

SPECIFICATION STANDARD

TERMINATIONS BLOCKS AND PATCH PANELS 27 11 19

PART 1: GENERAL

1.01 General

- A. Work covered by this Section shall consist of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified, and in performing the following operations recognized as necessary for the installation, termination, and labeling of termination blocks and patch panels as described on the Drawings and/or required by these specifications.
- B. Install termination blocks and patch panels as specified by the requirements of this section and in particular the related sections; 27 15 13 Copper Horizontal Cabling; 27 15 43 Face plates and Connectors and the other related sections specified in Section 1.02.

1.02 RELATED SECTIONS

- A. The project's architects, engineers, contractor, manufacturer, and/or University employee are responsible to be knowledgeable with the provisions contained within the following and other related sections of these standards of the UNM IT department as they apply to the completion of the project's installation and design.
 - 1. Division 27, Section 27 00 00 Communications
 - 2. Division 27, Section 27 05 28 Pathways for Communication Systems.
 - 3. Division 27, Section 27 05 53 Identification for Communication Systems.
 - 4. Division 27, Section 27 11 16 Communications Cabinets, Racks, Frames, and Enclosures.
 - 5. Division 27, Section 27 15 43 Faceplates and Connectors
 - 6. Division 27, Section 27 11 23 Communications Cable Management and Ladder Rack.
 - 7. Division 27, Section 27 13 13 Communications Copper Backbone Cabling.
 - 8. Division 27, Section 27 13 23 Communications Optical Fiber Backbone Cabling.
 - 9. Division 27, Section 27 13 33 Communications Coaxial Backbone Cabling.
 - 10. Division 27, Section 27 15 23 Communications Optical Fiber Horizontal Cabling.
 - 11. Division 27, Section 27 15 33 Communications Coaxial Horizontal Cabling.
 - 12. Division 27, Section 27 08 00 Communications, Testing and Acceptance
- B. Design, manufacture, test, and install the project's data cabling systems in accordance to the UNM IT design guidelines and standards, industry standards, manufacturer's requirements and in accordance with NFPA 70 (National Electric Code), state codes, local codes, requirements of authorities having jurisdiction, and particularly the most recent editions of the following standards and specifications.

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1. UNM IT Design Guidelines and Standards
2. This Technical Specification and Associated Drawings
3. ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises, and its published addenda.
4. ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, and its published addenda.
5. ANSI/TIA-568-C.2, Copper Cabling Components Standard, and its published addenda.
6. ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard, and its published addenda.
7. ANSI/TIA/EIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces, and its published addenda
8. ANSI/TIA/EIA-606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings, and its published addenda
9. ANSI/J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, and its published addenda.
10. Building Industries Consulting Services International (BICSI) Telecommunications Distribution Methods Manual (TDMM)
11. ANSI/TIA-942, Telecommunications Infrastructure Standard for Data Centers, and its published addenda

1.03 QUALITY ASSURANCE

- A. UNM IT shall inspect the project's design documents and installation while in progress.
- B. It is the responsibility of the Contractor to schedule regular and milestone inspection times with UNM IT. It is incumbent upon the Contractor to verify that the installation and material used has been inspected before it is enclosed within building features, buried, or otherwise hidden from view. The Contractor shall bear costs associated with uncovering or exposing installations or features that have not been inspected.
- C. The Contractor will provide electronic test results and a 20 year manufacturer's warranty with a copy of the warranty to be submitted to UNM IT at the completion of work.

1.04 COPPER HORIZONTAL SYSTEM DESCRIPTION

- A. The main Equipment Room (ER) and each Telecommunications Room (TR) shall house both voice and data backbone cabling and active equipment to support networking requirements. The ER in most cases shall be the main point of entry for outside services as well as main distribution point for all backbone cabling to the TR. The copper horizontal cabling shall be employed using a universal type cabling system between the work area outlet and the ER or TR for voice, data and special systems connectivity.
- B. Copper cabling in the horizontal system shall consist of plenum rated Category 6 premise cables and work area outlets, pathways, patch panels, termination blocks, equipment racks, cable management, labeling and documentation. The end-to-end link

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begins at the outlet and shall include the work area outlet with angled keystone jacks using insulation displacement contacts (IDC), Category 6 premise cable, and Category 6 IDC patch panels and termination blocks terminating in the designated TR or ER. All components shall be of the same manufacturer's warranted cabling system. All cables shall be supported in the equipment racks and pathways accordance with the manufacturer's specifications and recommendations.

