

DIVISION 27 – COMMUNICATIONS

27 00 00 – COMMUNICATIONS

- ~~A. System design shall be completed by a Registered Communications Distribution Designer (RCDD).~~
- ~~B. Comply with American National Standards Institute (ANSI), the Electronics Industries Association/Telecommunications Industry (EIA/TIA) Standards, and Technical Systems Bulletins (TSB).~~
- ~~C. Specify only products listed and classified by Underwriters Laboratories, Inc.~~

27 13 00 – COMMUNICATIONS BACKBONE CABLING (VOICE & DATA)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Data systems
- B. Fiber Optic systems
- C. Premises wiring and outlets

1.02 RELATED SECTIONS

(to be filled in by Design Professional)

1.03 REFERENCES

- A. Category 6A requirements found in the following ANSI, TIA/EIA, and TSBs.
- B. ANSI/TIA/EIA 568-A. Commercial Building Telecommunications Cabling Standard.
- C. TIA/EIA 568-B.2-2001. Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted Pair Components. See also addendum 568-B.2-2002. Transmission Performance Specifications for 4-Pair 100 Ohm Category 6A Cabling.
- D. TIA/EIA-607 – Commercial Building Grounding and Bonding Requirements for Telecommunications; 1997.
- E. TIA/EIA-569-AB – Commercial Building Standard for Telecommunications

Pathways and Spaces.

- F. NFPA70 – National Electric Code; National Fire Protection Association; Most current addition.
- G. TIA/EIA TSB-67 – Transmission Performance Spec for Field Testing of UTP cabling systems.
- H. TIA/EIA TSB-72 – Centralized Optical Fiber Cabling Guidelines.
- I. UL444 – Standard for Safety for Communications Cable.

1.04 SUBMITTALS

- A. See Section ----- Submittals, for submittal procedures.
- B. Submit telecommunications room layout per communication standards.
- C. Provide sample of each type of modular jack, faceplate, and data wire.
- D. Product data:
 - 1. Materials list of items proposed under this section.
 - 2. Manufacturer's spec and other data needed to prove compliance with the specified requirements.
 - 3. Manufacturer's recommended installation procedures, approved by the Engineer, will become the basis for acceptance or rejection of the procedures used on the installation work.
- E. Shop Drawings: Show detail of all materials used on job. Modular outlets, Cable types, accessories, and related equipment.

1.05 QUALITY ASSURANCE

- A. Work shall be done in accordance with the manufacturer's recommendations of the equipment to be supplied and installed under this contract.
- B. Perform work in accordance with the telephone utility's rules and Regulations and NFPA70.
- C. Products: Furnish only the specific products listed in this section. No Substitutes.

1.06 QUALIFICATIONS

- A. Manufacturer: Commscope/Systimax only. No substitutes.

- B. Installer: Personnel installing and terminating the Commscope Cabling system shall be trained for data installations, and testing work. All installers/testers shall provide proof of training. Only Commscope or BICSI training certificates will be acceptable. Proof of training shall be submitted to Owner of the cable plant, for review prior to start of work.

1.06 SYSTEM DESCRIPTION

- A. Cable trays, conduits, surface raceways, copper cable, optical fiber cable, and modular connectors to form physical pathway and data channel for voice and data systems.
- B. The data cable distribution is intended to be a Category 6A Open System Architecture in accordance with TIA/EIA 568 Standard.
- C. Workstation data outlets shall be Category 6A rated and blue in color. Each jack shall be fed by an individual 4-pair station wire so all pins are active. Include 2 data patch cords (one for office and one telcom room) for ~~8~~ 100% of the total data jacks in the facility. See Owner's representative with cable quantity questions.

