Section D7030
IT Equipment Rooms

D7030 – Subsections:

D7030: Introduction
D7030.11: IT Equipment Room Scope of Work
D7030.12: IT/Communication Design Requirements
D7030.21: IT Equipment Room Materials
D7030.31: IT Equipment Room Execution
D7030.41: Data Equipment
Appendices

D7030 - Introduction

This section outlines standards and requirements for IT Equipment Rooms in all campus projects.

D7030.11 – IT Equipment Room Scope of Work

1. Provide all services, labor, materials, tools, and equipment required for the complete and proper installation within the Main Distribution Frame and Intermediate Distribution Frame (MDF/IDF) as called for in these specifications and related drawings.
2. This section includes minimum requirements and installation methods for the following:
    a. Equipment Racks and Cable Routing Hardware
    b. Copper Termination Equipment
    c. Fiber Termination Equipment
    d. Grounding and Bonding

D7030.121 –IT/Communication Design Requirements

1. If any DAS/BDA equipment is to be located within the MDFs and IDFs, the space and environmental requirements for these rooms will be revised to accommodate this additional equipment without impacting the OIT equipment in these rooms. The MDF and IDF room designs shall be coordinated between the telecommunications low-voltage consultant and the DAS/BDA consultant.
2. The hardware layout in the racks shall follow the UCB standard format from top to bottom and left to right as shown in the typical rack layout drawings later in this section.
    a. Refer to Appendix **D7030.1211** for Standard OIT room Layout Details.
3. Each relay rack shall have a maximum of (6) 48 port patch panels with 10 percent growth.
4. For OIT Design Requirements Refer to Appendix **D7030.1212** for Architectural – Mechanical-Electrical-Plumbing and IT Designer Guidelines.

D7030.21 – IT Equipment Room Materials

1. Refer to Appendix **D7030.211** for IT Equip. Room Materials.
2. D7030.212 - Equipment and Materials Minimum Requirements

a. Floor-Mount Equipment Rack
    i. Standard 19” rack mounting space
    ii. 84” high with 44 rack spaces (1 rack space = 1-¾”)
    iii. EIA-310-D standard 5/8” 5/8” 1/2” hole pattern
    iv. EIA channel width of 3” with double-sided 12/24 tapped screw holes
    v. Lightweight high strength aluminum construction with clear finish
    vi. 15” deep base with four (4) ¾” bolt down holes and equipped with hardware for permanent mounting on concrete floor
    vii. Rack installation kit
    viii. Dust covers for the base of all racks.
    ix. 1000 lb standard for the Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF), or 1500 lb for data centers, as required.
b. Vertical Rack Cable Management (for new installations)
    i. 84” high x 10” wide on both sides.
    ii. Slack Loop Storage Organizer, Extended (2”) Mounting Bracket
    iii. Cable Retainer Cover
c. Rack Cable Management and Accessories
    i. Interbay Cable Organizer
    ii. Screw-Mount, Reusable Cable Ties
    iii. Cable Runway Rack Elevation Kit – Cable Runway Support (stiff leg)
    iv. Rack to Runway Mounting Plate – (stiff leg)
d. Power Strips
    i. Standard 19” rack-mount power strip with 10 outlets and 10’ cord
e. Ladder Cable Runway
    i. Tube steel painted Gray with cross members welded at 12” intervals: 6”, 12”, 18” and 24” wide with lengths as required.
    ii. Cable Runway Radius Drops for cross members and stringers: 6”, 12”, 18” and 24” wide.
    iii. Include support kits, brackets, splice kits, end caps, etc. as required for complete installation.
f. ½ D-Rings and D-Rings wall-mount nominal 2” 4” or 6” as required.
g. Velcro cable ties for cable routing and management as required. Various lengths to ensure a minimum 2” overlap when wrapped around the cable.

