Network Physical Plant & Standards
University Technology Services - Network Communications Team

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Section One: General Information

The purpose of this document is to identify specific requirements and specifications for telecommunication and data communication infrastructure at Oakland University. This document will outline telecommunication spaces that conform to current and future technology best practices in order to maximize the University's investments. Please note that the label Telecommunications is used interchangeably throughout the document to describe both telephone and data networking infrastructure.

Please note that this is a guide and all designs based off these specifications must be reviewed with Network Communications Services prior to purchase or implementation.

General Requirements

Pursuant to Oakland University policy #850, Network Communications Services must be consulted before any project planning, implementation, or installation is considered complete.

Project planning

Any telecommunications specifications for new buildings or new spaces must be reviewed and approved by Network Communications. This ensures that the planning process includes proper communication ports and the facilities to house the telecommunication infrastructure. During the project-planning phase the requirements and specifications in this document should simply be referred to as a guide.

When planning the project, please determine the following prior to initial project planning meeting:

- Square footage of the building and each floor
- Number of building floors

- Length of floors
- Closet plan
- Number of rooms
- Types of rooms (i.e., office, classroom, common, conference room, residence)
- Access control locations, including entry and exit
- Card reader locations, particularly cashiering locations with payment card readers
- Elevators
- Number of and location of multi-function copier/fax
- Payroll time clock locations
- Security camera locations
- Digital signage and menu boards
- Equipment inventory prior to demolition

Project implementation

Any requirements and specifications in this document, including any ANSI/EIA/TIA specifications should be strictly followed during the implementation or construction phase. Network Communications Services must approve any deviations from the specifications listed in this document.

Project Completion

All specified test results must be turned over to Network Communication Services as soon as they are available. Network Communication Services reserves the right to verify any test results furnished. A project will be considered complete only after all test results have been verified and considered satisfactory.

Network Communication Services requires that the most recent version of the following standards be adhered to in all installations.

- TIA/EIA 569
- TIA/EIA 607
- TIA/EIA 606-A (Labeling standards)
- TIA/EIA 570 (Residential Dorms/Apartments only)
- Panduit Structured Cabling System Specification (Installer must have the most recent certification offered by Panduit, in order to comply with the Panduit warranty).
- IPv6 Enabled electronics are required; deviation requires prior approval from CIO

Section Two: Inter-building Specifications

(Connections from individual buildings to the master cross connects)

General Guidelines

Where possible every building should have two independent connections to the University backbone. Each connection should enter the building from opposite ends of the building. Each connection should be brought in through separate manholes. Providing two distinct connections to the backbone gives the building a redundant connectivity in the case of a cable cut. Due to the number of critical systems that are now run on the University network it is imperative that we provide redundancy into the telecommunications plant. Services such as fire alarm signaling, swipe card door locks, and emergency 911 need a highly available, high quality telecommunications infrastructure.

Entrance Facilities

An entrance facility is designated as the space into which the telecommunications cabling enters the building. The entrance facility space should be within 50 feet of where the cabling penetrates the building. Specific room requirements are listed below.

- TIA/EIA 569 requires a locked and dedicated room.
- It is preferred to have two separate entrance facilities, located at opposite ends of the building. The size of the entrance facility space must be at least 10 ft x 12 ft.
- The height of the room should measure at least 10 ft tall.
- The room itself must have no dropped ceilings; concrete floor and all surfaces must be treated to reduce dust.
- The location of the entrance facility must be away from any source of Electromagnetic Interference. (Less than 3V/m interference across the frequency spectrum)
- The room must be used exclusively for telecommunications. No water pipes, sanitation pipes, ductwork, electrical conduit or mechanical equipment should pass through the room.
- Lighting should be ample for this type of room and the type of lighting should not interfere with the electronics within the room. Lighting should also be connected to the emergency power system.
- Electrical outlets should be attached to the top of every rack (110V quad outlet on separate 20A circuits). Note that 220V service may be required in some instances.
- Check with Network Communications for per project specifications.
- Room must have proper grounding bars in place.
- Proper HVAC must be installed in order to accommodate a year round temperature of 68-75 degrees Fahrenheit, 45-55% humidity.
- Door must open on the outside only and be secured with the electronic access control system managed by the Oakland University Police Department (OUPD). If electronic access control is unavailable, then a lock using a telecommunications only core is required but must be pre-approved by Network Communications.