PART 2 PRODUCTS

2.01 SERVICE AND PATHWAYS

- A. Horizontal pathways shall conform to TIA/EIA-569-A, using the Backboards and raceways as indicated.
- B. All data outlet locations with 3 modular data jacks or fewer, shall have a deep 4" square box with a raised single gang mud ring. All these locations shall be a 1.0 inch conduit. This includes all security camera and wireless access locations.
- C. All data outlet locations with 4 or more modular data jacks, shall have a standard depth 5" square box with a raised single gang mud ring. All these locations shall be 1.25 inch conduits.
- D. All telecommunication conduits shall be extended to within 18 inches of the nearest cable tray. All conduits grounded and bonded per TIA/EIA-607 Standards. In addition, the University of Northern Iowa requires all metallic conduits and raceways be grounded and bonded to the cable tray system using approved components.
- E. All data outlet locations shall have a single-gang quad faceplate with modular data jacks (blue) starting in position One. Any unused openings in the quad faceplate shall be blanked with ivory inserts.
- F. All wireless access point locations shall have 2 - CAT6A cables. Both cables

shall be terminated with blue CAT6A modular jacks. Each jack shall lay loose inside the four square box.

2.02 TELECOMMUNICATION ROOMS

- A. The building telecommunication rooms shall be centrally located with air conditioning. If the building is multi-floor, the telecom rooms should be stacked vertically in the building. The size of the conduit to connect the rooms will depend on the amount of cable infrastructure needed between floors. Owner must approve the proposed size.
- B. The room must be 8ft in depth and length may vary according to how many racks will be installed. 40 inches of width for every rack – plus an additional 6ft. That allows 3 feet for the entrance door and 3ft to the back wall.
- C. Telcom room backboards:
 - 1. Grade AC fire retardant pressure treated plywood painted with two coats of fire-retardant gray paint. One label is to remain visible on each sheet.
 - 2. Size: Floor to 8ft height on all walls of the telecom room.
 - 3. Thickness: $\frac{3}{4}$ inch.
- D. Inside telecom rooms shall have flat ladder cable trays at 8ft A.F.F. with waterfall drop outs into the tops of the vertical wire managers.
- E. Power: Each rack in the telecom room shall have a 208VAC – L6/20 outlet and a Quad 110VAC outlet. These outlets shall be mounted above the racks and below the ladder tray.
- F. The Owner must be present and included with the drawing of any telecom room. The Facilities Project Manager shall arrange a meeting with the Contractor and our IT Rep before any racks or cable trays are installed in any telecom room to ensure the desired layout.

2.02 BACKBOARDS

- ~~A. Telcom room backboards: Plywood~~
 - ~~1. Coated with fire-retardant gray paint.~~
 - ~~2. Size: floor to 8ft height on all walls of telecom room.~~
 - ~~3. Thickness: $\frac{3}{4}$ inch.~~

2.03 COMPONENTS

- A. Modular Information Outlet Faceplates
 - 1. Commscope M14SP quadplex faceplate

2. Comcode: 108 615 204
3. Color: Stainless Steel
4. Provide blank inserts for unused openings that match the color of the electrical outlets. ~~Provide ivory blank inserts for unused openings~~
5. Comcode: 107 067 860 ivory, 107 067 928 white, 107 067 951 gray ~~107 067 860~~

B. Modular Outlets

1. As specified in the Materials List at the end of this document

C. Telecom Room Equipment racks

1. Aluminum relay racks, clear finish
2. CPI part# 55053-503. No substitutes.

D. Telecom Room Wire Management

1. Chatsworth Extra Wide Vertical Rack Cabling Sections
2. CPI part# 30166-703. No substitutes.

2.04 VOICE EQUIPMENT

A. New Building Construction

1. Owner shall provide and install a 50 pair dial tone cable into the Facility.
2. Owner shall be responsible for any voice related terminations.
3. Owner will install new 110 block
4. Contractor is responsible for the path into the building and to the telecommunications closet.

