SECTION 27 11 19

Communications termination blocks and patch panels

Notes to the Specification Writer:

This Section has been written to cover most, but not all, project conditions that you will encounter. Depending on the project, you may need to add material, delete items, or modify what is currently written. Editing instructions are included throughout the document. (If this document is viewed or printed in color, these instructions appear in red specific bold italic text.)

Review this entire specification Section and edit it to meet the requirements of the specific project. Options or items where the specification writer’s input is needed are enclosed in [brackets].

Before publishing your final version of this specifications Section, remove all red bold italic instructions.

1. GENERAL
	1. SUMMARY

### This Section includes:

#### The supply, delivery, supervision, coordination, and installation of equipment items specified herein and shown on the Drawings

#### The testing, documentation, and instructions for completing the Structured Cabling System

#### Products supplied but not installed under this section, including loose equipment specified herein, which is to be turned over to the Owner at the completion of this project

### Examine the contract documents in their entirety (including drawings and specification sections in the other divisions) for requirements or work which may affect work under this section, regardless of whether such requirements or work are specifically indicated in this section.

### Contractor Shall Provide and Install

#### The Contractor shall furnish and install telecommunications passive equipment, including:

##### Horizontal cable

##### Termination hardware

##### Communications outlets

##### Intersystem connections

##### Device connections

##### Splicing and terminations

##### Testing

##### Administration

#### Although such work is not specifically mentioned herein or on the Drawings, the Contractor shall furnish and install all miscellaneous items, accessories, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation, without claim for additional payment.

#### The Contractor shall provide system testing and demonstration, system documentation, and instruction of Owner personnel, without claim for additional payment.

### Errors or Omissions in Drawings or Documentation

#### If any errors or omissions appear in Drawings, Specifications, or other documents, the bidding Contractor shall notify the Engineer no later than ten (10) days prior to submitting the bid.

#### Should conflict occur in or between Drawings and Specifications, the bidding Contractor is deemed to have estimated the more expensive way of doing the work, unless the bidding Contractor has asked for and obtained written decision (addendum) before submission of the bid as to which method or materials will be required.

### Related Sections:

#### Section 00 00 00 – Procurement and Contracting Requirements –

#### Section 01 00 00 – General Requirements

#### Section 26 05 26 – Grounding and Bonding for Electrical System

#### Section 27 05 00 – Common Work Results for Communications

#### Section 27 05 26 – Grounding and Bonding for Communication Systems

#### Section 27 05 53 – Identification for Communication Systems

#### Section 27 11 16 – Communications Cabinets, Racks, Frames and Enclosures

#### Section 27 13 23 – Communications Fiber Backbone Cabling

#### Section 27 16 13 – Communications Copper Custom Cable Assemblies

#### Section 27 16 13.01 – Communications Fiber Custom Cable Assemblies

## Definitions

### ANSI – American Northern Standards Institute

### AWG – American Wire Gauge

### BICSI – Building Industry Consulting Service International

### BCT – Bonding Conductor for Telecommunications

### EIA – Electronics Industry Alliance

### ETL – Intertek Certification Services

### IEC – International Electrotechnical Commission

### IEEE – Institute of Electrical and Electronic Engineers

### IDC – Insulation displacement contact

### ISO – International Standards Organization

### NECA – National Electrical Contractors Association

### NFPA – National Fire Protection Agency

### NRTL – Nationally Recognized Testing Laboratory

### TIA – Telecommunications Industry Association

### UL – Underwriters Laboratory

### Provide: Furnish, install, terminate, label, test and certify a complete operating cabling system.

### Contract Documents (CD): Design drawings, specifications, sketches and schedules provided by the Engineer as they directly relate to this scope of work and this project.

### Structured Cabling Systems (SCS) wiring is defined as all required equipment and cabling including hardware, termination blocks, cross connect wire or cordage, patch panels, patch cords, telecommunication outlets, work area cords, UTP and fiber cable installed and configured to provide computer data and voice connectivity.

### Point–of–Entry (POE): Unmarked Manholes/Vaults at property line

### NET–POP Rooms/MPOE (Main Point of Entry): The area where the outside plant media/carrier services appear in the facility. The NET–POP contains equipment used by owner or carrier to hand–off/transition cable from outside plant into inside plant type.

### Network Center/Main Distribution Frame (MDF) Areas: This technology space houses Layer 2/3 network switching gear and other main network distribution equipment and acts as the mid–connection point between the Core/Network and the TR/IDF/access zones for all connections.

### Telecommunications Room (TR)/Intermediate Distribution Frame (IDF): is the location for the termination of backbone cables and for termination of horizontal cables, and for the interconnection of each. The space also hosts access–layer switches and user network connections within each floor.