3. D7030.213 - Copper Termination Equipment
    a. Category 3 – For Renovations Match Existing and for Additions use 66-type connecting blocks and brackets:
        i. 66 block punch down 66M1-50 style
        ii. 89 bracket
        iii. 66M cover
        iv. Bridge clips
    b. Patch Panel: 24-port or 48-Port Rack Mount Panel – Unloaded for station cabling.
    c. Patch Panel Pre-loaded: 24-port Panel – Preloaded for backbone cabling.
    d. Building Entrance Protector – Cat 3: 66 block punch to 66 block punch with 5 pin heat coil input.
    e. Building Entrance Protector Gas Tube and 4 ohm with 5 pin Heat Coils
    f. Building Entrance Protector – 4 pair Cat 6: 110 termination
    g. Solid State Protector Modules: 18V, 27V, or 65V (for PoE)
4. D7030.214 - Fiber Termination Equipment
    a. Rack-Mount Fiber Termination Shelves
        i. 4U Fixed Shelf for Backbone Cable
        ii. 1U Sliding Shelf for Combination Station and Backbone Cable

   b. Fiber Termination Panels for Rack-Mount Shelves
      i. LC Duplex Adapter Panel for Singlemode Fiber
      ii. LC Duplex Adapter Panel for Multimode 62.5/125 Fiber
      iii. LC-APC Duplex Adapter Panel for Singlemode with Angled Polished Connector
   c. Splice Kits and Wallets as required for fiber termination
   d. Wall Mount Fiber enclosure (for repair and special approved projects only, approved in writing by OIT).
5. D7030.215 - Copper Patch Cords – supplied by OIT
6. D7030.216 - Grounding and Bonding
   a. #4 and #6 AWG wire suitable for grounding application.
   b. All connectors and clamps shall be mechanical type made of silicon bronze.
   c. Terminals shall be solderless compression type, copper long-barrel NEMA two bolt.
   d. Telecommunications Bonding Backbone (TBB): Minimum No. 6 AWG insulated copper conductor.
   e. Telecommunications Grounding Busbar (TGB): Minimum 6 mm thick x 50 mm wide predrilled copper busbar with standard NEMA bolt hole sizing and spacing
   f. All grounding equipment shall be UL listed for that purpose.

D7030.31 – IT Equipment Room Execution

1. D7030.311 - Equipment Racks and Cable Routing Hardware In IT/Telecommunications Rooms
   a. The Main Distribution Frame and Intermediate Distribution Frame (MDFs/IDFs) may be equipped with some existing hardware, such as plywood backboards, grounding bus bars, equipment racks, ladder cable runway, horizontal and vertical cable management, and copper and fiber termination equipment. Existing hardware already in place will be shown on the project drawings.
   b. Install new equipment racks with all related mounting hardware, vertical and horizontal cable management and power strips in the MDFs and IDFs as required for project and as shown on drawings. Letter designation for racks and equipment shall be placed as shown in the rack layout at the end of this Section and in the panel details at the end of Section D7050. All equipment racks shall be securely anchored to the concrete floor using minimum 3/8" hardware or as specified by rack manufacturer.
   c. Install new ladder cable runway with all related mounting hardware for cable routing in the MDFs and IDFs as required for project and as shown on drawings. All ladder cable runway shall be securely anchored to the walls with support kits and brackets as specified by manufacturer. Secure equipment racks to ladder cable runway with all-thread covered with EMT conduit sleeve.
   d. Install plywood backboard on the walls in the MDFs and IDFs as required for the project and as shown on drawings. All plywood backboard shall be securely anchored to the walls and shall meet the requirements in the OIT Architectural – Mechanical-Electrical-Plumbing and IT design Guidelines document, Refer to Appendix **D7030.1212**.
   e. Install D-rings on plywood backboard for cable routing in the MDFs and IDFs as required for the project and as shown on drawings.
   f. A small drip loop on the horizontal cable is required for trouble shooting and tracing patch cords.
   g. Refer to the drawing attached at the end of this section for patch cord routing.
   h. All patch cords and horizontal cables leaving the equipment racks shall have Velcro cable ties placed on the bundle every 8 to 12 inches within the MDFs and IDFs. The Velcro cable ties shall overlap a minimum of 2" to allow for more cable to be added in the future.
2. D7030.312 - Copper Termination Equipment
   a. Refer to Appendix **D7030.3121** for Back of Patch Panel Service Loop Detail.

b. Some copper termination equipment may already be in place in existing MDFs and IDFs and will be shown on the project drawings.
c. Mount new 66M1-50 blocks on 89B brackets for backbone and horizontal telephone cables directly on plywood backboard in the MDFs and IDFs as required for the project and as shown on drawings. Add bridge clips, cross-connects, and patch cords for all voice installs in IDFs prior to final testing for projects and after testing for daily installs, and place new clear covers after cable termination and labeling.
d. Mount new unloaded patch panels for horizontal cables in the floor-mounted equipment racks in the MDFs and IDFs as required for the project and as shown on drawings.
e. Label all copper terminations according to UCB campus standards. A one-page Copper Termination sheet, with backbone cable numbering for each MDF and IDF, will be provided by UCB OIT. All labels shall be supplied and installed by the Contractor.