B. Remodel

1. Owner shall be responsible for any voice related terminations.
2. Owner will remove and reinstall 110 block in telecommunication closet

2.05 DATA SYSTEMS EQUIPMENT

- A. Cross Connect Hardware (modular panels)
 - 1. For use with Avaya 2091B wiring systems
 - 2. CommScope M2000 frames – 2U – 48 port
 - 3. Comcode: 760 049 940
- B. Category 6A Modular Data Jacks
 - 1. To be installed in Quad faceplates
 - 2. Commscope MGS600-318
 - 3. Wired TIA/EIA 568B
 - 4. Comcode: 760 092 452
 - 5. Color: Blue
 - 6. No substitutes
- C. ~~Horizontal Station~~ Cable
 - 1. UL Listed Category 6A, plenum rated
 - 2. Unshielded twisted pairs
 - 3. Commscope 2091B Cable
 - 4. Comcode: 760 107 201
 - 5. Color: Blue
 - 6. No substitutes
- D. Patch Cord Assemblies
 - 1. Commscope Patch cords – light blue in color
 - 2. Telecom room – 7ft lengths
 - a. Commscope# CPCSSX2-02F007
 - 3. Office rooms - 10ft, 14ft, 19ft, 25ft
 - a. Commscope# CPCSSX2-02F010

- b. Commscope# CPCSSX2-02F014
 - c. Commscope# CPCSSX2-02F019
 - d. Commscope# CPCSSX2-02F025
4. Supply one office cable and one room cable for 100% of the data jacks in the facility. Contact Owner for percentages of office room cable lengths.
- E. Data Connection Labeling
- 1. Label both ends of each connection.
 - 2. Data labels shall be: room#-1, room#-2, room#-3
Example: room 240 with four data connections would be: 240-1 240-2
240-3 240-4.
 - ~~3. Wireless labels shall be room#-1W, room#-2W, room#-3W. Example: room 240 with three access points would be: 240-1W, 240-2W, 240-3W.~~
 - 3. Every data label must contain a dash.

2.06 Optical Fiber Systems Equipment

- A. ~~Optical Fiber Systems Building Entrance Optical Fiber~~
- ~~1. The Owner shall be responsible for any and all things related to the optical fiber in the facility. The Contractor has no responsibility for anything related to the optical fiber. All Building Entrance Optical Fiber, connectors, and supplies shall be purchased and supplied by Owner. Constructor shall only be responsible for pulling in the 12-strand single mode plenum fiber cables inside the facility. The Owner shall be responsible for termination, testing and labeling.~~

PART 3 EXECUTION

3.01 INSTALLATION

- A. Pathway Installation
- 1. Provide complete conduit system from outlets to cable tray
 - 2. All telecommunications conduits shall be 1-inch minimum trade size. Higher data count locations shall be 1-¼ inch conduit.
 - 3. Any surface raceways shall be Wiremold 2400 trade size minimum.

4. Any floor box locations shall be the Hubbell SystemOne with Duplex/Duplex sub plates. One duplex opening for power and one duplex opening for data jacks. Use Commscope 106 frames under the sub plate. Frame accepts up to four modular data jacks.
5. All metallic conduits shall be grounded and bonded to the Cable Tray system with approved components.
6. Provide data labels on both ends of the cable run.
7. Provide pull string in any spare conduit up to cable tray.

B. Data Wire and Cable Installation

1. No data runs shall be longer than 90 meters
2. Install according to manufacturer's installation guidelines
3. Wire connections to TIA/EIA 568B
4. Finished installation shall meet the most current Category 6A draft system installation standards.
5. Splices, bridge taps, and repairs to wiring are NOT acceptable. Replace all damaged cables.
6. Maintain pair twists up to termination.
7. Replace all cables that fail Field quality Control testing. If only the termination is the cause of the failure, re-termination is acceptable.
8. Ground and bond racks and patch panels in accordance with NEC and TIA/EIA-607.
9. Labeling sequence for data outlets is room# followed by a dash, followed by jack#. Example: room 240 has four data jacks. Data labels would be 240-1 240-2 240-3 240-4.
10. Dashes must always be present in the data labels.
11. When entering a room with multiple faceplates, enter room, turn left, and label clockwise around the room.

C. Fiber Cable Installation

1. Owner will install optical fiber unless noted otherwise

2. Install in accordance with manufacturer's instructions.
3. Maintain bending radius as required. Conduit installations must meet the fiber bending radius requirements.

