDES Storm Water Program Notice
6. Inspection Reports
7. Materials List
8. Record of Construction Activities

Standards of Installation for Network Cabling at UTA



Construction Sites of 12,000 feet to five (5) acres, and all Commercial Sites

Before starting any activity that will disturb an area between 12,000 square feet and five (5) acres of land, the contractor is required to submit a Storm Water Pollution Prevention Plan to the EH&S Office and SWM Team for review. For commercial sites, a Storm Water Pollution Prevention Plan is required regardless of the area disturbed.

Site De-watering, Tank and Pipe Testing

Discharge from de-watering, hydrostatic tank testing or pipe pressure testing must be free from sediment, chemicals, and any other pollutants. Some discharges, such as those from underground storage tank pits, will require prior approval from the City of Arlington.

Petroleum

Spills of hydraulic fluid, oil and other petroleum products should always be immediately cleaned up to prevent discharge of these fluids with storm water run-off. Petroleum contaminated soil should be cleaned up and disposed of properly. Storage containers should be kept closed, clean, and free of oily residue. Construct a liquid-tight bermed area for temporary fuel tanks used during construction.

Separators or Traps

Before removing oil/water separators or traps connected to the sanitary sewer, the materials in them must have been tested (Toxicity Characteristic Leachate Procedure, or TCLP) within the last two years before they are cleaned out. Be aware that this test may take three weeks to complete if a recent test has not been completed, so plan accordingly. Documentation of the test results must be submitted to the EH&S Office for review and approval before emptying or removing the trap.

Spill Prevention, Clean-Up and Disposal

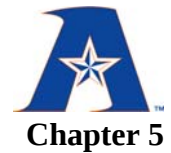
Plan Ahead

It is cheaper to prevent spills than to clean them up. Be prepared to contain or dike spills to prevent spreading. Small areas are easier to clean than large ones. Keep sorbent materials such as clay (kitty litter), polypropylene booms and pads, rags and sawdust on hand for clean-up of spilled liquids.

Clean-up

Sorbent materials can be used to effectively clean up various materials spilled on pavement, water, and soil. Soil or other media which has been contaminated with petroleum or other pollutants should be excavated or remediated to prevent contaminated discharges to a storm drain or waterway. Excavated contaminated materials should be stored in containers or on plastic and covered so that the contamination is not flushed back onto the ground during a rainstorm.

Standards of Installation for Network Cabling at UTA



Contaminated Material Disposal

Proper disposal of waste materials depends partly on the type of contaminant. Hazardous wastes (such as flammable petroleum products and solvents, thinners) and materials contaminated with hazardous wastes, are considered regulated wastes, and should be containerized for transport and disposal by a permitted company. Disposal also depends on the amount of contaminant. For information on testing of contaminated soil and disposal options contact EH&S, 817-272-2185.

Spill and Complaint Response Program

The University's Environmental Health & Safety Office has a program to enforce water quality regulations and assist you in compliance with those regulations. The EH&S staff respond 24 hours a day, 7 days a week to hazardous materials spills and spills which threaten surface water quality, within the University of Texas at Arlington. Investigations are conducted to determine compliance with environmental laws & regulations and ensure corrective actions are taken when necessary. Strictly prohibited are discharges of any material or substance which will or might cause pollution to surface waters. Staff have specialized training in hazardous materials response and spill clean-up regulations. For more information on spill clean-up requirements and other regulations call 817-272-2185.

General Safety

It is UTA's intention to provide a safe work environment for all individuals at this work site. For this reason, all contractors performing services on the campus must comply with and enforce all applicable local, state, federal (OSHA regulations), and our campus safety policies. This includes having implemented any required employee training and written programs.

Before providing any services under this contract, the contractor is requested to furnish a copy of all applicable required written programs and documentation of training for each employee under their control at the work site.