- C. All cables, termination blocks and patch panel hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. Testing shall be done for link compliance to UNM IT requirements. All conductors and system components of each installed cable link shall be verified useable prior to system acceptance.
- D. Any defect in the cabling system and/or link installation including but not limited to cable, connectors, feed-through couplers, patch panels, termination blocks and all associated system components and parts shall be repaired or replaced at the providers expense in order to ensure 100% useable system.

PART 2: PRODUCTS

2.01 GENERAL

- A. The materials and products specified herein reflect the minimum acceptable standards of fabrication and manufacturing.
- B. All materials and products supplied by the Contractor and specified herein are to be new, unused, of first quality and in original packaging or shipping containers or as shown on drawings, specified and described in this section.
- C. All products shall be a part of the provided manufacturer's cabling system.
- D. Approved manufacturers products and systems shall be technically compliant systems that include the manufacturer's system partners:
 - 1. AMP
 - 2. Belden
 - 3. CommScope/Systimax/Uniprise
 - 4. Ortronics
 - 5. Siemons
- E. UNM IT will provide patch cords and make all connections to campus network and phone system unless otherwise specified by UNM IT.
- F. The standard work area Telecommunications Outlets consists of 2 - Category 6 connectors and cable terminated on a Category 6 patch panel located in the Equipment Room (ER) or Telecommunications Room (TR). Common variations could substitute or

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add Category 6 10G F/UTP, CATV, or Single Mode optical fiber to the desktop which is terminated in an FDU.

- G. Wall phones shall consist of 1 Category 6 or 6A F/UTP connector to be installed within a single gang, modular one port stainless steel faceplate and on a patch panel.
- H. Wireless Access Points outlets for wireless antenna installations mounted in ceilings require two, Category 6 outlets and terminated on a patch panel.
- I. New buildings and major renovations will be treated differently than minor remodels in existing buildings.
 - 1. New building construction and renovations will utilize a minimum of Category 6, 23 gauge cabling and IDC termination hardware as specified in the project specifications, drawings and approved by UNM IT through RFI submittal.
 - 2. For Adds Moves or Changes, match the existing manufacturer's cabling systems and termination hardware with a minimum of Category 5E in areas previously installed with Categories 5E, 5 or 3 for both voice and data unless directed otherwise by UNM IT. Including those areas where separate voice and data closets are utilized. In areas where Category 6, Category 6 10G UTP or F/UTP has been installed, match the new to be installed cabling with the exact manufacturer and category as the existing cabling system. Update the manufacturer's warranty to include any additions.
- J. All testing shall be performed using a Fluke DTX 1800 or UNM IT approved equal complete with updates and certified by the manufacturer capable to provide LinkWare reports.
- K. Contact the UNM IT for approval of cabling systems before installation. Verify exact cabling requirements with UNM IT.
- L. All test equipment shall be certified, calibrated to meet manufacturers' requirements and meet the performance requirements of Underwriters' Laboratories (UL), ETL – SEMKO, the manufacturer's systems specifications/requirements and most current TIA/EIA standards applicable at the time of contract award to the installation contractor as it applies to the specified testing application.
- M. Contact the UNM IT Facilities Manager for approval of cabling systems before installation. Verify exact cabling requirements with UNM IT.
- N. UNM IT will provide patch cords and make all connections to campus network and phone system.

2.02 SUBSTITUTIONS

- A. Product substitutions shall be managed according to the following guidelines:
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1. All substitutions shall be submitted to and approved by UNM IT.
2. Acceptance of substitutions is at discretion of UNM IT. UNM IT reserves the right to determine suitability of the substitute product and reject any and all materials submitted for substitution. Submit requests for substitutions in writing to UNM IT for approval within 10 days of contract award, or sooner if required to maintain the construction schedule.
3. Products rejected or otherwise judged unsatisfactory by the UNM IT will not be authorized for use in completing the work. Any unapproved products discovered as part of the installation will be removed and replaced with UNM IT specified and approved products at the Contractor's expense.
4. Project Drawings may be based on equipment configuration of a particular manufacturer. If a substitution is approved, the Contractor shall make changes needed to accommodate the substitution at no expense to the University of New Mexico, including work under other divisions.