- All cabling must be routed through cable trays.
- Access control systems and cameras, provided by OUPD, must be installed and utilized.

Underground Conduit Facilities

All new underground telecommunication facilities must meet the following criteria.

- All new conduit installation must be built out from existing locations as specified by Network Communications.
- Every new building should have a minimum of 4 conduits to the identified demarcation point(s) that connects to the campus backbone.
- Size of conduits should be 4-5”.
- Conduit must be PVC and conform to the NEMA T6 and T9 standards for PVC.
- Underground conduits shall be concrete encased. Other options, including Direct Burial, may be permitted based on requirements of a given project but only with prior CIO approval. Manholes should be equipped with sump pumps and provide sufficient space to allow for feed-through and branching of cabling within bend radiuses.
- Conduit must be installed in a bank formation of 2 x 2, 2 x 3 or 3 x 3.
- Conduit should be buried a minimum of 42”.
- Manholes must be placed as needed to finish the installation. Manholes should be spaced no more than 300ft (90m) apart.
- All conduits should be pitched so that it drains into the manholes.
- After installation conduits should be free from any debris.
- A test mandrel with diameter no less than 3-3⁄4” should be drawn through the conduit to test the installation.
- Conduits that pass the test should be plugged immediately. Conduits that do not pass must be replaced, free of cost.
- All routing of conduit should be documented on the master campus map. GPS coordinates should be provided for any of the following: turn in direction, penetration of building, or manhole. Depth changes must be documented if they deviate ±6” from the requested depth.
- Network Communications must approve all conduit installations prior to start of construction.
- Network Communications must receive and approve of all test results and documentation before project is considered complete.

Copper Connectivity Cable and Termination Requirements

Inter-building copper is no longer used on campus or required for new projects.

- Heavy duty gel-filled armored cabling if cable is directly buried, otherwise no armoring is required. Cable capacity will be specified per project.
- Cabling must be terminated in one of two Building Entrance Protectors.
- Appropriate part should be used based on mounting location.
- Building Entrance Protectors should use Circa C4B1S-BAL (PTC) protection modules.

- Clearly label and document all copper installations. See appendix for Oakland University labeling standards.

Fiber Connectivity Cable and Termination Requirements

- Single-Mode double-jacket required for conduit installation, double-jacket single armor required for direct burial installation.
- Each inter-building fiber connection must include a minimum of 48 strands.
- All cables should be 100G and DWDM capable. Documentation must be provided detailing maximum cable distance at specified speed.
- All fiber must terminate in Panduit Opticom Rack Mount Fiber Enclosures and use LC style fiber adapter modules unless otherwise noted.
- All fiber installations must be labeled properly on both ends. See appendix for Oakland University labeling standards.
- A BiCSi Certified Fiber Optics Installer is preferred. The fiber installer must minimally be certified by the fiber manufacturer.
- Splicing of fiber optics in manholes is not acceptable, unless approved, in writing, by Network Communication Services.
- The terminated installation must be able to support error-free 10Gb operations over the entire length of the installation. All fiber optic installations must be certified using applicable procedures found in EIA/TIA-455 and EIA/TIA-526.
- Documentation including fiber optic test results, as-built drawings as well as GPS coordinates of building entrance points and major directional changes must be submitted in both print and electronic form (Contact Network Communication Services for acceptable electronic formats).

Section Three: Intra-building (Riser/Backbone) Specifications

(Connections from MDF to IDFs)

General Requirements

Intra-building telecommunications is defined as the building backbone or riser system. The riser system in most cases should be designed into the center of the building on each floor. If a central location is not possible, a central riser system for each section of a building is acceptable. Each telecommunication space must be stacked on top of each other on every floor of the building. A sufficient number of conduits should be used for backbone cabling so that no conduit is filled more than 25% upon initial installation.

Telecommunications Facilities

There should be a minimum of 1 telecommunication room per floor. The room must be built to the following specifications.