The following OSHA regulations may apply to the services being performed and require proper employee training, documentation of employee proficiency, and a written program by the contractor:

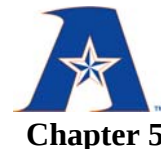
- ★ LOCKOUT/TAGOUT, 29 CFR 1910.147, Subpart J
- ★ HAZARD COMMUNICATION, 29 CFR 1910.1200 Subpart Z
- ★ RESPIRATOR PROTECTION, 29 CFR 1910.134, Subpart I
- ★ CONFINED SPACE (PERMIT REQUIRED), 29 CFR 1910.146, Subpart J
- ★ BLOODBORNE PATHOGEN, 29 CFR 1910.1030, Subpart Z

The following OSHA regulations may apply to the services being performed and require only employee training and documentation of employee proficiency by the contractor:

- ★ FALL PROTECTION, 29 CFR 1926.503 Subpart M
- ★ PERSONAL PROTECTIVE EQUIPMENT, 29 CFR 1910.132 Subpart I
- ★ WELDING, CUTTING, BRAZING, 29 CFR 1910.254, Subpart Q
- ★ ELECTRICAL SAFE WORK PRACTICES, 29 CFR 1910.332, Subpart S

Contractors will:

Standards of Installation for Network Cabling at UTA



-
- ★ Conduct daily safety inspections of all assigned area
 - ★ Identify and correct hazards
 - ★ Provide contractor employees with required personal protective equipment
 - ★ Establish and maintain an effective Housekeeping Program

Contractor Requirements and Responsibilities

The contractor shall maintain a legible copy of a current Material Safety Data Sheet (MSDS) for each hazardous chemical brought to the construction site. MSDS(s) shall be readily available, on request, for review by University personnel.

Contractors are responsible for cleaning up and properly disposing of all spilled pollutants that you brought to the site, including oil, paint, fuels, antifreeze, solvents, etc. You should keep accurate records (such as receipts, copies of analytical results, etc.) indicating proper disposal of spilled materials. Furthermore, you are responsible for ensuring that all discharges from the site are in compliance with all applicable regulations.

In general no substance should be dumped or leaked onto the ground or allowed to run-off of a construction site that might cause pollution. Be aware that you are responsible for pollutant contaminated run-off and proper disposal of all your waste materials generated as a result of your activities.

Notification Requirements and Procedures

We should be notified immediately in the event of:

- ★ Any spill that threatens to enter a storm sewer or watercourse.
- ★ All petroleum spills, e.g. hydraulic fluid, transmission fluid, diesel, gasoline, etc.
- ★ Contact with asbestos containing or suspect asbestos containing materials.
- ★ Any hazardous or unknown material spill, e.g. many solvents, cleaners, etc.
- ★ Any discharge from your site which you suspect may be a violation of City Code or state regulations, e.g. discharges which are cloudy, foul-smelling, colored, contain chemicals or heavy sediments loads.

Environmental Health & Safety – (817) 272-2185

Call this number to contact a representative for information during office hours (8:00 a.m. to 5:00 p.m.).

(After hours call UTA Police Dispatch, 817-272-3381, who will contact an EH&S representative).

Revised: August, 2000

End Of Safety Office Attachment

This Page Intentionally
Left Blank

Chapter 6 – Additional Information

1. Campus Notification For Core Holes

All core holes and permanent modifications to Buildings and other structures must be first reported to the UTA representative. This notification must be given in writing before the work is to be done.

2. After Hours or Holiday Work

Any work to be performed by the Contractors outside normal University business hours (**8:00am-5:00pm Monday - Friday**) and/or work to be done during University Holidays requires written approval be granted and access to the area must be scheduled by the University Police department. Normally this can be taken care of by the UTA Project Coordinator/OIT Network employee.

3. Work in Hazardous or High Liability Areas

Certain areas on campus may pose a hazard to Contractors due to the nature of the department's research. Possible hazards include but are not limited to poisonous animals, high-powered lasers and reactive chemicals. For the safety of the contractors and to limit possible damage to expensive property and equipment, we require a departmental escort to be with the Contractors at all times.