### Active Equipment: electronic equipment used to develop various WAN, LAN, and voice services, e.g., digital multiplexers, RS–232 controllers, Ethernet hubs, switches, routers, PBX, etc.

### Campus Backbone: cabling system consisting of media and termination hardware interconnecting POE, Net–Pop’s and Future onsite buildings.

### Building Backbone: cabling system consisting of media and termination hardware interconnecting MDFs to IDFs.

### Horizontal: cabling system consisting of media and termination hardware interconnecting the Telecommunication Outlets (TOs) and the TRs.

### Bonding: permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct safely any current likely to be imposed on it.

### Basket Cable Tray: A cable support and management system fabricated of continuous, rigid, welded steel wire mesh and available in many sizes with attachment hardware suiting multiple installation methods

### Cable Tray: vertical or horizontal open supports, usually made of aluminum or steel, which are fastened to the building structure. Cables are laid in and fastened to the trays.

### Cabinet: free standing, floor–mounted or wall–mounted modular enclosure designed to house and protect rack–mounted electronic equipment and passive terminations.

### Channel: The end–to–end transmission path between two points at which application specific equipment is connected; encompasses all the elements of the horizontal cabling link, plus the equipment cords in the telecommunications spaces and work area.

### Cross–Connect: equipment used to terminate and tie together communications circuits.

### Cross–Connect Jumper: a cluster of twisted–pair conductors without connectors used to establish a circuit by linking two cross–connect termination points.

### Grounding: a conducting connection to earth, or to some conducting body that serves in place of earth.

### Jack: receptacle used in conjunction with a plug to make electrical contact between communications circuits, e.g., eight–position/eight–contact modular jacks.

### Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).

### LAN: Local area network.

### Link: Horizontal cabling link encompassing all components of the horizontal cabling (TO, patch panels, blocks, jumpers and patch cords that join them in the horizontal cross–connect). It is distinguished from a channel because it does not include the equipment cables/cords at the telecom spaces or work area.

### Media: twisted–pair, and fiber optic cable or cables used to provide signal transmission paths.

### Mounting Frame: rectangular steel framework, which can be equipment rack or wall mounted to support wiring blocks, patch panels, and other communications equipment.

### Outside Plant (OSP): generally, any and all portions of the cable system that runs outside of an environmentally enclosed structure and/or building with each end terminated at different buildings. This specifically includes inter–building cables, conduits, manholes, hand–holes, and innerduct.

### UTP: Unshielded Twisted Pair.

### FO: Fiber Optic

### Passive Equipment: non–electronic hardware and apparatus, e.g., equipment racks, cable trays, electrical protection, patch panels, wiring blocks, fiber optic shelves, etc.

### Patch Cords: a length of wire or fiber cable with connectors on one or both ends used to join communications circuits at a cross–connect.

### Patch Panel: system of terminal blocks or connectors used with patch cords that facilitate administration of cross–connect fields.

### Pathway: facility for the placement of communications cable. A pathway facility can be composed of several components including conduit, wireway, cable tray, surface raceway, under floor systems, overhead systems, raised floor, ceiling support wires, etc.

### Protectors: electrical protection devices used to limit foreign voltages on metallic communications circuits.

### Raceway: an enclosed channel designed expressly for holding wires or cables; may be of metal or insulating material. The term includes conduit, tubing, wire ways, under floor raceways, overhead raceways and surface raceways; does not include cable tray.

### Racks: An open, freestanding, floor–mounted structure, typically made of aluminum or steel, used to mount equipment; usually referred to as an equipment rack.

### Riser Backbone: The Riser Backbone subsystem links the main cross connect (MDF) in the equipment room to the distribution rooms (TRs).

### Structured Cabling System (SCS): A SCS is defined as all required cabling including hardware, termination blocks, cross connect wire or cordage, patch panels, patch cords, telecommunication outlets, work area cords, UTP and fiber optic cable installed and configured to provide computer data and voice connectivity from each data or voice device to the network file server or voice network/switch designated as the service point of the local area network.

### Telecommunication Outlet (TO): Connecting device mounted in a work area used to terminate horizontal cable and interconnect cabling with station equipment.

### Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.

### Work Area Subsystem: The connection between the telecommunications outlet and the station equipment in the work area is provided by the Work Area Subsystem. It consists of cords, adapters, and other transmission electronics.

### Wireless Access Point (WAP): Telecom outlet designated for use with wireless network devices. Such outlet shall be mounted above ceiling.

