UNCP Telecommunications Cabling Guidelines

All cabling shall meet or exceed ANSI/TIA/EIA Telecommunications Building Wiring Standards. Contractors should adhere to the North Carolina Telecommunications Wiring Guidelines (STS-1000) unless otherwise stated in this document.

1. INTERIOR CABLING

IA. Interior Cable Type Details
1. All horizontal wiring for both data and voice will be plenum rated 4-pair UTP, Category 5e.
2. All terminations will be TIA-EIA 568-B.
3. All voice cables should be HOT PINK and all data cables should be YELLOW.

IB. Interior Cable Path Details
1. All voice and data runs will extend from the patch panels on the rack in the wiring closet.
2. At least one Cat 5e UTP voice (HOT PINK) and two Cat 5e UTP data (YELLOW) will be routed to each designated outlet.
3. Cabling to all rooms will be plenum rated.
4. All cables shall be routed and supported by industry approved conduit, cable trays, J-hooks, etc.
5. Cable length maximums are specific to the media itself - e.g. 100 meters for UTP Level 5e.

IC. Interior Cable Termination

ALL TERMINATION PRODUCTS SHALL BE LEVITON VENDOR-SPECIFIC PARTS.
1. Each office termination location will utilize Cat 5e RJ-45 modular 110-style jacks with faceplates colored to best match the environment (usually ivory or white) and located according to the project drawings. Faceplates may be 2, 4 or 6 - gang and are available in styles to fit modular furniture. If modular furniture shall be used as a permanent fixture, cables should be terminated on the modular furniture using appropriate parts.
2. Each location that bears the potential need for network or telephone connectivity should contain a minimum of one telecommunications drop. The terminations at each location should consist of a minimum of three Level 5e UTP 4-pair 24 gauge cables terminated on Cat 5e RJ-45 modular 110-style jacks wired with the EIA/TIA T568-B scheme - one for voice and two for data.
3. The contractor shall ensure the twist rate of the individual cable pairs is maintained as close as physically possible to the point of termination on all cables. No more than 13 mm of sheathing shall be removed from each end of the cable.
4. The telecommunications closet will consist of 7' tall, 19" wide racks anchored to the floor and attached to the wall with ladder rack.
5. Equipment racks shall be fitted in front and rear with cable management components in sufficient quantities for a neat and clean installation. More specifically, each rack will be outfitted with frontside vertical cable managers on both sides. Each patch panel should be separated by horizontal cable managers, both front and back and above and below. See specific parts list for cable manager type details.
6. All Category 5e cables will be terminated on 110-style Cat 5e patch panel in the 7’ rack using the EIA/TIA T568B pinout.

7. Rack Termination Details:

   Top:
   Fiber terminations will be installed at the top of the rack in an appropriate size rack-mounted fiber patch panel with ST termination type. Single mode fiber terminations should be indicated with a yellow dust cap and multi-mode with a black dust cap.

   Next:
   Category 5e UTP data terminations will be installed directly below the fiber patch panel separated by an appropriate
horizontal cable manager. All patch panels for both data and
voice shall be of type 110 style, Category 5e with EIA/TIA
T568-B scheme. 48-port patch panels should be used and
enough spare ports installed to accommodate a 20% future
expansion. All data (YELLOW) should be terminated on
patch panels separate from voice terminations. Voice (PINK)
should be terminated on separate patch panels located
below all data terminations and separated by an appropriate
horizontal cable manager.

Next:
25-pair Category 5e UTP trunk cables shall be terminated
below voice terminations and should be separated by an
appropriate horizontal cable manager. Each port should be
terminated with 1-pair each. Enough pairs shall be installed
to support the expected telephone population of the building
plus a 25% future expansion. If multiple patch panels are
used, they will be separated by appropriate horizontal cable
managers. The trunk cable will be routed back to the main
telephone demarcation point and terminated on a wall-
mounted 110-style punch down block so that connections
can be patched as needed.

Bottom:
An adequate rack mounted surge/power strip shall be
installed below the last patch panel, separated by an
appropriate horizontal cable manager. The receptacles
should be rear facing. If an uninterruptible power supply,
UPS, unit is to be installed, it should be located near the
bottom of the rack.
The owner will install all network electronics equipment below the power
supply unit. Multiple racks should be supplied if ample room is not
available to provide the needed electronics to support the infrastructure.
Consultation with the owner may be required for this determination.
8. A dual-gang receptacle should be located on the same wall as the rack
near the point where the ladder rack attaches to the wall. The power
supply unit will be connected here.
9. The rack should be properly grounded. All separate pieces of the rack
must be grounded with #6 AWG.

II. EXTERIOR CABLING
IIA. Exterior Cable Type Details
1. Adequate UTP voice feeder cable and adequate Multi-mode and Singlemode
fiber optic cable shall be installed to support current and future operations within
the targeted building. The owner should be consulted when determining the
amount of UTP and fiber optic cabling to be installed.
2. Unshielded Twisted Pair shall be 100 ohm Category 5e verified to a minimum
of 100 MHz, CMR or CMP NEC Rating and shall meet or exceed TIA/EIA 568-B.
3. Multimode Optical Fiber shall be 62.5/125 micron, OFNR, OFNP or
Indoor/Outdoor (I/O) NEC Rating.
4. Single-mode Optical Fiber shall be 8.3/125 micron Class IVa Dispersion-Unshifted, OFNR, OFNP or Indoor/Outdoor (I/O) NEC Rating.