3. D7030.313 - Fiber Termination Equipment
   a. Some fiber termination equipment may already be in place in existing MDFs and IDFs and will be shown on the project drawings.
   b. Mount new fiber termination shelves with associated splice kits and wallets, adapter panels, and couplings, in the floor-mounted equipment racks in the MDFs and IDFs as required for the project and as shown on drawings.
   c. Mount new LIUs with associated splice kits and wallets, adapter panels, and couplings, on the walls in the MDFs and IDFs as required for the project and as shown on drawings.
   d. Label all fiber enclosures according to UCB campus standards. Fiber schematic sheets and Fiber Termination labels will be provided by UCB OIT and installed by the Contractor.
   e. Ensure dust covers are in place on all couplings prior to final acceptance.
4. D7030.314 - Copper Patch Cords – supplied by OIT
   a. Refer to Appendix **D7030.3141** for Patch Cord routing Details.
5. D7030.35 - Grounding and Bonding
   a. Mount new TGBs on plywood backboard in IDFs as shown on project drawings. The location for the TGBs shall be coordinated with UCB OIT.
   b. Mount new TMGB on plywood backboard in MDF as shown on project drawings. The location for the TMGB shall be coordinated with UCB OIT.
   c. Install new TBB from the TMGB in the MDF to the TGBs in the IDF as shown on project drawings. Connect the TBB to the TMGB and TGBs in accordance with TIA-607 and NEC. All grounding conductors leaving the MDFs and IDFs shall be in a separate conduit from all communication cabling.
   d. Bond all metallic surfaces of new racks, ladder cable runway, and equipment in the MDFs and IDFs to the TGB or TMGB in the same room with #6 AWG grounding wire as straight as possible.
   e. Bond all metallic raceways (conduit, cable tray, etc.) entering the MDFs and IDFs to the TGB or TMGB in the same room with #6 AWG grounding wire as straight as possible.
   f. All grounding items shall be installed in complete compliance with UCB Electrical standards (or Construction Specifications Institute for Electrical) and NEC.

D7030.41 – Data Equipment

1. D7030.51 - DATA COMMUNICATIONS EQUIPMENT
   a. Each project supplies funds for all required data communications equipment.
   b. The data communications equipment is designed, provided, installed, and configured by UCB OIT.
   c. The data communications equipment consists of routers, firewalls, and switches.
   d. All access points and connecting patch cords are supplied by OIT and installed by the contractor.

Appendices

D7030.211 - IT Equipment Room Materials.