### Contractor – The successful bidder engaged to provide the work of this specification

## REFERENCES

### Most recent editions and addenda of the following documents:

### ANSI/TIA 568 series, most recent revisions, addenda and systems bulletins. All applicable

### ANSI/TIA–569 Telecommunications Pathways and Spaces, most recent revision including all relevant addenda and systems bulletins

### ANSI/TIA–606 Administration Standard for Telecommunications Infrastructure, most recent revision including all addenda and systems bulletins

### ANSI/TIA–607 Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises, most recent revision including all addenda and systems bulletins

### ANSI/TIA–862 Structured Cabling Infrastructure Standard for Intelligent Building Systems, most recent revision including all addenda and systems bulletins

### ANSI/TIA–942 Telecommunications Infrastructure Standard for Data Centers, most recent revision including all addenda and systems bulletins

### ANSI/TIA–1179 Healthcare Facility Telecommunications Infrastructure Standard, most recent revision including all addenda and systems bulletins

### ANSI/TIA–4966 Telecommunications Infrastructure Standard for Educational Facilities, most recent revision including all addenda and systems bulletins

### TIA–TSB–162 Telecommunications Cabling Guidelines for Wireless Access Points, most recent revision including all addenda and systems bulletins

### Telecommunications Distribution Methods Manual, most recent edition

### Information Transport Systems Installation Methods Manual (ITSIMM), most recent edition

### National Electric Codes (NEC) – all applicable

### OSHA Standards and Regulations – all applicable

### Local Codes and Standards – all applicable

### UL444 – Standard for Safety of Communications Cable

### UL 1666 – Standard for Safety of Flame Propagation Height

### Local Authority Having Jurisdiction (AHJ)

### Anywhere cabling standards conflict with one another or with electrical or safety codes, Contractor shall defer to the NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either

### Any violations of applicable standards or codes committed by the Contractor shall be remedied at the Contractor’s expense

## SYSTEM DESCRIPTION

### The Contractor will provide, install, and test a complete structured cabling system for the project’s voice and data communications systems from the Telecommunications Outlet (TO) to the Telecommunications Room (TR), and between telecommunications spaces. The Contractor will provide and install all required components, as identified below.

### Horizontal Cabling

#### Horizontal cabling includes horizontal cable, telecommunications outlet/connectors in the Work Area (WA), mechanical terminations and patch cords or jumpers located in a Telecommunications Room (TR) or Telecommunications Enclosure (TE) and may incorporate Multi-User Telecommunications Outlet Assemblies (MUTOAs) and Consolidation Points (CPs).

## SUBMITTALS

### Engineer’s Review

#### The Engineer’s review of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the contract documents.

#### With the shop drawings, the Contractor shall include an index sheet detailing all deviations from the contract documents, and will be held responsible for all deviations, unless the Contractor has received written approval from the Engineer for the specific deviation, separate from general shop drawing approval.

#### The Engineer’s review shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

### General Component Data

#### For all products covered under this Section, the Contractor shall submit the following data for each component:

##### A Specification Section

##### The Manufacturer’s name.

##### The Manufacturer’s model and part number

### Devices

#### In addition to the general requirements above, the Contractor shall submit the following additional data for outlets, cover plates, and fiber connectors:

##### The outlet specifications, including category rating, material, wiring, termination type, wire type, and color

##### The associated faceplate

##### A drawing of each device

### Connecting Hardware

#### In addition to the general requirements above, the Contractor shall submit the equipment specifications for copper patch panels, fiber patch panels, and wiring blocks, including quantity of ports, material, dimensions, mounting, terminating devices and color.

### Testing and Test Results

#### Refer to Section 27 05 00

## QUALITY ASSURANCE

### Standards for Materials and Equipment

#### The Contractor shall provide all materials, equipment, and installation in compliance with the latest applicable standards from ANSI, FCC, ASTM, EIA/TIA, IEEE, NEC, NFPA, NEMA, OSHA, REA, and UL.

### Installer Qualifications

#### Refer to Section 27 05 00

## DELIVERY, STORAGE, AND HANDLING

### To prevent damage, theft, soiling, and misalignment, protect equipment during transit, storage, and handling

### The contractor shall coordinate the secure storage of equipment and materials on site, or, if no on-site storage is available, shall provide their own secure storage at the Contractor’s expense.

#### Do not store equipment where conditions fall outside the manufacturer's recommendations for environmental conditions.

#### Do not install damaged equipment. Remove environmental conditions from the site and replace damaged equipment with new equipment.