- Room size must be at least 10’ x 12’ in size.
- Rack installs within the room need to be planned for human access on all four sides of the rack.
- Room should have no drop ceiling.
- All surfaces in the room should be treated to reduce dust.
- Room should be centrally located within the building or section of the building. The distance from this room to any outlet on the floor must not exceed 80m (~260ft).
- Room should be exclusively used for telecommunications. No water pipes, sanitation pipes, ductwork, electrical conduit or mechanical equipment should pass through the room.
- Lighting should be ample for this type of room and the type of lighting should not interfere with the electronics within the room. Lighting should also be connected to the emergency power system.
- Electrical outlets should be installed at the top of every rack (110V quad outlet on separate 20A circuits). 220V service may be required in some instances. Check with Network Communications for per project specifications.
- Proper HVAC must be installed in order to accommodate a year round temperature of 68-75 degrees Fahrenheit, 45-55% humidity.
- Door must open on the outside only and be secured with the electronic access control system managed by the Oakland University Police Department (OUPD). If electronic access control is unavailable, then a lock using a telecommunications only core is required but must be pre-approved by Network Communications.
- All cabling must be routed through cable trays.
- Must have a minimum of three 4” conduit or duct. Stub out on floor and ceiling must be a minimum of 1”.
- Each conduit should have a maximum fill of 25% on initial installation.

- Each conduit should be fire-stopped. Self-sealing pathways are preferred.

Power Requirements and Recommendations

- Power in telecommunication spaces should be installed with great care. Electrical in these areas will be powering sensitive data networking and telecommunication equipment.
- Each box of 110V outlets must be installed on a separate 20A circuit.
- There should be a quad outlet attached to the top of the equipment racks for equipment use. At least one duplex outlet should be installed on a wall in close proximity to the racks for instrumentation and test equipment use.
- Use Red outlets if central backup power is used.
- Label outlets clearly with Amperage rating and circuit number.
- Backup Power allowing a minimum equipment runtime of 30 minutes in buildings connected to the campus generators. In buildings with no generator, 2 hours runtime is required.
- In some instances it may be more cost effective to install backup power in a central location and run dedicated circuits to each telecommunication space in the building.
- Installation of a building generator to power network and telecommunication equipment and critical building infrastructure should be considered.

Copper Connectivity

These requirements are based on Network Communications current telephone infrastructure; consult with Network Communications for per project specifications. Depending upon the project scope, intra-closet copper may not be required.

- A multi-pair UTP cable from entrance facility to each IDF. See Network communications for UTP cable size.
- Maximum conduit fill should not exceed 25% on initial installation.
- Cabling must be clearly labeled at each end. Labeling must follow TIA/EIA-606-A standard.
- In each IDF, rack-mounted patch panels should be used with RJ-45 connectors on front side. See appendix for approved parts list.
- Must be wired for 8-pin operation

Fiber Optic Connectivity

The requirements listed below are generalizations. Consult with Network Communications for per project specifications.

- 24 strands of Single-mode (rated for 100G) and 24 strands of OM4 Multimode from the MDF to each IDF.
- Must be terminated in approved rack mount enclosure (see approved parts list)
- MDF must have separate fiber enclosure for each IDF/closet.
- Must observe bend requirements and tension limitations of installed cable.
- All non-armored fiber must be routed through inter-duct.
- All fiber installations must be routed through separate conduit. Sharing of conduit between fiber and any other cable is not permitted.
- Maximum conduit fill should not exceed 25% on initial installation.

- All terminations must be done using a fusion splice with LC style connectors.
- All strands must be terminated during install. Any empty bays in the fiber enclosures should be filled with blanks.
- A BiCSi Certified Fiber Optics Installer is preferred. The fiber installer must minimally be certified by the fiber manufacturer.
- Must leave a service loop of 15’ on each end of cable to allow for re-termination.
- The terminated installation must be able to support error-free 100Gb operations over the entire length of the installation.
- All fiber optic installations must be certified using applicable procedures found in EIA/TIA-455 and EIA/TIA-526.
- Documentation including fiber optic test results, as-built drawings must be submitted in both print and electronic form (Contact Network Communication Services for acceptable electronic formats).

Section Four: Horizontal Telecommunications Specifications

(Connections from individual locations to IDF)

General Requirements

The horizontal cabling is the most expensive and most complex portion of telecommunication cabling in a building. For this reason extreme care must be taken when installing, as repairs are very costly and time consuming. One of the most important aspects in horizontal cabling is documentation. All horizontal cabling runs **MUST** be labeled at both ends, on both the cable itself and at the termination point. Labels **MUST** be: easily read, resistant to the environmental conditions, must have a design life equal to or greater than that of the labeled component, and be generated by a mechanical device (As stated in TIA/EIA 606-A). In addition, the following specifications must be followed.