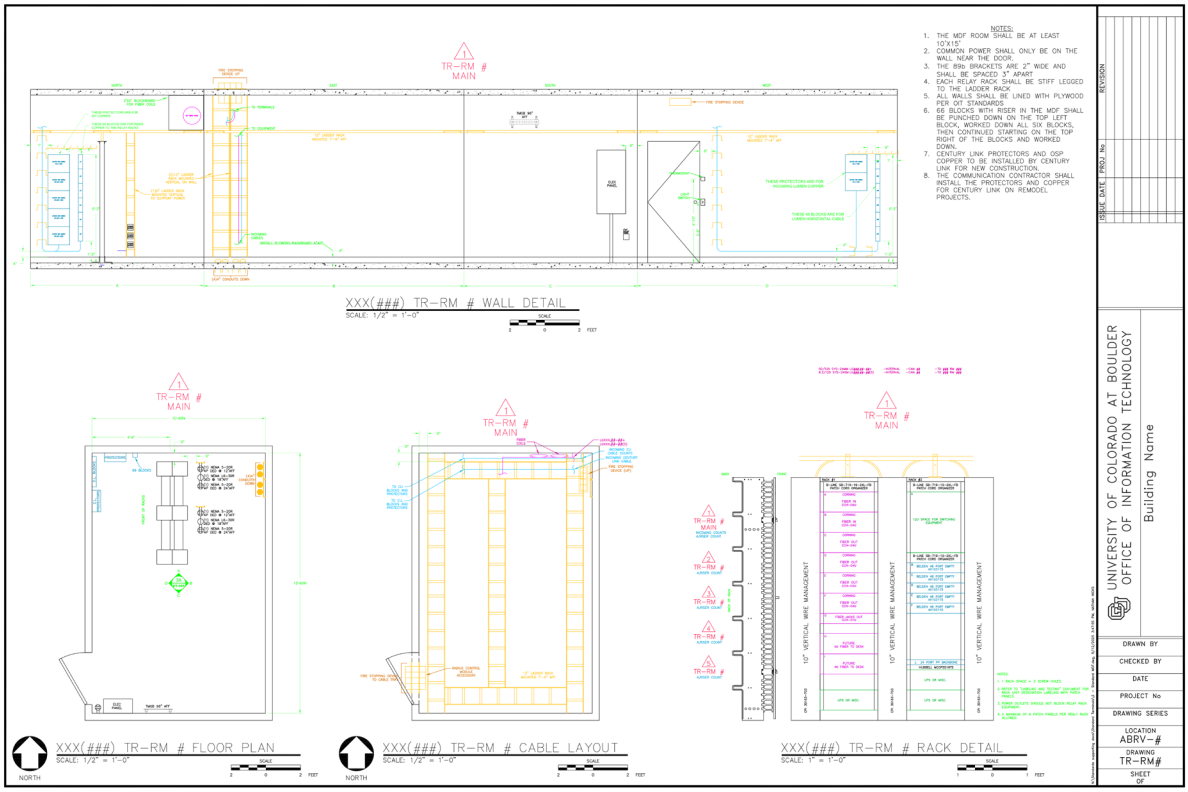
Pre-Approved Equipment Schedule

Line	Description	Manufacturer	Part Number
1	Floor-Mount Equipment Rack – 19” 1000 lb	CPI	55053-503
2	Floor-Mount Equipment Rack – 19” 1500 lb	CPI	46353-503
3	Floor-Mount Equipment Rack - installation kit	CPI	40604-001
4	Dust Covers for floor racks	CPI	41050-119
5	Vertical Rack Cable management 84”H x 10”W	CPI	30163-703
6	Patch Cord Organizer	B-Line	SB-719-19-2XL FB
7	Screw-Mount, Reusable Cable Ties	Hubbell	MCCMV9BS10
8	Power Strip for 19” racks	Hubbell	MCCPSS19TS
9	Ladder Cable Runway 6” wide	CPI	10250-106
10	Ladder Cable Runway 12” wide	CPI	10250-112
11	Ladder Cable Runway 18” wide	CPI	10250-118
12	Ladder Cable Runway 24” wide	CPI	10250-124
13	Cable Runway Radius Drop 5” wide	CPI	12100-106
14	Cable Runway Radius Drop 11” wide	CPI	12100-112
15	Cable Runway Radius Drop 17” wide	CPI	12100-118
16	Triangle Support Bracket - 6” wide	CPI	11312-106
17	Triangle Support Bracket – Steel - 12” wide	CPI	11312-112
18	Triangle Support Bracket – Steel - 18” wide	CPI	11312-118
19	Wall Angle Support Kit Cable Runway	CPI	11421-112
20	Cable Runway Rack Elevation Kit – (stiff leg)	CPI	10506-106
21	Rack to Runway Mounting Plate – (stiff leg)	CPI	10595-112
22	66 block 66M1-50 style	Hubbell	HPW66M150
23	89 bracket	Hubbell	HPW89B
24	66M cover	Hubbell	HPW66MCVR
25	Bridge clips	Siemon	SA1-SS-1000
26	24 Port 1U Modular Patch Panel for horizontal cables KeyConnect – Empty / Unloaded	Belden	AX103114
27	48 Port 2U Modular Patch Panel for horizontal cables KeyConnect – Empty / Unloaded	Belden	AX103115
28	24 Port 1U Patch Panel for backbone cables REVConnect – Pre-Loaded	Belden	RVACPF1U24BK
29	Building Ent. Protector – 66/66 – Porta System product	Tii	24100-66-M66C
30	Gas Tube Heat Coils – Porta System product	Tii	195BCXN-230
31	Cat 6 Ent. Protector – PoE - Porta System product	Tii	606-65 with LVP65
32	TGB – Grounding Busbar	CPI	13622-010
		CommScope part #	Corning part #
33	4U Fiber Shelf	SD-4U (Uniprise) Mat. ID = 760231464	CCH-04U
34	1U Fiber Shelf –	SD-1U-UP-FX Mat. ID = 760234738	CCH-01U
35	Replacement Front Panel for existing 600B 1U Shelves	600G2-1U-IP-UP Mat. ID = 760101741	
36	Wall Mount enclosure 4 Panels (LIU)	200A LIU Mat ID = 105535926	WCH-04P