Certain areas on campus also use very expensive research equipment. In these areas, the department is required to provide an escort for the Contractor to ensure nothing is damaged during the required cabling work in that area.

- ★ Work with a departmental representative to cover any equipment that can be damaged when drilling or cutting work is performed near the equipment.
- ★ DO NOT touch or lean against computer or sensitive equipment. If the equipment is in the way of the installation, make arrangements with a departmental representative to have it relocated to a safe place until the work has been completed.
- ★ Cover machines whenever moving the ceiling tiles above them.
- ★ Clean up any debris and dust caused by the work performed.
- ★ Report any damage to furniture or equipment immediately to your foreman or the UTA Project Coordinator.

4. Glossary of Terms

Basic Link - This test is only for the horizontal wiring, without the patch cords. This is when the circuit is being tested by the LanMeter to certify that it meets Cat 5e/6 specifications.

Channel - The Channel includes the user's patch cord & the TC patch cords that connect the circuit to the network electronics. You should see network traffic on this circuit if it is properly working.

MM - The abbreviation for multi-mode fiber 62.5 or 50.0 μm in size operating at 850nm or 1310 nm wavelengths. Multi-mode fiber systems generally use LED's to transmit data; even so proper safety precautions should be taken to prevent permanent eye damage.

NEC - The abbreviation for National Electric Code, an international standards-making organization that is part of the National Fire Protection Association. They create code practices that must be adhere to on any electrical installation including have authority of low voltage

OSP - The abbreviation for Out-Side Plant, refers to any cable or work performed between Campus buildings or off of Campus property. The construction of these products must withstand the elements and is usually unsuitable for indoor use.

OTDR - The abbreviation for Optical Time Domain Reflectometer. This device is used to show breaks and loss problems in a fiber optic cable.

SM - The abbreviation for single mode fiber 8.3 μm in size 1330nm or 1550 nm wavelengths. ***Since it uses lasers to transmit data, take proper safety precautions to avoid permanent eye damage.***

TC - The abbreviation for Telecommunications Closet, also called a Hub Room, MDF/IDF or Network Distribution Room. The point at which cables are terminated to patch panels and connected to network electronics.

WAO - The abbreviation for Work Area Outlet. This is the faceplate location at the user site.

5. Relevant Campus Phone Numbers

Campus Network Services

David Caldwell (Director - Network Services)	(817) 272-3622
Brad Samek (Network Manager)	(817) 272-3633

Telecommunications

Craig Beal (Director Telecommunications)	(817) 272-5011
Scott Brasher (PBX Switch Room Operations)	(817) 272-2064

Office Of Enviromental Health & Safety

Craig Powell (Director)	(817) 272-2185
Steve Walt (Fire Marshall)	(817) 272-4431

Physical Plant

Jeff Johnson (Director)	(817) 272-3571
Bryan Sims (Associate Director)	(817) 272-7000

Campus Police

Police (Emergency)	(817) 272-3003
Police (Non-Emergency)	(817) 272-3381
Lt. Nan Rhodes (Building Access)	(817) 272-3381