Telecommunications Facilities

See Section 3: Telecommunication Facilities.

Copper Connectivity

- The telecommunications contractor must be a company specializing in communications cabling installation. Installers must be certified by the manufacturer of the product being installed.
- Maximum horizontal cable run must not exceed 90m.
- Cable must not have any defects, burns, cuts or tears. Any cable exhibiting these defects must be removed and replaced.
- When pulling cable, no more than 110N (25lbs) of pull force should be used.
- Utilize appropriate cable lubricant in sufficient quantity to reduce pulling force and ensure that force is within acceptable limits.
- Cables must be dressed and terminated in accordance with manufacturer recommendations.
- Pair untwist must not exceed 1/8”. Specialized manufacturer tools should be used where applicable to attain this specification.
- Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- Cables shall be neatly dressed and bundled to their corresponding patch panel.
- Each patch panel bundle must be fed by an individual bundle which should remain distinct bundle back to the point where it enters the rack.
- Color coordinated jacks must be used on both ends, if unsure please consult with Network Communications Services.
    - Data - Blue
    - Classroom (AV over IP) - Violet
    - Voice – Black (Including Elevators)
    - Wireless AP's - Orange

    - Wireless AP's (Secondary) - Green
    - IP Cameras/Emergency Call Stations/OUPD Systems - Yellow
    - IP Cameras/Emergency Call Stations/OUPD Systems (Secondary) - White
    - Fire Alarm - Red
    - Non-Data AV Drops (between table and display) - Brown
- See approved part list for part numbers.
- Each cable MUST be labeled with a mechanically generated label at both ends (behind the patch panel or jack). See appendix for Oakland University labeling standards.
- A nylon pull cord must be installed with any cable run that is installed through a conduit.
- All twisted pair copper cabling must be tested for continuity, shorts, opens, pair- reversals, and performance as listed below.
    - Wire map
    - Length
    - Attenuation/Insertion loss over applicable frequencies o Near end cross talk (NEXT)
    - Return loss
    - ELFEXT Loss
    - PSNEXT
    - PSELFEXT
    - Propagation Delay
    - Delay skew
- All cabling must be tested and certified to meet the most current Panduit/Belden requirements.
- Network Communications may ask for a re-test of up to 10% to verify the documented findings. If re-testing disagrees with documented findings, Network Communications may request additional re-testing of up to 100%. Any additional re-test will be done at no additional cost to the project.

Documentation

- Complete documentation must be delivered to Network Communications within ten (10) business days of completion. Documentation should include both original drawings as well as as-built drawings, and test results.
- All as-built drawings should include cable paths and outlet locations. Outlets must be identified by their labeled name. Numbering, icons and drawings must be consistent throughout all documentation.
- Three full sets of documentation both in print and electronic form should be delivered. Check with Network Communications for acceptable electronic formats.
- Laminated drawings should be hung on the wall in each closet representing the area which that closet covers. Drawings should indicate drop location and correlate with the patch panel labels.

Fiber Optic Connectivity

Fiber optic cable to the desktop provides an enhanced high-speed connection capable of advanced multimedia, and data applications.

- A certified fiber optic cable installer must complete all fiber installations.
- All requirements for bend radii pull and tension must be strictly followed.
- All fiber must be terminated at the time of installation using a fusion splice with LC style connectors.
- Each cable must be labeled with a mechanically generated label at both ends.
- All installations must be tested end to end. Detailed test results must be provided in both print and electronic form. Check with Network Communications for acceptable electronic formats.

Coaxial Connectivity

- Only high-grade coaxial cable should be used for all installations.
- All installations should be capable of digital cable services.
- All installations must be tested end to end and meet the specifications of the project.
- Detailed test results for cable install must be provided in both print and electronic form. Check with Network Communications for acceptable electronic formats.

Cable Path Specifications

- General
    - All cabling paths must be at least 24 inches away from any electrical cabling or lighting fixtures.
    - All cabling paths must be used exclusively for Network Communication cabling. No other cabling may share these paths.
    - All cabling paths must meet all Fire and Building codes.
    - Cabling paths should not be more than 50% full on initial installation, unless approved by Network Communications.
    - Logical bundles of cables should be grouped together using Hook and Loop tape at regular intervals and at junctions and turns.

- Conduits
    - Must have bushings installed at both ends.
    - Must have a nylon pull cord inserted at the time of installation.