#### If off-site storage of materials is necessary, this shall be at the Contractor’s expense.

## COORDINATION

### The Contractor shall coordinate with all other trades. The Contractor will submit a schedule for the installation within 10 days of contract award

#### The schedule shall include delivery, installation, and testing for conformance to specific job completion dates.

#### At minimum, the schedule shall provide dates for the start of demolition, the completion of demolition, the installation start date, the completion of copper cabling, the completion of backbone cabling, the completion of testing and labeling, cutover, the completion of the final punch list, final inspection, and acceptance.

### Meeting Attendance and Schedule Adherence

#### The Contractor must attend all project-related meetings and adhere to schedule set by the Project Manager.

### Final Inspection

#### The Contractor is required to notify the Engineer of a proposed appointment for Final Inspection at least 72 hours before the appointment.

#### Within five working days after the final inspection, the Contractor shall send final project documentation and warranty information to the Owner and Engineer. The final project documentation shall include, but may not be limited to:

##### As-Built Drawings, in an AutoCAD format, with legible outlet address and cable paths

##### Outlet location spreadsheets

##### Warranty paperwork

##### A copy of the Final Inspection and Acceptance Signoff Sheet

##### Photos of each ER and TR

## PROJECT CONDITIONS

### Project Environmental Requirements

#### Hazardous Materials Prohibition

##### The Contractor shall ensure that all materials used in the project are asbestos-free, unless specifically authorized in writing by the Owner

#### Existing Conditions

##### Verify that all conditions on the project site are acceptable for the Work specified in this Section. Prior to bid opening, notify the Consulting Engineer, in writing, of any discrepancies, conflicts, or omissions. Otherwise, correct these issues at no additional cost to the Owner.

##### Continue to monitor the project site. If conditions develop that require a variance from the Specifications or Drawings, then immediately notify the Owner in writing. Otherwise, make recommendations, submit drawings showing how the Work may be installed, and, upon approval, proceed with the necessary changes without additional cost to the Owner.

### Record Drawings

#### Keep a complete set of all telecommunications drawings in the job site office for demonstration of the actual installation work specified in this Section.

#### Use this set of drawings for no other purpose.

#### Where any material, equipment, or system components are installed differently than what is shown on the drawings, indicate the differences clearly and neatly using ink or indelible pencil.

#### Upon completion of the project, submit the record set of drawings.

## USE OF THE SITE

### Where the Owner deems it necessary to place restrictions, use the site as directed by the Owner.

### When proceeding with the work, do not interfere with the ordinary use of streets, aisles, passages, exits, or operations of the Owner. During the day, set up cones and barriers in hallways and walkways. Do not string cable down the hallways during normal hours.

### Request a hazardous materials worksheet that identifies potentially-hazardous locations. Do not proceed with any work in locations where hazardous materials are known to be. Obtain instructions from the Contractor’s Project Manager on and when to work in these areas.

### Multiple times each day, each contractor shall remove all trash and debris from the site. Before leaving the room each day:

#### The Contractor shall replace all ceiling tiles that they have removed.

#### The Contractor shall place all furniture and equipment that they have moved back into its original location.

#### The Contractor shall return any equipment that they have disconnected to working order.

#### The Contractor’s Job Foreman shall inspect all work locations to ensure that the rooms are clean and that all of the tasks described above have been done.

#### It is recommended that the Contractor inspect the site and take pictures to document the condition of the ceilings and walls.

## CONTINUITY OF SERVICES

### Take no action that will interfere with or interrupt existing building services, unless previous arrangements have been made with the Owner's representative. Arrange all work to minimize shutdown time.

### The Owner's personnel shall perform shutdown of operating systems. When shutdown of systems is required, the Contractor shall give three (3) days advance notice.

### Should building services be inadvertently interrupted:

#### The Job Foreman shall immediately notify the Project Manager of the accidental disruption of services, the remedy, and how long it will take to restore services.

#### The Contractor shall immediately furnish the labor, including overtime, the material, and the equipment necessary to promptly restore the interrupted service at no cost to the Owner.

## WARRANTY

### Refer to Section 27 05 00

#  PRODUCTS

## GENERAL

### Refer to Section 27 05 00 for General Requirements

### All materials and products shall be:

#### Appropriate for the intended use

#### Recognized as such by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories (UL), ETL SEMCO (ETL), the Canadian Standards Association (CSA) or the American National Standards Institute (ANSI)

#### Permitted by the Authority Having Jurisdiction (AHJ)

### All products shall be new, of the latest version at time of bid, and brought to the job site in original manufacturer's packaging. Used equipment and damaged material will be rejected.

### Any modifications to equipment to suit the intent of the specifications shall be performed in accordance with these requirements.

### Cable lubricants specifically designed for installing communications cable may be used as needed to reduce pulling tension when pulling cable into conduit.