Campus Information Center

Information	(817) 272-2222
-------------------	----------------

This Page Intentionally
Left Blank

Appendix A – UTA Standards Parts List

Part Number	Description
Belden	
1701A	DataTwist 350 Cat 5e data cable, Plenum, 1000' spool (yellow)
1700A	DataTwist 350 Cat 5e data cable, PVC, 1000' spool (blue)
7882A	DataTwist Cat 6 data cable, Plenum, 1000' spool (yellow)
7881A	DataTwist Cat 6 data cable, PVC, 1000' spool (blue)
7852A	DataTwist Enhanced Cat 6 data cable, Plenum, 1000' spool (yellow)
7851A	DataTwist Enhanced Cat 6 data cable, PVC, 1000' spool (blue)
7997A	DataTwist, Cat 5e Outdoor, 1000' spool (black)
1874A	MediaTwist, Cat 6 data cable, Plenum, 1000' spool (blue)
Chatworth	
10250-712	Universal Cable Runway, 10' length, 12" width (black)
10595-712	Channel Rack-To-Runway Mounting Plate, 3" (black)
10608-001	Runway Wall Brackets (pair)
10642-001	Protective End Caps, Cable Runway (pair)
10723-712	Cable Runway Radius Bend, 90 degree Outside Bend, 12" (black)
10724-712	Cable Runway Radius Bend, 90 degree Inside Bend, 12" (black)
10822-712	Cable Runway E-Bends, 12" (black)
11301-001	Cable Runway Junction, Butt-Splice Kit
11302-001	Cable Runway Junction, Junction-Splice Kit
11348-519	Universal Swing Gate Rack (clear)
11374-703	Single-Sided Wide Vertical Cabling Section (black)
11421-712	Wall Angle Support Kit, Cable Runway, 12" (black)
11583-519	Flush Mounted Wall Bracket (clear)
11685-219	Wall-Mount Cabinet (computer white)
11755-003	Wall-Mount Cabinet Accessories, Fan/Filter Kit
12100-712	Cable Runway Radius Drop, 12" (black)
12101-701	Runway Radius Drop, Stringer, 10-1/4" (black)
12847-702	Offset Rack-Mount Bracket, 9.1" (black)
12847-703	Offset Rack-Mount Bracket, 11.7" (black)
12851-706	Vertical Power Strip, 66.25" overall height, 20Amp, Surge Protect, Standard Plug, 20 outlet (20)
40604-001	Rack and Frame Installation Kit, Concrete Floor Kit
55053-703	Standard Rack, 7' x 19" (black)
Commscope	
5NF4RLBLK	Gel-Filled Cat 5e data cable, PVC, 1000' spool (black)
Corning	
Corning - Connectors	
95-101-41-SP	Fiber Optic Connector, SC, MultiMode, Ceramic Ferrule and Composite Hardware
95-201-41-SP	Fiber Optic Connector, SC, SingleMode, Ceramic Ferrule and blue shroud
95-101-52-SP	Fiber Optic Connector, ST, Multi-Mode, Ceramic Ferrule and Metal Hardware
95-201-52-SP	Fiber Optic Connector, ST, Single-Mode, Ceramic Ferrule and Metal Hardware
95-101-98-SP	Fiber Optic Connector, LC, Multi-Mode, Ceramic Ferrule, single pack
95-201-98-SP	Fiber Optic Connector, LC, Single-Mode, Ceramic Ferrule, composite hardware, single pack
Corning – Splice and Accessories	
95-000-04	Fiber Optic CamSplice mechanical splice
M67-031	Aluminum Splice Tray, stores 12 CamSplice mechanical splices, type 2S
M67-053	Aluminum Splice Tray, stores 6 CamSplice mechanical splices, type 2R
M67-061	Aluminum Splice Tray, stores 6 CamSplice mechanical splices, type 2R
M67-070	Aluminum Splice Tray, stores 12 CamSplice mechanical splices, type 4S
UST-024	Plastic Splice Tray, stores 24 CamSplice mechanical splices, type 4A