- Trays
    - Trays used in any application must be bonded together.
    - Must have a minimum of 12” of unobstructed access to the tray on all sides.
    - If an obstruction cannot be avoided, approval must be obtained from Network Communications prior to installation.
    - Trays must not be installed on, connected to any other pipe, conduit, or duct. Trays should be installed and connected directly to the building structure.
    - Network Communications prefers the use of CabloFil or FlexTray tray products. See approved parts list for part numbers.

- Ceilings
    - All cable routed through ceilings must be installed in a tray. Use of CabloFil or FlexTray is preferred. See approved parts list for part numbers.
    - Trays must be mounted to the ceiling or the wall. If mounted to the ceiling, the tray must be hung from both sides of the tray.

- Raised Floors
    - All cable routed through raised floors must be installed in a tray. Use of CabloFil or FlexTray is preferred. See approved parts list for part numbers.
    - Trays must be mounted to the floor support system, and be raised a minimum of 1 inch above the floor.

- Solid Floors (Cement)
    - Must use at minimum a 2 inch PVC conduit.
    - Nylon pull string must be installed.
    - Conduit should be no more than 25% full on initial installation.
    - The conduit (2 inch) bend radius must be at least 6 times the diameter of conduit. For conduit greater than 2 inches, a bend radius of 10 times the inside diameter of the conduit must be used.
    - Within one section of conduit, the conduit may turn up to 90 degrees.
    - A continuous section of conduit must not exceed 100 feet in length. A junction box must be used to connect sections that are longer than 100ft. A separate pull cord should be installed in each section.

- Walls
    - Cabling must be run in conduits.
    - All conduits must stub into the cable path (wire tray or larger conduit).
    - Conduits must not be more than 25% full upon initial installation.
    - All fiber optic cabling must be run in its own conduit.
    - All conduits larger than 2 inches, housing fiber optic cabling, must use interduct within the conduit. Alternatively, dielectric armored fiber optic cable may be used without interduct.

- Patch Cables
    - All patch cables in the telecommunication closets must be 7 feet in length. No other length patch cord should be used. The Panduit cable management system allows for excess cable to be neatly stored.
    -
    - All patch cables used from the wall jack to computer/network device must not exceed 10 feet.

Section Five: Communication Outlet Specifications

General Requirements

There are many different spaces in a building, offices, conference rooms, lobby space, classrooms. The number of connections for a specific room depends on the specific function and use of the room. Network Communications will review outlets for other areas not listed on a case-by-case basis.

Standard Connectors

- UTP: RJ45
- Fiber: LC
- Coax: BNC

Office Space

- Single Occupant Office Space
    - Location: Should be centered on either the left or right wall as viewed from the entrance. Exact location depends on furniture arrangement.
    - Outlet Configuration: 2 UTP

- Multiple Occupants Office Space
    - Location: Should be one outlet per 10 feet of wall space with a minimum of one outlet per occupant.
    - Outlet Configuration: 2 UTP per outlet

- Cubicle Office Space
    - Location: Should be one outlet per cubicle, located either on the top of the desk or along the perimeter of the cube.
    - Outlet Configuration: 2 UTP per person/cubicle
    - Main cable feeds for cubicles must never be run on the floor. Cables must always be run through a flexible conduit, securely attached to the wall or floor and the cubicle. Power poles attached to the cubicle furniture may also be used to bring in cable feeds. Cable feeds must not be located in walking paths. Please note that any construction work such as power pole installation and room renovation needs to be handled through *Campus Facilities and Operations* via a work order or project request.
    - See appendix for modular furniture faceplates.

- Wireless Services
    - Location: Outlet should be installed above the ceiling. If it is not concealed by ceiling tile, a lockable enclosure should be used.
    - Outlet Configuration: 2 UTP per location (location must not exceed 25 potential clients).
    - **Notes:** Wireless outlets should be installed in accordance with the wireless plan for the building.

Conference / Seminar Room Space

- Location:
  - Outlet #1 - Located on the wall behind the display
  - Outlet #2 - Located on the wall at or near the conference room table
  - Outlet #3 - Located on the opposite wall from outlet #2
- Outlet Configuration:
  - Outlet #1 & 2 - 3 UTP
  - Outlet #3 - 2 UTP
- Note: The specific technology used in the conference room may supersede these requirements.
- Wireless: Wireless outlets should be installed in accordance with the wireless plan for the building. Wireless plans should accommodate a Wireless Access Point for every 25 seats.