### Take care during installation to prevent scratches, dents, chips, etc. Equipment with significant or disfiguring cosmetic flaws will be rejected.

### All components will be approved by the Engineer and shall have the most aesthetic value possible while maintaining specified functionality. Hardware shall:

#### Be in compliance with the Construction Documents

#### Have fit and finish compatible with the existing surrounding structure

#### Be unobtrusive

#### Provide the required functionality

### All work area termination hardware, including mounting boxes, faceplates, and outlets, shall match the existing wall surface color as closely as possible.

### All copper and fiber products shall be from a single manufacturer so that a single performance warranty covers all applications on vertical and horizontal links.

### Fabricate custom-made equipment with careful consideration given to aesthetic, technical, and functional aspects of the equipment and its installation.

### Provide products that are suitable for the intended use, including, but not limited to environmental, regulatory, and electrical factors.

## SUBSTITUTION POLICY

### This is a performance-based specification developed from the experience of <<ClientName>> IT in providing exceptional solutions for all our facilities and departments. As such, substitution of specified products or systems is not allowed.

### Contractor shall assume all costs for removal and replacement of any product installed in substitution of those specified. Such costs shall include but not be limited to labor, materials as well as any penalties, fees or costs incurred for late completion.

## FIELD-TERMINATED PATCH PANELS

### Patch panels for field termination of Category [insert 6 or 6A] Unshielded Twisted Pair (UTP) cable shall:

#### Be [angled or flat], 19 inch rack-mountable panels

#### Be [insert 1RU or 2RU], [insert 24 port or 48 port] units

#### Have 8 pin modular Insulation Displacement Connectors (IDCs) that:

##### Meet Category [insert 6 or 6A] performance standards

##### Support T568A and T568B wiring schedules

#### Have space on the front and rear of all jacks for labeling and identification

#### Have a steel frame, with a black power-coat finish, in 24 port, and 48 port configurations

#### Accommodate at least 24 ports for each Rack Unit (RU)

#### Have circuit boards tested in both directions, as required by ANSI/TIA 568

#### Support applications up to 500 MHz

#### Meet the requirements of IEEE 802.3af, IEEE 802.3at and IEEE 802.3bt for PoE applications up to 100 watts

#### Have 110-style IDCs on which termination is accomplished with a single conductor impact tool or a 4 pair impact tool

#### Be backwards compatible to allow lower-performing categories of cables or connecting hardware to operate at their full capacity

#### Allow for a minimum of 20 re-terminations without signal degradation below the limit specified by industry standards

#### Have modular ports that are in compliance with FCC CFR 47 part 68, subpart F and IEC 60603 7 with 50 micro- inches of gold plating over nickel contacts or equivalent

#### Be made by an ISO 9001 Certified Manufacturer

#### Have the following electrical specifications:

##### Compliance with ANSI/TIA- 568 and ISO/IEC 11801 Category [insert 6 or 6A] channel compliant

##### CSA C22.2 approval or equivalent

##### Provide color-coded icons or color-coded designation label strips for all patch panels that are incompliance with TIA 606 and that identify voice or data functionality as required

####  <<ClientName>> approved Manufacturer:

##### Panduit

#### <<ClientName>> approved Field-Terminated Patch Panels - The table below lists part numbers. The part numbers and sizes listed are a small subset of the number available. For additional information, contact Panduit customer service or refer to the current parts catalog.

| *part number* | *description* |
| --- | --- |
| Patch Panels - Angled |
| DPA246X88TGY | Punchdown Patch Panel, Cat 6A, Angled, 24 Port, 1RU |
| DPA486X88TGY | Punchdown Patch Panel, Cat 6A, Angled, 48 Port, 2RU |
| DPA24688TGY | Punchdown Patch Panel, Cat 6, Angled, 24 Port, 1RU |
| DPA48688TGY | Punchdown Patch Panel, Cat 6, Angled, 48 Port, 2RU |
| Patch Panels - Flat |
| DP246X88TGY | Punchdown Patch Panel, Cat 6A, Flat, 24 Port, 1RU |
| DP486X88TGY | Punchdown Patch Panel, Cat 6A, Flat, 48 Port, 2RU |
| DP24688TGY | Punchdown Patch Panel, Cat 6, Flat, 24 Port, 1RU |
| DP48688TGY | Punchdown Patch Panel, Cat 6, Flat, 48 Port, 2RU |