2.03 110 / 66 TERMINATION BLOCKS

- A. The 110 and 66 block termination systems are considered part of the horizontal cabling system. These components shall be of the same manufacturer, system, and warranty and performance level installed for the horizontal cabling system.
- B. The 110 cabling system is the standard for the termination of backbone cabling. The 66 block system is designated for use when approved by UNM IT for special applications.
- C. The 110 and 66 termination block system shall include wiring block, standoff legs, and vertical/ horizontal wire management on all sides of the termination blocks.
- D. The 110 system shall also include (6) C-4's for 4 pair cable installations, and (5) C-5's for 25 pair wiring strip, and labels.
- E. Connect telco patch panel with a 25 pair cables terminating on 110 blocks.
- F. Install horizontal wire management components on the top and bottom of each block. All wire management components shall be of the same manufacturer and system type of the termination block.
- G. The connections between terminal blocks shall be made using with 24 gauge cross-connect wire. All connections will be made by the owners unless otherwise specified and approved by UNM IT.
- H. The installation of block splices to extend distribution cable is not permitted.

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2.03 BUILDING ENTRANCE TERMINALS AND PROTECTOR BLOCKS

- A. Refer to Division 27, Section 271313 Communications Copper Backbone Cabling

2.04 PATCH PANELS

- A. Install approved category compliant modular patch panels black in color.
- B. In mixed use applications (Category 6/Category 6A F/UTP) install modular F/UTP patch panels capable of supporting both applications.
- C. UNM Minimum Compliant Installed Horizontal Copper Permanent Link Requirements
1. Category 6 systems that are technically approved must be guaranteed by the Contractor and Manufacturer to meet the link performance field testing as prescribed in the UNM Minimum Complaint Installed Link Headroom Table (below) for Category 6 after installations.
 2. Currently UNM is specifying Single Mode Optical Fiber to the desk top for link/channels requiring 10 G performances to the desktop. Refer to UNM IT Specification: 27 Communications/ Optical Fiber Horizontal 27 15 23, for the exact requirements.
 3. Note: The minimum TIA 568 performance test levels for Category 6 Link or Channel testing that establish a PASS/FAIL test report does not constitute the minimum UNM acceptable performance level for permanent links. The minimum UNM acceptable link performance for Category 6 cabling systems are stated in the table below.
 4. The table below represents the current UNM IT acceptable performance level. The actual UNM IT minimum performance requirements are set 2 db above the most current TIA minimum Category 6 performance level for each perimeter.

UNM Minimum Complaint Installed Link Headroom Table

Cable Type	NEXT db	PSNEXT db	ACRF db	PSACRF
100 MHz Category 5E	43.8	41.3	26.2	23.2
250 MHz Category 6	37.3	34.7	17.2	15.2

- D. Existing Copper TO Locations: Where new jacks are being installed in existing TO locations, match with the existing connector hardware and patch panel manufacturer.
- E. Voice grade patch panels shall be 8 position (8P4C) modular, high density, 48 port, Pins (3, 4, 5 and 6), with Female Telco connectors. Connect patch panel with a 25 pair tail cable with male connectors terminating directly on 110 blocks. Do not use connectorized

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cables to connect to the 110 block. The approved telco patch panel for voice is the OR-808004343 or approved UNM IT equal.

F. Wire and Cable Management

1. Horizontal Wire Managers shall be black and 2 RU in size.
2. Vertical Wire Managers shall be black in color, a minimum of 6" wide x 9.30" deep with a removable cover and shall also be compatible with the installed rack (CPI PN 12833-703 for reference).
3. Cable support managers are required at the rear of all patch panels.

2.05 HORIZONTAL OPTICAL FIBER ENCLOSURES, FIBER DISTRIBUTION UNITS (FDU's)

A. Rack Mounted FDU' for Horizontal cabling

1. Provide FDUs functionally equivalent to Corning PCH-01U through PCH-04U or UNM IT approved equivalent.
2. The size of the FDU shall be determined by the fiber strand count.
3. Provide duplex LC coupler panels.
 - a. Blue for SM
 - b. Aqua for 50um MM
 - c. Beige for 62.5um MM.
4. Provide FDU's manufactured to include the required splice trays except where splice enclosures are specified or required.
5. Provide a minimum of 1 meter 6 or 12 tight buffered optical fiber pigtail assemblies with LC connectors to match the installed optical fibers and buffer tube count. Fusion splice the assemblies in the FDU or splice closure.
6. Vertical Wire Managers shall be black in color, a minimum of 6" wide x 9.30" deep with a removable cover and shall also be compatible with the installed rack (CPI PN 12833-703 for reference).
7. Refer to Division 27, Section 27 15 23 Communications Optical Fiber Horizontal Cabling for the complete requirements for optical fiber horizontal cabling systems.