Standards of Installation for Network Cabling at UTA

Part Number	Description
Corning - Enclosures / Connector Panel	
*** Note *** CCH and WCH are the new generation enclosures.	
CCH-01U	Rack Mount Closet, 2 CCH slot panel
CCH-02U	Rack Mount Closet, 4 CCH slot panel
CCH-03U	Rack Mount Closet, 6 CCH slot panel
CCH-04U	Rack Mount Closet, 12 CCH slot panel
CCH-CP06-15T	CCH Connector Panel, 6 Bulkhead, ST, Multi-Mode, ceramic insert, composite housing
CCH-CP06-19T	CCH Connector Panel, 6 Bulkhead, ST, Single-Mode, ceramic insert, composite housing
CCH-CP12-15T	CCH Connector Panel, 12 bulkhead, ST, Multi-Mode, , ceramic insert, composite housing
CCH-CP12-19T	CCH Connector Panel, 12 bulkhead, ST, Single-Mode, ceramic insert, composite housing
CCH-CP06-91	CCH Connector Panel, 3 SC duplex adapters, Multi-Mode, composite insert, composite housing
CCH-CP06-59	CCH Connector Panel, 3 SC duplex adapters, Single-Mode, ceramic insert, composite housing
CCH-CP12-91	CCH Connector Panel, 6 SC duplex adapters, Multi-Mode, composite insert, composite housing
CCH-CP12-59	CCH Connector Panel, 6 SC duplex adapters, Single-Mode, ceramic insert, composite housing
CCH-CP06-A7	CCH Connector Panel, 3 LC duplex adapters, Multi-Mode, metal insert, composite housing
CCH-CP06-A9	CCH Connector Panel, 3 LC duplex adapters, Single-Mode, ceramic insert, composite housing
CCH-CP12-A7	CCH Connector Panel, 6 LC duplex adapters, Multi-Mode, metal insert, composite housing
CCH-CP12-A9	CCH Connector Panel, 6 LC duplex adapters, Single-Mode, ceramic insert, composite housing
CCH-CP24-A7	CCH Connector Panel, 12 LC duplex adapters, Multi-Mode, metal insert, composite housing
CCH-CP24-A9	CCH Connector Panel, 12 LC duplex adapters, Single-Mode, ceramic insert, composite housing
WCH-02P	Wall Mount Closet, 2 CCH slot panel
WCH-04P	Wall Mount Closet, 4 CCH slot panel
WCH-06P	Wall Mount Closet, 6 CCH slot panel
WCH-12P	Wall Mount Closet, 12 CCH slot Panel
WIC-04P	Wall mount interconnect center, 4 WIC slot panel
WJG-02R	Wall-mountable jumper storage guides for WCH series closet
Corning - Cable & Accessories	
006K88-31150-29	Plenum Rated MIC Cable, 6 Multi-Mode strand
006E88-31131-29	Plenum Rated MIC Cable, 6 Single-Mode strand
012K88-33150-29	Plenum Rated MIC Cable, 12 Multi-Mode strand
018X88-A7256-29	Plenum Rated MIC Cable, Hybrid 6 Single-Mode, 12 Multi-Mode strand
HDWR-GRND-KIT	Armored Cable Grounding Kit
FAN-BT25-06	Fiber Indoor Buffer 6 Tube Fan-Out Kit, 25"
FAN-BT25-12	Fiber Indoor Buffer 12 Tube Fan-Out Kit, 25"
FAN-BT47-06	Fiber Indoor Buffer 6 Tube Fan-Out Kit, 47"
FAN-BT47-12	Fiber Indoor Buffer 12 Tube Fan-Out Kit, 47"
FAN-OD25-12	Fiber Outdoor Buffer 12 Tube Fan-Out Kit, 25"
Erico	
MPLS	Single Gang Wall Mount Bracket
MPLS2	Double Gang Wall Mount Bracket
CAT32BCB	J-Hook with beam clamp
CAT324Z34	J-Hook with spring clamp
CAT425WM	Adjustable Cable Support (Caddy Bag)
CAT600R	Strut Mount Support
CAT600WM	Wall Mount Support
Hilti	
00310223	Ceiling Wire, 4'
Panduit	
Network Jacks	
CJ5E88TBU	TX Style Cat 5e Modular Jack (blue)
CJ5E88TYL	TX Style Cat 5e Modular Jack (yellow)
CJ5E88TOR	TX Style Cat 5e Modular Jack (orange)
CJ88IWY	Mini-Com Cat 3 Modular Jack (international white)
CJ688TPBU	TX Style Cat 6 Modular Jack (blue)