IIB. Exterior Cable Path Details
1. Inter-building cable paths shall provide adequate space for fiber optic backbone and UTP voice feeder cable. Enough additional path should be installed to ensure the capability for at least 50% future growth.
2. Campus Backbone pathways should consist of a minimum of two 4” PVC conduits with four 1” inch innerducts and copper tracing wire. Buildings exceeding 10,000 square feet shall have a minimum of three 4” conduits. Conduit should be buried at a minimum of 36” deep and should have sturdy access locations no more than 500’ apart – preferably 350’.
3. Non-backbone, building to building pathways shall consist of a minimum of two 2” PVC conduits with copper tracer wire.

IIC. Exterior Cable Termination
1. Fiber Optic terminations shall be consistent with existing fiber terminations in an area. If fiber is being terminated in a location where no fiber exists, it should be termination in a rack-mounted fiber patch panel. All fiber terminations shall be of type ST. Single-mode dust caps shall be YELLOW and Multimode dust caps shall be BLACK for easy identification.
2. UTP voice feeder cable shall be installed in accordance with the latest published version of Article 800 of the National Electric Code (NEC). The UTP cable is to be terminated on a wall-mounted 110-style terminal block on each end. The terminal blocks must be grounded on each end with AWG #6. Fuse protection shall be provided with arrestors being installed at each end for each pair. Arrestors must be solid state type, tested and listed per ANSI/UL 497 1995 or later.

III. Cable Testing
1. All interior and exterior cabling, including all unshielded twisted-pair, single-mode fibers, and multi-mode fibers, must be tested and shown to meet or exceed current industry standards (IEEE and EIA/TIA).
2. Documentation of the test results will be submitted in duplicate electronically and on paper. At least two electronic copies should be submitted on disk in a compatible format, and at least two paper copies placed into labeled binders and submitted to the owner at project completion.

IV. Cable Labeling
A consistent labeling and numbering scheme shall be used. The labeling shall be clearly legible and easily identifiable on both ends of the termination. If properly labeled and documented, a technician should be able to easily identify the exact location of the remote end of the termination.

IVA. Telecommunications Closet Labeling
1. Rack Labeling
   Patch panels will be labeled with a capital letter starting with “A” at the top and continuing consecutively down the rack.
   Each terminated cable should be labeled with a consecutive number starting with “001” on the cable sheathing at the rack end.
and the remote end. UTP feeders between IDF’s should be labeled on the patch panel in the label section below the actual ports. (Ex. Cat 5e feeders 1-6 to IDF 233.) No other labeling is required on the patch panels. A technician should be able to refer to a cable either by its consecutive number or its port location. Ex. The cable terminated at patch panel A, port 1 would be labeled “001” on the sheath.

2. Fiber Labeling Fiber panels will be labeled on the outside surface with the feeder location. (Ex. Fiber Feeder to Lumbee Hall MDF Rm 115) The actual fiber will also be labeled at the point before it enters the termination box. Single-mode and multi-mode fiber connector sections should be distinctively labeled. (Ex. SM 1-12, MM 13-24) Each fiber should be numbered and labeled at the connector.

3. Voice Feeder The rack-mounted voice feeder patch panel should be labeled with the termination location and cable pairs. (Ex. 25 PR to DMRC Rm. 115 1-25, 25 PR to DMRC Rm. 115 26-50, etc.) The demarcation end should be labeled similarly. (Ex. 25 PR to IDF Rm. 138 1-25.)

IVB. Workstation End Labeling Each drop location in a user area should be labeled. From this label, a technician should be able to identify the exact location of the termination in the appropriate telecommunications closet. A wallplate with dual labeling windows should be used with one at the top and one at the bottom. A typical drop will consist of two data connections and one voice connection. The label should include the telecommunications closet room number where the cable is terminated, the patch panel where the cable is terminated, the type of cable, D for data and V for voice, the actual patch panel port number, and the current room number and location letter for when multiple drops are placed in a room.

Example Top Wallplate Label: 152/B-D41,42/103 B 152 - telecommunications closet room number A - patch panel this cable is terminated on. D - indicates this is a cable intended for data use 41,42 - ports 41 and 42 on the patch panel 103 - the workstation room number B - the drop location in the room

Example Bottom Wallplate Label: 152/E-V13/103 B 152 - telecommunications closet room number E - patch panel this cable is terminated on. V - indicates this is a cable intended for voice use 13 - port on the patch panel 103 - the workstation room number B - the drop location in the room

IVC. Telecommunications Closet Documentation Each telecommunications closet should hold a copy of the workstation-to-patch panel assignment table and a copy of the “As-Built Drawings” with the actual cable numbers and termination locations. The table should list the telecommunications room number, the cable number, the cable type (voice or data), the patch panel letter, the port number, and the remote termination location (room number and wallplate location). All data connections should be listed first followed by all voice connections. This list should be laminated, bound and hung near or on the rack.

Ex: BDF RM# TYPE CABLE# PORT PANEL WRKSTN LCTN 125 D 1,2 1,2 A 101 A 125 D 4,5 3,4 A 101 B 125 V 3 1 F 101A