Auditorium

- Location: Outlets should be installed as specified by Classroom Services and Instructional Technical Services.
- Outlet Configuration: 8-12 UTP per outlet
- Wireless: Wireless outlets should be installed in accordance with the wireless plan for the building. Wireless plans should accommodate a Wireless Access Point for every 25 seats.

Lobby Space

- Location: Outlets should be installed as required.
- Outlet Configuration: 2 UTP per outlet.
- Wireless: Wireless outlets should be installed in accordance with the wireless plan for the building.

Multifunction Printers

- Location: Outlets should be installed as required.
- Outlet Configuration: 3 UTP per outlet.

Wepa Print Stations

- Location: Outlets should be installed as required.
- Outlet Configuration: 2 UTP per outlet.

Visix Displays

- Location: Outlets should be installed as required.
- Outlet Configuration: 2 UTP per outlet.

Classroom Spaces

Listed below are general recommendations, Classroom Services and Instructional Technical Services must be consulted to provide specifications on a per project basis. Consultation with Classroom Services and Instructional Technical Services is required if seating capacity is greater than 50.

- Regular Classroom
    - Location: Outlets should be installed in all four corners of the room.
    - Outlet Configuration: 8 UTP per outlet, coax if needed for multimedia enabled rooms.
    - Wireless: One access point per 25 seats should be installed.

- Computer Classroom
    - Location: Outlets should be installed in all four corners of the room. In addition, one outlet should be installed for every planned computer. Outlets should be installed in wall outlets or floor outlets as appropriate for furniture configuration.
    - Outlet Configuration: 2 UTP, coax if needed.
    - Wireless: One access point per 25 seats should be installed.
    - Notes: Setup should be planned to be flexible for future room reconfiguration.
    - 8 UTP outlet at Instructor Station location

- Distance Learning Classroom
    - Location: Outlets should be installed in all four corners of the room.
    - Outlet Configuration: 8-12 UTP
    - Wireless: One outlet per 25 seats should be installed.

Laboratory

- Location: Outlets should be installed in all four corners of the room.
- Outlet Configuration: 8 UTP, coax as needed. Laboratories must use water resistant faceplates, see appendix for part number.
- Wireless: One outlet per 25 seats should be installed

Residence Hall Room

- Location: One outlet should be installed per occupant/bed. Outlets should be installed next to the planned desk location.
- Outlet Configuration: 2 UTP
- Wireless: Wireless should be installed according to the building master plan for wireless. Wireless should adequately cover each room.

Utility Space, Utility Room (HVAC, Building Controls)

- Location: Outlets should be installed as necessary to support HVAC and building controls equipment.
- Outlet Configuration: 3 UTP

Doorways/Entrance Ways and Classroom Doors

Building entrance-ways, secure areas, Classroom Doors, and certain shared spaces will be secured with an electronic lock. Power and network connectivity are required for installation of the Blackboard card access system. The ID Card Office or Oakland University Police department will specify exact locations and approve final specifications prior to installation; the department depends on the building access control system in use at the location. Classroom Door locks may be manual if approved by Oakland University Police.

Wireless Networking Equipment

The installation of wireless Access Points (AP) requires that equipment be installed so that it is as unobtrusive as possible. It is recommended that the following guidelines be followed to make the wireless infrastructure as invisible as possible.

- Location: AP should be installed above dropped ceilings whenever possible. If there are no dropped ceilings, the AP should be installed as high as possible.
- If security of the AP is in question, it should be installed in a lockable, vented enclosure.
- An outlet containing 2 UTP per outlet should be installed for each AP.

Point of Sales Locations

Power and network connectivity is required at any location where Blackboard Transact card system is used. The ID Card Office will specify outlet configuration on a case-by-case basis. Typical Services could include:

- Vending Machines
- Copiers
- Printers
- Dining Services
- Value Transfer Stations

Other/Special Space

Network Communication Services must handle specifications for any other space not specifically mentioned in this section. Network Communications will continue to add popular environments to this section as needed.