Standards of Installation for Network Cabling at UTA

Part Number	Description
CJ688TPYL	TX Style Cat 6 Modular Jack (yellow)
CJ688TPOR	TX Style Cat 6 Modular Jack (orange)
CJ5E88TGBU	Mini-Com TX5e Jack Module (blue)
CJ5E88TGYL	Mini-Com TX5e Jack Module (yellow)
CJ5E88TGOR	Mini-Com TX5e Jack Module (orange)
CJ688TGBU	Mini-Com TX6 PLUS Jack Module (blue)
CJ688TGYL	Mini-Com TX6 PLUS Jack Module (yellow)
CJ688TGOR	Mini-Com TX6 PLUS Jack Module (orange)
NK5E88MBUY	NetKey Category 5e UTP Jack Module (blue)
NK5E88MYLY	NetKey Category 5e UTP Jack Module (yellow)
NK688MBU	NetKey Category 6 Jack Module (blue)
NK688MYL	NetKey Category 6 Jack Module (yellow)
Panduit - Termination Tools	
CGJT	Module Termination Tool, Giga-TX style terminations
EGJT	Module Termination Tool, Enhanced Giga-TX style terminations
CWST	Copper Wire Snipping Tool
CJAST	Cable Jacket Stripping Tool
Panduit - Face Plates	
CBX2IW-AY	Mini-Com Surface Mount Box, 2 Modular Space (international white)
CBX4IW-AY	Mini-Com Surface Mount Box, 4 Modular Space (international white)
CBXC4IW-A	Mini-Com Surface Mount Box, 4 Modular Space (international white)
CBXD6IW-AY	Mini-Com Surface Mount Box, 6 Modular Space (international white)
CBX12IW-AY	Mini-Com Surface Mount Box, 12 Modular Space (international white)
CBXF6IW-AY	Mini-Com Multi-Media/Fiber Surface Mount Box, 6 Modular Space (international white)
CBXF12IW-AY	Mini-Com Multi-Media/Fiber Surface Mount Box, 12 Modular Space (international white)
CFPE2IWY	Mini-Com Executive Series Vertical Faceplates, 2 modular space, Single Gang (IW)
CFPE4IWY	Mini-Com Executive Series Vertical Faceplates, 4 modular space, Single Gang (IW)
CFPE6IWY	Mini-Com Executive Series Vertical Faceplates, 6 modular space, Single Gang (IW)
CFPE10IW-2GY	Mini-Com Executive Series Vertical Faceplates, 10 modular space, Double Gang (IW)
CMBIW-X	Mini-Com Blank Module (IW)
JB1IW-A	Pan-Way Low Voltage Surface Mount Outlet Box, Single Gang
MIWBAIW	In-Wall Faceplate Adaptor, Double gang to single gang adapter
EFPK-XY	Label/Label Cover Kit with Screws (single gang)
CF1064IWY	Mini-Com 106 Duplex Module Frame (international white)
Panduit - Patch Panels	
UICFFP4BL	Mini-Com Ultimate ID Modular Furniture Faceplate, 4 Modular Space (black)
CFFP4BL	Mini-Com Snap-On Modular Furniture Faceplates, 4 Modular Space (black)
CPP24WBLY	Mini-Com Modular Patch Panel, 24 port (black) with CFFP4 style snap-in faceplates
CPP48WBLY	Mini-Com Modular Patch Panel, 48 port (black) with CFFP4 style snap-in faceplates
CPP48HDWBLY	Mini-Com High Density Modular Patch Panel, 48 port (black)
Panduit - Cable Management	
C4BL6	Fiber-Duct Slotted Wall Channel Cover, 6 ft section (black)
E4X4BL6	Fiber-Duct Slotted Wall Channel, 6 ft section (black)
WMP1E or WMP1EY	Slotted Duct Horizontal Cable Management System, Two Rack Space, Front/Back (black)
WMPF1E or WMPF1EY	Slotted Duct Horizontal Cable Management System, Two Rack Space, Front Only (black)
WMPSE or WMPSEY	Slotted Duct Horizontal Cable Management System, One Rack Space, Front/Back (black)
WMPFSE or WMPFSEY	Slotted Duct Horizontal Cable Management System, One Rack Space, Front Only (black)
WMPV22E	NetRunner Vertical Cable Management, front/back, 22 RU (black)
WMPVHC45E	NetRunner Vertical Cable Management - High Capacity, front/back, 45 RU (black)
WMPV45E	NetRunner Vertical Cable Management, front/back, 45 RU (black)
WMPVCBE	NetRunner Center Mount Bracket Kit
Panduit - Wall Rack Units	
WBH2 or WBH2Y	Hinged Wall Bracket, 19", 2 Rack Space (black)
WBH4 or WBH4Y	Hinged Wall Bracket, 19", 4 Rack Space (black)