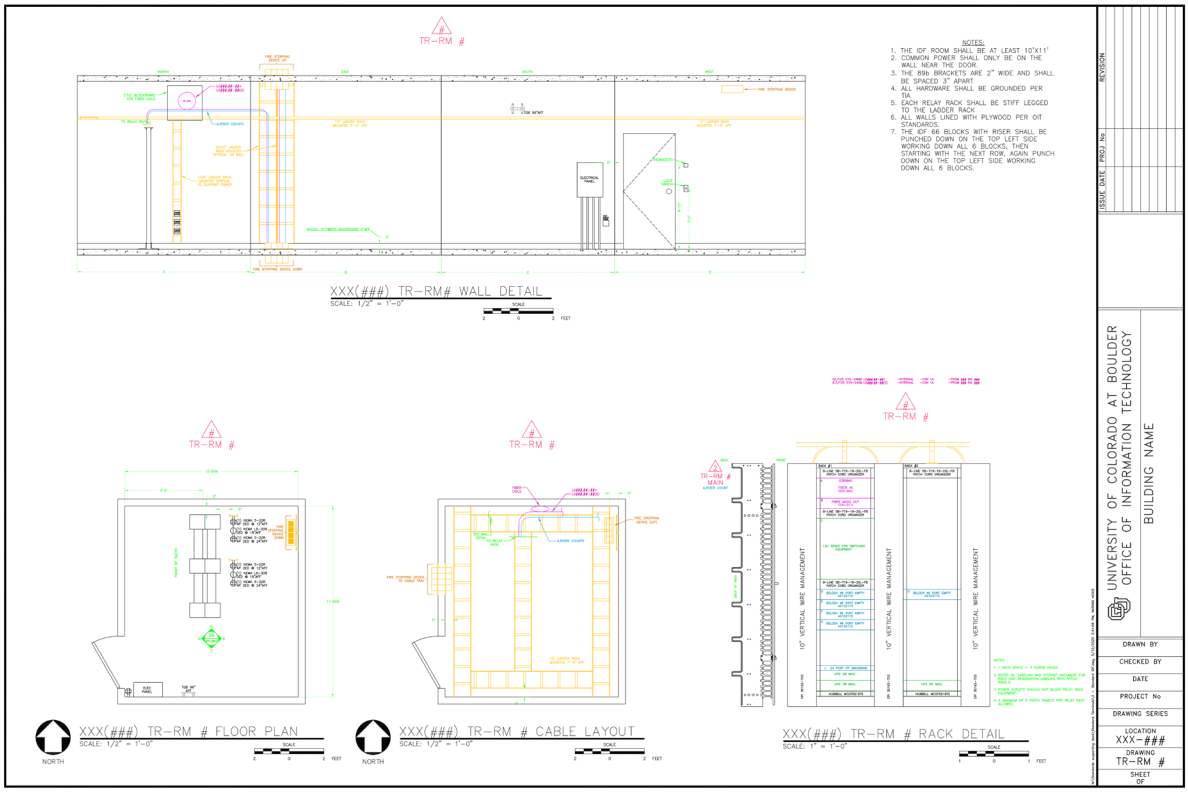
37	LC Duplex Adapter Panel for Singlemode Fiber – Loaded	PNL-BK-012-SFA-LC02-BL-SHUTTERED Mat ID = 760067165	CCH-CP12-A9
38	LC Duplex Adapter Panel for Multimode 62.5/125 Fiber – Loaded	PNL-BK-012-MFA-LC02-BG-SHUTTERED Mat ID = 760067157	CCH-CP12-A8
39	LC Duplex Adapter Panel – Unloaded	PNL-BK-012-EMT-LC02 Mat ID = 760067199	
40	LC-APC Duplex Low Profile Shuttered Adapter for Singlemode Fiber – Green	AFA-LC02-GR/LP-SHUTTERED Mat ID = 760056036	CCH-CP12-B3
41	Splice trays for use in Fiber Shelf	RS-2AF-16SF Mat ID = 760039867	M67-078
42	Splice Wallet for use in 4U Fiber Shelf - accepts 3 splice trays	SW-03 Mat ID = 760057059	
43	Fusion Splice Wallet Kit with 6 splice trays for use in 4U Fiber Shelf	SW-6AF-16SF Mat ID = 760031054	
44	Splice Tray, mass Fusion Splices or Heat-Shrink		M67-076
45	Wall mount Splice Trays		M67-110