## MODULAR PATCH PANELS

### Patch panels for modular field termination of Category [insert 6 or 6A] Unshielded Twisted Pair (UTP) cable shall:

#### Be [insert angled or flat] modular components with a maximum capacity of 48 connections per RU

##### ~~Made of a high-strength plastic frame with a black finish~~

##### Made of a steel frame with black powder coat finish

#### Have space on the front for labeling and identification

#### Accept a variety of media and connectivity components, including UTP, optical fiber, and audio/visual components

#### Be made by an ISO 9001 Certified Manufacturer

#### <<ClientName>> approved Manufacturer:

##### Panduit

#### <<ClientName>> approved Modular Patch Panels:

| *part number* | *description* |
| --- | --- |
| CPPL24WBLY | Patch Panel, 24 port w/labeling, Front access, Black |
| CPPL48WBLY | Patch Panel, 48 port w/labeling, Front access, Black |
| CPPLA24WBLY | Patch Panel, 24 port w/labeling, Angled Front access, Black |
| CPPLA48WBLY | Patch Panel, 48 port w/labeling, Angled Front access, Black |
| CPP24FMWBLY | Patch Panel, 24 Port, Modular Flush Mount, Black |
| CPPA24FMWBLY | Patch Panel, 24 Port, Modular Flush Mount, Black |
| CPP48FMWBLY | Patch Panel, 48 Port, Modular Flush Mount, Black |
| CPPA48FMWBLY | Patch Panel, 48 Port, Modular Angled Flush Mount, Black |
| CPP48HDWBLY | Patch Panel, 48 Port, 1RU, Modular High Density, Black |
| CPPA48HDWBLY | Patch Panel 48 Port, 1RU, Modular Angled High Density, Black |

## STRAIN RELIEF BARS

#### Horizontal cable support bars, strain relief bars, shall be from the same manufacturer as the patch panels, listed elsewhere in this Section, and have the following attributes:

##### Are constructed of 3 mm roll-formed ~~aluminum or~~ steel

##### Are 19 inch rack mountable

##### Are less than 5/8 inch (16 mm) high

##### Are factory manufactured with stamped or drilled points designed for use with hook and loop tape to provide secure support of incoming cables at the rear of the patch panel

##### Have a black powder-coat paint finish

#### <<ClientName>> approved Manufacturer:

##### Panduit

#### <<ClientName>> approved Strain Relief Bars - The table below lists part numbers. The part numbers and sizes listed are a small subset of the number available. For additional information, contact Panduit customer service or refer to the current parts catalog.

| *part number* | *description* |
| --- | --- |
| Strain Relief |
| SRB19BLY | Strain Relief Bar, Extended 2" |
| SRB19D5BL | Strain Relief Bar, Extended 5" |
| SRB19D7BL | Strain Relief Bar, Extended 7" |
| SRBBRKT | Strain Relief Bar Bracket |
| CNSRBKIT-C | Cage Nut Kit for Strain Relief Bars |

## 110 wiring BLOCKS

### The wiring block shall support Category 3 and Category 5e (110 type terminations) applications and facilitate cross connection and interconnection using cross connect wire (voice only)

### The wiring blocks shall have the following characteristics:

#### Be fire retardant, molded plastic consisting of horizontal index strips for terminating 25 pairs of conductors each. The index strips shall be marked with five colors on the high teeth, separating the tip and ring of each pair, to establish pair location

#### A series of fanning strips shall be located on each side of the block for dressing the cable pairs terminated on the adjacent index strips

#### The wiring block shall accommodate 22- through 26-AWG conductors and shall be able to mount directly on backboards

#### Clear label holders with the appropriate inserts shall be provided with the wiring blocks. The insert labels shall contain vertical lines spaced on the basis of circuit size (3-, 4-, or 5-pair) and shall not interfere with running, tracing or removing jumper wire/patch cords

#### The CAT5e wiring blocks shall be available in 100, 300 and 900 pair sizes

#### Meets IEC 60352-4 requirements; can withstand repeated terminations up to 200 cycles

#### The 110 wiring blocks shall meet the TIA/EIA-568.2-D specifications

## OPTICAL FIBER DISTRIBUTION ENCLOSURES

### All Fiber Distribution Enclosures (FDEs) shall:

#### Be rack-mounted, metal enclosures with removable doors and panels at front and rear

#### Be designed for cable entry from the rear of the enclosure

#### Be equipped with appropriate means for physically securing the cables in place, and shall provide sufficient rings, saddles, and guides to ensure that all cables and strands are dressed in a neat and workmanlike manner and to maintain the required minimum bend radii for all changes in direction

#### Be equipped with an integral bonding lug or stud for securing the fiber strength member

#### Provide space for six or twelve inserts

#### Use modular snap-in coupler panels or factory-made cassettes

#### Have front and rear access panels be fitted with manufacturer-supplied labels for each enclosure, cable, and all termination positions