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PART 3: EXECUTION

3.01 General

- A. This Section describes the installation locations for the products and materials, as well as methods and UNM IT Standards associated with the Telecommunications Installation portions of the Project. These Specifications, along with the drawings and other UNM IT supplied specifications shall be followed during the course of the installation.
- B. The contractor is required to be currently listed as an approved manufacturer registered Certified Installer for the installed cabling system.
- C. The Contractor shall supply verification of experience, for this type of work, to the Architect and UNM IT for approval before performing any work.
- D. All telecommunications cables, termination blocks and patch panels shall be installed and terminated by manufacturer certified technicians experienced in the installation and termination of telecommunications items listed in this section. In addition the contractor shall provide manufacturer certified technicians and installers per all the requirements of UNM RFP 779 Section V as related to this work.
- E. The Contractor is instructed to coordinate his efforts with the other tradesmen who may be working within the same vicinity to avoid conflict and lost time.
- F. The Contractor is required to supply all necessary tools, equipment, accessories, safety equipment, protective clothing, etc., as customary for the craft and necessary for the installation.
- G. All components shall be installed in a neat and workmanlike manner, arranged for convenient operation, testing and future maintenance.
- H. The Equipment Room and Telecommunications Room shall be cleaned, dust free, lockable with all racking, cable trays, lighting and power installed prior to the beginning of termination.
- I. All patch panel, termination block, wire management and racking are to be installed level and perpendicular to the floor.
- J. Elevator phones, emergency phones and fire alarms shall be terminated on a 110 termination block adjacent to the backbone and riser cabling.
- K. IT contractor shall ensure that there is a 36" clearance between wall-mounted termination blocks and equipment racks prior to installation.

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3.02 TERMINATIONS:

A. Twisted Pair Cable:

1. All twisted pair cable shall be terminated as required by the manufacturer's installation instructions.
2. All terminations shall be TIA T568B wiring standard connections unless otherwise specified or approved by UNM IT.

B. Coax Cable:

1. All Coax cable shall be terminated using connectors matching cable type and application, tool assembly matching connector type for crimp or compression type connectors as specified and follow the manufacturer procedures for termination and installation.

C. Optical Fiber Cable:

1. Install optical fiber links in accordance with the requirements of Division 27 15 23 Optical Fiber Horizontal.

3.03 110 TERMINATION BLOCK INSTALLATION

- A. The ER and TR shall contain wiring blocks as required to terminate all incoming pairs and all outgoing pairs to all TRs.
- B. Locate telephone wiring blocks on a white painted "¾" fire-rated plywood or fire-retardant painted white "¾" AC plywood backboards with the finished side exposed as specified on the Drawings or as specified herein. Backboards should be installed continuously on all interior walls of the IT ER or TR.
- C. It is the IT contractor's responsibility is to ensure that the specified backboard and paint are installed prior to installing cabling blocks, patch panels, splice enclosures or protector units on the plywood.
- D. Labeling for riser cables shall designate the corresponding destination TR wiring block.

3.04 PATCH PANEL INSTALLATION

- A. Each TR shall contain patch panels as required to terminate all pairs on its respective floor or floors served.
- B. Install patch panels in 19 inch equipment racks as specified on the Drawings or as specified herein.

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- C. Wire management to be mounted at the top and bottom of station cabling equipment racks and between every patch panel.
- D. Install no more than 8, 48 port patch panels (voice and data) per rack.
- E. Include vertical cable manager in between and on both sides of equipment rack.
- F. Patch panels for renovated or in commercial spaces with a TR too small for an equipment rack, shall utilize stand alone or wall mountable cabinets to mount horizontal wire management and patch panels. Approval for this type of installation is required from UNM IT prior to the design and installation.

3.03 FDU INSTALLATION FOR HORIZONTAL CABLING

- A. Install rack mounted fiber FDUs at the top of the equipment racks where specified and approved by UNM IT.
- B. Install FDU's with 1 RU spacing above and below each units or splice cabinet.
- C. FDU's for horizontal cabling shall be installed in the equipment racks with the horizontal structured cabling.
- D. Include vertical cable manager in between and on both sides of equipment rack.
- E. Horizontal cabling FCU's for renovated or in commercial spaces with a TR too small for an equipment rack, shall utilize stand alone or wall mountable cabinets to mount horizontal wire management and patch panels. Approval for this type of installation is required from UNM IT prior to the design and installation.

3.04: LINK TESTING:

- A. Contractor shall notify the responsible UNM IT Facilities Manager before the start of testing. UNM IT personnel may accompany the contractor during testing for verification purposes.
- B. 100% testing of all cabling is required.
- C. A Star Pass, Marginal Pass or Non Complaint UNM Installed Link Headroom Pass will not be accepted by UNM IT.
- D. The requirements of the UNM Minimum Complaint Installed Link supersede Manufacturer and TIA 568 testing for compliancy and acceptance by IT.
- E. All links that do not meet the tested performance link criteria shall be repaired or replaced by the contractor prior to test results submittal.