Standards of Installation for Network Cabling at UTA

Part Number	Description
Panduit - Jack/Cable Labels	
S100X125YAJ	Cable Labels, Self-Laminating Self Adhesive (2500/pkg)
C138X019FJJ	Modular Jack Labels, Self Adhesive Laser printed white (1000/pkg)
PST-FO	Self-Laminating Fiber Optic Cable Marker Tags
Panduit - LD Raceway & Fittings	
LD3IW8-A	Pan-Way Type LD Surface Raceway, 3 Cable Capacity, 8 ft section (IW)
LD5IW8-A	Pan-Way Type LD Surface Raceway, 5 Cable Capacity, 8 ft section (IW)
LD10IW8-A	Pan-Way Type LD Surface Raceway, 10 Cable Capacity, 8 ft section (IW)
CFX3IW-X	Pan-Way Type LD Surface Raceway Fitting, Coupler Fitting, 3 cable capacity (IW)
CFX5IW-X	Pan-Way Type LD Surface Raceway Fitting, Coupler Fitting, 5 cable capacity (IW)
CFX10IW-X	Pan-Way Type LD Surface Raceway Fitting, Coupler Fitting, 10 cable capacity (IW)
ICFC3IW-X	Pan-Way Type LD Surface Raceway Fitting, Inside Corner Fitting, 3 cable capacity (IW)
ICFC5IW-X	Pan-Way Type LD Surface Raceway Fitting, Inside Corner Fitting, 5 cable capacity (IW)
ICFC10IW-X	Pan-Way Type LD Surface Raceway Fitting, Inside Corner Fitting, 10 cable capacity (IW)
OCFX3IW-X	Pan-Way Type LD Surface Raceway Fitting, Outside Corner Fitting, 3 cable capacity (IW)
OCFX5IW-X	Pan-Way Type LD Surface Raceway Fitting, Outside Corner Fitting, 5 cable capacity (IW)
OCFX10IW-X	Pan-Way Type LD Surface Raceway Fitting, Outside Corner Fitting, 10 cable capacity (IW)
RAFC3IW-X	Pan-Way Type LD Surface Raceway Fitting, Right Angle Fitting, 3 cable capacity (IW)
RAFC5IW-X	Pan-Way Type LD Surface Raceway Fitting, Right Angle Fitting, 5 cable capacity (IW)
RAFC10IW-X	Pan-Way Type LD Surface Raceway Fitting, Right Angle Fitting, 10 cable capacity (IW)
ECFX3IW-X	Pan-Way Type LD Surface Raceway Fitting, End Cap Fitting, 3 cable capacity (IW)
ECFX5IW-X	Pan-Way Type LD Surface Raceway Fitting, End Cap Fitting, 5 cable capacity (IW)
ECFX10IW-X	Pan-Way Type LD Surface Raceway Fitting, End Cap Fitting, 10 cable capacity (IW)
TFC3IW-X	Pan-Way Type LD Surface Raceway Fitting, Tee Fitting, 3 cable capacity (IW)
TFC5IW-X	Pan-Way Type LD Surface Raceway Fitting, Tee Fitting, 5 cable capacity (IW)
TFC10IW-X	Pan-Way Type LD Surface Raceway Fitting, Tee Fitting, 10 cable capacity (IW)
DCF3IW-X	Pan-Way Type LD Surface Raceway Fitting, Drop Ceiling/Entrance End, 3 cable capacity (IW)
DCF5IW-X	Pan-Way Type LD Surface Raceway Fitting, Drop Ceiling/Entrance End, 5 cable capacity (IW)
DCF10IW-X	Pan-Way Type LD Surface Raceway Fit, Drop Ceiling/Entrance End, 10 cable capacity (IW)
RF5X3IW-E	Pan-Way Type LD Surface Raceway Fitting, Reducer Fitting 5<->3 (IW)
RF10X5IW-X	Pan-Way Type LD Surface Raceway Fitting, Reducer Fitting 10<->5 (IW)
RF10X3IW-X	Pan-Way Type LD Surface Raceway Fitting, Reducer Fitting 10<->3 (IW)
Panduit - Miscellaneous Items	
HLS-15R0	Velcro, 15' roll (black)
GB2B0304TPI-1	Telecommunications Grounding Busbar, 1/4" X 2" X 10"
GB2B0306TPI-1	Telecommunications Grounding Busbar, 1/4" X 2" X 12"
Siemon	
M2-5T-128LR-TP	66-50 style Punch Down block, pre-wired to RJ-45, T568A pin-out (white)
66M1-50	66-Punch Down Block (white)
S-89B	66-Block Wall Mount Bracket (white)
YT4-4U1	Modular 4-Way Splitter
Snake Tray	
CM 301-6-CAM	6" Deep Cam-Loc Snake Canyon
CM 301-6-CG	Universal Crossing Grid for Snake Canyon, 31" x 31"
CM 301-DG-6	Divider Fence for Snake Canyon, 24"L x 6"H
CM 301-6-TC-X	301 Series Snake Canyon Turning Component, 7-3/4" x 24" x 28"
Specseal	
SSB24	Fire Stop Pillow, 2"x4"x9"
Unique Fire Stop Products	
SP-1	1" Smooth Penetrator
SP-2	2" Smooth Penetrator
SP-4	4" Smooth Penetrator