D. Certification Testing ~~Field Quality Control~~

1. Testing Equipment: ~~Level IIIe or higher tester capable of testing 10GBASE-T category 6A permanent link. Test equipment must be capable of testing vendor specific cables. capable of testing CAT6A wire channel.~~
2. Tester must be ROM based and able to select Commscope 2091B cable, for testing of data connections. All test equipment shall have the most current ROM based version of the Commscope cable types. ~~Test equipment must be capable of testing vendor specific cables.~~
3. Tester must be capable of testing ~~Commscope 2091B cable per ANSI/TIA-1152, ISO/IEC 11801 for: Avaya 2091B cable for:~~
 - i. Wiremap
 - ii. ~~Insertion Loss~~
 - iii. Length
 - iv. Return Loss ~~Attenuation~~
 - v. NEXT
 - vi. ~~ACRF ELFEXT~~
 - vii. PSNEXT
 - viii. ~~PSACRF PSELFEXT~~
 - ix. ~~Propagation Delay~~
 - x. ~~Delay Skew~~
4. Notify the Owner at least 48 hours before testing begins.
5. The Owner may observe any or all testing.
6. Label individual test results to match the label that appears on the faceplate of the jack being tested.
7. Provide one electronic copy of results to Owner.

E. Frequency of Testing

1. Test 100% of all data and voice outlets installed.
2. Conduct testing after terminations have been made at the wall outlet and the modular panel.
3. Retest all cables that have been re-terminated or re-installed.

F. Optical Fiber Testing

1. All Optical Fiber testing shall be done by Owner.

MATERIALS LIST

Data Wire:	Commscope 2091B Wire (plenum) Color: Blue Comcode: 760 107 201
Data Panel:	Commscope M2000 frame (2U – 48 port) Comcode: 760 049 940
Data Jacks:	Commscope MGS600-318 Color: Blue Comcode: 760 092 452
Data Patch Cords:	Commscope CPCSSX2-02F007 – 7ft Commscope CPCSSX2-02F010 – 10ft Commscope CPCSSX2-02F014 – 14ft Commscope CPCSSX2-02F019 – 19ft Commscope CPCSSX2-02F025 – 25ft All are Light Blue in color
Building Entrance Protection	Circa Enterprises1880ENA1/NSC 110 connector in – 110 connector out Vendor# 1880ENA1/NSC100
Stainless Steel Wall Faceplates	Commscope M14SP-L Quadplex Faceplates Comcode: 760 072 207
Racks:	Chatsworth (CPI) Aluminum 7ft Racks CPI# 55053-503
Vertical Wire Managers	Chatsworth (CPI) extra wide Vertical Rack Cabling Section CPI# 30166-703

Horizontal Wire Managers	Chatsworth (CPI) Finger Snaps CPI # 12370-002 (box of 12)
Optical Fibers	All optical fiber cables shall be Corning Plenum rated 12 strands of 8.3 single mode. Yellow in color.
Building Entrance Fiber Cables	Owner of Cable Plant shall spec and install all building entrance fiber cable. Constructor will not be responsible for any building entrance fiber cables.
Cable Tray	Flextray or equivalent wire basket tray.
Wi-Fi right angle wall bracket	All WiFi devices shall be mounted horizontally Oberon Inc. model 1011-00

27 41 00 – AUDIO-VIDEO SYSTEMS

- A. See Media Resources Department for requirements and details. **See section 11 52 00 Audio-Visual Equipment for additional information.**

27 50 00 – DISTRIBUTED COMMUNICATIONS AND MONITORING SYSTEMS

27 53 13 – CLOCK SYSTEMS

- A. The campus has installed a wireless clock system transmitter with signal coverage over the entire main campus. Campus clock standard is Primex #14180, 12.5" silver brushed aluminum.
- B. During project design the consultant shall identify clock locations and show them on plan. Owner will purchase the clocks during construction and turn over to the Constructor to mount. Clocks are battery operated, self synchronizing.