#### Have blank connector panels for all available positions, unless the housing is ordered with optical fiber adapters pre-installed

### <<ClientName>> approved Manufacturer:

#### Panduit

### <<ClientName>> approved Fiber Distribution Enclosures - The table below lists part numbers. The part numbers and sizes listed are a small subset of the number available. For additional information, contact Panduit customer service or refer to the current parts catalog.

| *part number* | *description* |
| --- | --- |
| **Enclosures** |
| FCE1U | Rack Mount Fiber Enclosure 1RU |
| FRME1U | Rack Mount Fiber Enclosure 1 RU |
| FRME2U | Rack Mount Fiber Enclosure 2 RU |
| FRME4 | Rack Mount Fiber Enclosure 4 RU |
| FWME2 | Wall Mount Fiber Enclosure With 2 FAP Openings |
| FAPB | Blank FAP |
| **HD Flex (High Density)** |
| FLEX1U06 | HD Flex 1 RU 6-Port Enclosure |
| FLEX1U12 | HD Flex 1 RU 12-Port Enclosure |
| FLEX2U06 | HD Flex 2 RU 6-Port Enclosure |
| FLEX2U12 | HD Flex 2 RU 12-Port Enclosure |
| FLEX4U06 | HD Flex 4 RU 6-port enclosure |
| FLEX4U12 | HD Flex 4 RU 12-port enclosure |
| **Accessories** |
| FLEX-FCM\*UA | HD Flex Front Cable Manager, (replace \* with 1, 2, or 4 for RU size) |
| FLEX-RCM\*U | HD Flex Rear Cable Manager for Enclosures (replace \* with 1 or 4 for RU size) |
| FLEX-0RUBR06 | HD Flex 0 RU bracket, 6-port |
| FLEX-0RUBR12 | HD Flex 0 RU bracket,12-port |
| FLEX-0RUCH06 | HD Flex 0 RU cassette holder, 6-port |
| FLEX-0RUCH12 | HD Flex 0 RU cassette holder, 12-port |
| FLEX-PLATE\*UR | HD Flex Rear Cover Kit for Enclosures with slack plate & rear cover (replace \* with 1, 2, or 4 for RU size) |
| FLEX-PLATE\*UPR | HD Flex Rear Cover Kit for Panels with slack plate & rear cover (replace \* with 1, 2, or 4 for RU size) |
| FLEX-PLATE\*U | Enclosure Trunk Slack Plate – (replace \* with 1, 2 or 4 RU size) |
| FLEX-CLIP12 | HD Flex Trunk Transition Clip (qty 2); 12-position |
| FLEX-CLIP18 | HD Flex Trunk Transition Clip (qty 2); 18-position |
| FLEX-CM12C | HD Flex Rear Cable Manager (use with Panduit PEV12); 12-position Transition Managers (qty 4) and Clip |
| FLEX-CM18C | HD Flex Rear Cable Manager (use with Panduit PEV12); 18-position Transition Managers (qty 4) and Clip |
| FLEX-CM12S | HD Flex Universal Rear Cable Manager; 12-position transition manager (qty 2) with screw mount bracket |
| FLEX-CM18S | HD Flex Universal Rear Cable Manager; 18-position transition manager (qty 2) with screw mount bracket |

## OPTICAL FIBER CONNECTOR PANELS

### A connector panel is a modular removable plate containing optical fiber connector adapters or copper jacks.

### Optical fiber couplers shall have:

#### A modular unit of the same manufacture as the Fiber Distribution Enclosures and shall have keyed openings on the front and rear to provide proper alignment of the connectors.

#### Couplers will be factory-installed to maintain an appropriate A-B orientation throughout the optical link.

#### Couplers will be aqua with ceramic alignment sleeves for 50 µm graded-index optical fiber and blue for single-mode.

### Connector Panels

#### Connector panels shall:

##### Be manufactured from 16-gauge cold-rolled steel or injection molded polycarbonate for structural integrity

##### Be finished with a black powder-coat texture to match other hardware

##### Have a single mounting footprint

##### Be available with three, four, six, eight, twelve, or twenty-four connector adapters in each panel

##### Be both rack-mountable and wall-mountable

##### Be attached with two push-pull latches to allow for quick installation and removal

##### Be available with industry standard single-fiber and small form factor multi-fiber adapters, including the TIA/EIA 604 3A (SC), TIA/EIA 2 (ST) compatible, and TIA/EIA 604 10A (LC)

##### Include removable icons that identify the circuits, including blank, telephone, computer, CATV, video camera, satellite dish, or CAT 6, and in colors including blue, yellow, red, white, electric ivory, ash, green, purple, gray, black, brown, and orange