Standards of Installation for Network Cabling at UTA

Part Number	Description
Miscellaneous	
	Cable Ties, 8", Natural (100/pkg)
	Cable Ties, 14", Natural (100/pkg)
	Cable Ties, 24", Natural (10/pkg)
	Cable Ties, 36", Natural (10/pkg)
	Cable Ties with screw mount, 7", Natural (100/pkg)
	Cat 5E Patch Cable with booted ends (assorted colors) 3'
	Cat 5E Patch Cable with booted ends (assorted colors) 5'
	Cat 5E Patch Cable with booted ends (assorted colors) 7'
	Cat 5E Patch Cable with booted ends (assorted colors) 10'
	Cat 5E Patch Cable with booted ends (assorted colors) 14'
	Cat 5E Patch Cable with booted ends (assorted colors) 25'
	Cat 5E Patch Cable with booted ends (assorted colors) 40'
	Cat 5E Patch Cable with booted ends (assorted colors) 100'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 3'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 5'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 7'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 10'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 14'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 25'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 40'
	Cat 5E Patch Cable with non-booted ends (assorted colors) 100'
	Cat 6 Patch Cable with booted ends (assorted colors) 3'
	Cat 6 Patch Cable with booted ends (assorted colors) 5'
	Cat 6 Patch Cable with booted ends (assorted colors) 7'
	Cat 6 Patch Cable with booted ends (assorted colors) 10'
	Cat 6 Patch Cable with booted ends (assorted colors) 14'
	Cat 6 Patch Cable with booted ends (assorted colors) 25'
	Cat 6 Patch Cable with booted ends (assorted colors) 40'
	Cat 6 Patch Cable with booted ends (assorted colors) 100'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 3'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 5'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 7'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 10'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 14'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 25'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 40'
	Cat 6 Patch Cable with non-booted ends (assorted colors) 100'

This Page Intentionally
Left Blank