Approved Part List

Fiber Optics

Manufacturer	Part Number	Description	Comments
Panduit	FCE1U	Opticom rack mount fiber drawer	Accepts 4 FAPs
Panduit	FCE2U	Opticom rack mount fiber drawer	Accepts 8 FAPs
Panduit	FCE4U	Opticom rack mount fiber drawer	Accepts 12 FAPs
Panduit	FAP6WAQDLCZ	LC Style FAP module, see project notes for specific part number	One FAP can provide 6 – 12 LC connectors
Panduit	FAPB	Blank	
Panduit	NWSLC-2Y	Cable identification sleeve, 2mm simplex cable, yellow	
Panduit	NWSLC-3Y	Cable identification sleeve, 3mm simplex cable, orange	
Panduit	NWSLC-7Y	Cable identification sleeve for 3mm duplex fiber cable	
General	BE0121PNR- ILPA	SM or MM(OM4) tight buffer	Intra-building Riser
General	BEP0121PNI- ILPA	SM or MM(OM4) tight buffer SM or MM Loose Tube, Double Jacket Heavy Duty Outdoor cable	Intra-building Plenum Inter-building

External Building Copper

Manufacturer	Part Number	Description	Comments
Circa	1880ECA1-25G	Wall mount protector 25	
	1880ECA1-50G	Wall mount protector 50	
	1880ECA1-100G	Wall mount protector 100 pair.	
	1880ENA1/NSC-200	Rack mount entrance protector 200 pair.	
	C4B1S-BAL (PTC)	Solid state protector module for entrance protectors.	
Belden		25 pair gel-filled cable	
Belden		50 pair gel-filled cable	

Horizontal Wiring

Manufacturer	Part Number	Description	Comments
Belden/General Cable	24816995/7133819	Riser Cat 6A UTP	Used ONLY in new build-outs/construction.
Belden	24817995 /7131819	Plenum Cat 6A UTP	Used ONLY in new build-outs/construction.
~~Belden/General Cable~~	~~1212/6133712~~	~~Riser Cat 5e UTP~~	~~Used ONLY in existing buildings which have Cat5e or lower.~~
~~Belden/General Cable~~	~~1213/6131690~~	~~Plenum Cat 5e UTP~~	~~Used ONLY in existing buildings which have Cat5e or lower.~~
Belden	1189AP	Plenum RG6 CATV cable	Or similar product.

Belden	PTSP501	Plenum Multimode 2 strand fiber 50/125µm	Or similar product. Fiber to the desktop.
Panduit	UICFPSE2WH	Single gang vertical sloped faceplate, 2 modules, White	NO SUBSTITUTES
Panduit	UICFPSE4WH	Single gang vertical sloped faceplate, 4 modules, White	NO SUBSTITUTES
Panduit	UICFPSE6WH	Single gang vertical sloped faceplate, 6 modules, White	NO SUBSTITUTES
Panduit	UICFPSE8WH- 2G	Single gang vertical sloped faceplate, 8 modules, double-gang, White	NO SUBSTITUTES
Panduit	CFPWR4CIG	Single gang vertical water resistant faceplate accepts four Mini-Com modules.	NO SUBSTITUTES Used for laboratories or washdown rooms.
Panduit	CJ6X88TG**	Mini-com RJ-45 Add suffix BL (Black), YL (Yellow), OR (Orange), BU (Blue), RD (Red)	NO SUBSTITUTES
Panduit	CBX1WH-A	Mini-com Surface Mount Boxes, single UTP	Used ONLY for above ceiling applications.
Panduit	CBX2WH-AY	Mini-com Surface Mount Boxes, double UTP	Used ONLY for above ceiling applications
Panduit	CFFPLA4BL	Modular Furniture Faceplates	Height: 1.34” – 1.40” Width: 2.67” – 2.75”
Panduit	CFFPHM4BL	Modular Furniture Faceplates	Height: 1.88” – 1.91” Width: 2.98” – 3.03”
Panduit	CFFPEBSL4BL	Modular Furniture Faceplates	Height: 2.38” Width: 3.44”

Panduit	KWP6PY	Keystone Phone Plate with Module	For wall mounted phones.