### Blank Connector Panels

#### Blank connector panels shall be available to fill unused space in the housings. The blank connector panels shall be:

##### Attached with at least two push-pull latches to allow for quick installation and removal

##### Manufactured from injection molded polycarbonate

##### Finished with a wrinkled black texture to match the housing

### <<ClientName>> approved Manufacturer:

#### Panduit

### <<ClientName>> approved part numbers listed in the table below. The part numbers and sizes listed are a small subset of the number available. For additional information, contact Panduit customer service or refer to the current parts catalog.

| *part number* | *description* |
| --- | --- |
| CMDSAQLCZBL | Duplex LC Sr./Sr. 10 GbE Fiber Adapter (AQ) With Module (BL) Zirc |
| FAP12WAQDLCZ | FAP w/12 LC 10 GbE Duplex MM Adapters (AQ) Zirconia |
| FAP12WBUDLCZ | FAP w/12 LC Duplex Adapters (BU) Zirconia |
| FAP6WBUDLCZ | FAP w/6 LC Duplex Adapters (BU) Zirconia |
| FAP6WAQDLCZ | FAP w/6 LC 10 GbE Duplex MM Adapters (AQ) Zirconia |
| FAP6WBUDSCZ | FAP w/6 SC Duplex Adapters (BU) Zirconia |
| CFAPPBL1 | Fiber Adapter Patch Panel 1 RU |
| FQMAP65BL | Fiber Optic Migration Adapter Panel - 6 MPO Adapters |

# EXECUTION

## GENERAL

### The Contractor shall input the cabling data into the cable management software.

### Install required cables, a faceplate/surface box/furniture insert, a jack at each location designated on the drawings and a preloaded or modular patch panel in the TR/TE

### Provide any required screws, anchors, clamps, hook and loop, miscellaneous grounding and support hardware, etc. needed to facilitate the installation of the cable plant system.

### Furnish any special installation equipment or tools necessary to properly complete the installation.

### Failure to follow the appropriate guidelines may require the installer to provide additional material and labor required to properly rectify the situation. This shall also apply to any and all damages caused to the cables by the installer during the implementation.

### All techniques and fixtures used in the installation must minimize complexity and must allow for easy maintenance of, and ready access to, all components for test measurements.

### All materials used in installation shall be resistant to fungus growth and moisture deterioration.

### All cable runs must be continuous from patch panel to the outlet location.

## PATCH PANELS

### Install patch panels in the equipment racks identified on the Drawings. Place patch panels as close as is practical to the locations depicted on the Drawings.

### Install patch panels square and plumb and fasten them to the mounting rails in four places using manufacturer-supplied screws, with at least one fastener at each corner.

### Install horizontal cable support bars at the rear of all patch panels as indicated on the manufacturer’s instructions.

### Attach all accessories supplied with the panels per the manufacturer’s instructions.

### Restore all covers, panels, label holders, and accessories removed during the installation of panels to their original places and states.

### On the front and rear of each patch panel, place a machine-generated, self-adhesive white label bearing the panel’s identifier, as listed in the submittals, in black ½ inch block letters.

## WIRING PRACTICES

### Where specific instructions are not given, perform all wiring in strict adherence to standard industry practices as described in the referenced Telecommunications Distribution Methods Manual (TDMM), and ANSI/TIA-568 standards.

### All cables shall originate and terminate at active or passive devices. Cables shall not be spliced. Where several devices are in close proximity, use approved housing to housing connectors and adapters.

### All cables terminated in a connection plate mounted in an enclosure shall be dressed to allow cables to be removed from the enclosure and shall be of sufficient cable length to allow for service or re-termination. The plate shall either set on the floor or freely swing clear.

## SYSTEM ADMINISTRATION

### Uniquely identify all components of the installed system by location, function, unit, and sub-unit.

### Identify each location with a unique alphanumeric identifier.

### Assign a unique alphanumeric identifier for each equipment enclosure in the building.

### Identify each adapter module in each distribution or interconnect enclosure with an alphanumeric identifier.

### Identify all conduits, trays, and pathways with a unique alphanumeric identifier.

### Identify optical fiber cables by a textual label that indicates its type, strand count, point of origin, and termination.

### Supply a Cable Identification Matrix

### Supply all records in compliance with ANSI/TIA 606.

## IDENTIFICATION

### Before installing or terminating cable, confirm all specific labeling requirements with the Owner or the Owner’s Engineer.

### Refer to Section 27 05 53

## FIELD QUALITY CONTROL

### General Testing

#### Refer to Section 27 05 00 for complete testing specifications.

#### END OF SECTION 27 11 19