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- F. The Contractor shall immediately notify UNM IT of any problems related to the manufacture's quality, high incidents of failure or other anomalies discovered during testing such as trends of failing test results and cable not meeting manufacturer's specifications.
- G. Test Category 6 - 10 G Links to meet TIA 568 Category 6A F/UTP Permanent Link Testing requirements in addition to the test requirements set forth by the Manufacturer.
- H. UNM IT may perform random verification testing and/or commissioning as part of acceptance of all copper cable testing or provide a third party commission agent to provide testing and inspection services.
- I. The contractor shall repair or replace all cabling that does not meet the requirements of this Section and/or Standard.

3.05: AS-BUILT INFORMATION AND CLOSEOUT:

- A. Contractor shall provide as-built information to UNM IT to accompany all test result information.
- B. As-built information shall be in electronic format in AutoCAD Version 2000. Indicate location of all outlets, distribution cable trays, junction boxes, patch panels, termination blocks, equipment rack layout with cable designators and counts and all additions and deletions pertaining to the copper horizontal cabling system. Include correct outlet labeling next to all telecom symbols.
- C. The Contractor shall provide one set of preliminary as-built information and test results to UNM IT including all test result information 30 days prior to occupancy to ensure the scheduled installation and activation of UNM IT equipment and services.
- D. **Failure of the contractor to provide the required as-built information in a timely manner for UNM IT to prepare cutover information may cause an installation delay for the project due to the contractors not meeting these requirements. The delivery of the as-built documentation needs to be coordinated with UNM IT as a project milestone.**
- E. Partial as-builds shall be submitted as additional cabling is completed to meet installation schedules.
- F. The Contractor shall provide at substantial completion a list of all uncompleted work and a punch list of open items to the IT Facilities Manager at substantial completion and prior to UNM scheduled activations.
- G. If construction drawings are not utilized, contractor shall provide all telecommunications location information on an accurate and electronic formatted scaled floor plan preapproved by UNM IT.

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- H. Partial as-builds shall be submitted as additional cabling is completed to meet installation schedules. The Contractor shall provide one set of preliminary as-build information, equipment layouts including elevations and test results to meet the schedule requirements of the UNM IT equipment installation and activation.
- I. As final submission, provide a CD with 2 copies of the IBNS in Excel format one copy shall be locked and the second shall be in an open, searchable format. Provide patch panel equipment rack layout and ID's in Auto Cad and Complete Test results (not just summary sheet) in LinkWare.
- J. The final as-built shall be submitted with all corrections made no later than 30 days after cabling installation is completed.

3.06: SYSTEM WARRANTY REQUIREMENTS

- A. Contractor shall provide a 20-year extended manufacturer's warranty in addition to the contractor's warranty provided to the project. The warranty shall be titled to the UNM IT Department. The warranty shall begin at the system acceptance date and remain in effect for a period of 20 years from that date.
- B. The umbrella warranty provided for the horizontal copper cabling system shall be issued by the manufacture of the cabling system. The contractor shall provide to UNM IT any additional warranties from partners in addition to the cabling system warranty, i.e. cable manufacturer, contractor warranties. Acceptable manufacturer warrantees include:
 - 1. AMP
 - 2. Belden
 - 3. CommScope/Systimax/Uniprise
 - 4. Ortronics
 - 5. Siemons
- C. All installed systems must conform to the manufacturer's official published specifications. Any exceptions agreed to by the contractor and the manufacturer shall be approved by UNM IT. The contractor shall submit in writing and obtain approval from UNM IT for all exceptions pertaining to the cabling system's warranty prior to the request being submitted to the manufacturer.
- D. The warranty shall include a warranty of the applications published by the manufacturer at the time of the warranty application. The contractor is to provide to UNM IT a list of these applications.
- E. The contractor will provide UNM IT with a copy of the warranty application at the time of submittal to the manufacturer.

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- F. Contractor shall perform all labeling requirements and provide testing documentation for verification and submittal to the manufacturer and UNM IT. A copy of the warranty application and all documentation and test results shall be submitted simultaneously to UNM IT and the manufacturer.
- G. Contractor shall provide copies floor plans sent to the manufacture showing final locations of all telecommunication outlets, patch panels, termination blocks and spaces prior to submission of the warranty application. The contractor is to ensure that the warranty submittals match the submitted as-built.
- H. Contractor shall submit for the warranty all cable records to reflect moves, adds, and changes as built.
- I. The contractor shall include and schedule UNM IT in all site surveys and inspections that relate to the warranty application or processes.

END OF SECTION