Cable Path

Manufacturer	**Part Number**	**Description**	**Comments**
Cablofil	CF54/300	2” Deep tray, 12” wide	Or similar product
Cablofil	CF54/200	2” Deep tray, 8” wide	Or similar product
Cablofil	FAS P400	FAS Profile, for hanging tray	Or similar product
Cablofil	EDRN	Fast Splice for joining two straight sections of tray	Or similar product
Cablofil	SWK	Splice washer kit for fabricating bends	Or similar product
Cablofil	EZ T90	Kit for creating 1 90o tee or 2 90o bends	Or similar product
Cablofil	CABLEXIT100	6.4” Cable drop off, 2” bend radius	Or similar product
Cablofil	DROP OUT	12.35” Cable drop off, 7” bend radius	Or similar product
Cablofil	GNDCL	Grounding lug	Or similar product
Cablofil	EZBN 1⁄4	Nut/Bolt/Clamp assembly	Or similar product
Cablofil	HB2	Wall Termination Bracket	Or similar product
Cablofil	EZJB 5/16	Used with FAS P400 to mount tray to standard 19” relay rack	Or similar product
Cablofil	UFCN 300	Under floor Clamp, attaches to under floor support posts	Or similar product

STI	EZ-Path	Self adjusting firestop product	
STI	SSB14	1”x4”x9” Firestop Pillow.	Use where code requires

Telecommunication Closets

Manufacturer	**Part Number**	**Description**	**Comments**
Panduit	CMR19x84	Standard 19” x 7’ two post rack	NO SUBSTITUTES
Panduit	PRV12	PatchRunner Vertical Cable Management system	NO SUBSTITUTES 12” between racks
Panduit	PRV8	PatchRunner Vertical Cable Management system	NO SUBSTITUTES 8” end of racks
Panduit	PRD8	Vertical Cable Management Door	NO SUBSTITUTES 8”
Panduit	PRD12	Vertical Cable Management Door	NO SUBSTITUTES 12”
Panduit	PREP	PatchRunner Vertical Cable Management system	NO SUBSTITUTES End panels
Panduit	TRGB191	Rack grounding bar	NO SUBSTITUTES
Panduit	TRGK672	Rack to building ground kit	NO SUBSTITUTES
Panduit	Type LCA Copper Lugs	Used to connect ground wires to grounding bars	NO SUBSTITUTES
Panduit	TTS-35RX0	Tak-Tape	Substitutes must be approved

Panduit	UICMPP48BLY	Mini-com flush mount modular patch panel	NO SUBSTITUTES 48 Port
Panduit	UICMPP24BLY	Mini-com flush mount modular patch panel	NO SUBSTITUTES 24 Port
Panduit	CJ6X88TG**	Mini-com RJ-45 Add suffix BL (Black), YL (Yellow), OR (Orange), BU (Blue), RD (Red), GR (Green)	NO SUBSTITUTES
Panduit	UTP6A7GR	CAT6A 7ft patch cable (Closet only)	Or similar product

Labeling Standard

Network Communications follows TIA/EIA-606-A Administration Standard for Commercial telecommunications Infrastructure. All labeling must be reviewed and approved with NCS prior to labeling any device, patch panel or outlet.

Patch Panel Port: Each patch panel should be designated a unique ID starting with the top patch panel which should be labeled “A”. Each subsequent panel should increment the letter by one. Each port on the patch panel should indicate the room number where the far end terminates.

Horizontal Cable: Each cable should be labeled on both ends as follows: <floor><TR> - <patch panel ID><port number>--<room number>

<floor>: numeric character indicating the floor which the telecommunications room (TR) lies
<TR>: alpha character indicating the unique ID of the TR
<room number>: room number where the cable terminates.

Example
2A-A10--101 = Second floor, telecommunications room A, patch panel A, port 10 terminating in room number 101.

Patch Panels: Each port on the patch panel should indicate the room number where the far end terminates. For locations that terminate in a ceiling/corridor please consult with NCS.

Example
101 = The other end of this cable terminates in room 101.

Outlets: Each port on the outlet should be labeled as follows <floor><TR> - <patch panel ID><port number>

<floor>: numeric character indicating the floor which the telecommunications room (TR) lies
<TR>: alpha character indicating the unique ID of the TR

Fiber LIU: Each fiber LIU should be given a unique ID and each port labeled to reflect the location of the other end of the fiber LIU.

<floor><TR>-<LIU ID><LIU Port>

<floor>: numeric character indicating the floor of the opposite end of fiber. <TR>: alpha character indicating the telecommunications room (TR)
<LIU ID>: alpha character indicating the unique LIU
<LIU Port>: numeric character indicating the individual port

Example

1B-A012 = Floor 1, Telco Room B, LIU A, port 012