D7030.1211 for Standard OIT room Layout Details.

Standard MDF room layout.



Standard IDF room Layout



D7030.1212 for Architectural – Mechanical-Electrical-Plumbing and IT Designer Guidelines.

Architectural, Mechanical-Electrical-Plumbing, and IT designer Guidelines for building IT spaces.

OIT Architectural Design Requirements

1. New Main Distribution Frame and Intermediate Distribution Frame (MDFs/IDFs) shall be designed in compliance with the space, electrical, and environmental requirements of ANSI/TIA-569- – Commercial Building Standard for Telecommunications Pathways and Spaces. Smaller spaces or enclosures shall not be acceptable without prior written approval from UCB OIT.
2. The MDF and IDF designs for Consultant Designed projects shall comply with the requirements of Section D7000.
3. Corridor access with the door to swing out is required for all new MDFs and IDFs, which shall comply with common area access requirements. No other rooms shall lead directly to or from the MDF or IDF.
4. All walls of the MDFs and IDFs shall be covered with rigidly fixed ¾" A-C fire-resistant or non-combustible plywood backboard, void free, 8' high, and painted with two coats of white colored paint while retaining the plywood stamps on all sheets to be exposed. The project shall confer with Facilities Management paint shop to assure the paint is campus and LEED acceptable. The bottom edge of the plywood shall be 4" above the floor. Add plywood per the CU OIT standard Terminal layout for the fiber coils above the 8-foot sheets of plywood.
5. MDFs and IDFs shall be open to the structure above (no suspended ceiling).
6. The floor, walls and ceiling of the MDFs and IDFs will be sealed to reduce dust. The floor shall be sealed concrete.
7. The communication MDFs and IDFs cannot be shared with other departments or purposes including, but not limited to, custodial, electrical, mechanical, storage, etc.
8. Equipment not related to the support of the MDF or IDF (e.g., piping, ductwork, pneumatic piping, electrical equipment, plumbing, etc.) should not be installed in, pass through, or enter the room.
9. No equipment, hardware, piping, etc. shall be added in or near any MDF or IDF that will change the temperature or humidity of these rooms without written agreement from UCB OIT department prior to design and installation.
10. New MDFs and IDFs shall not be adjacent to any electrical room or room containing a transformer or motors. Electrical power systems in or adjacent to the MDFs and IDFs should be configured such that their electromagnetic fields do not interfere with telecom cabling or equipment.
11. All MDFs and IDFs shall be secure with all walls from floor to the ceiling structure. In the event of extra high ceilings, a hard ceiling can be added to these rooms with OIT prior written approval.
12. MDF, IDF and equipment rooms shall all be 1 hour rated rooms.

OIT Mechanical and Plumbing Requirements

a. The communication MDFs and IDFs cannot be shared with other departments or purposes including, but not limited to, custodial, electrical, mechanical, storage, etc.
b. Equipment not related to the support of the MDF or IDF (e.g., piping, ductwork, pneumatic piping, electrical equipment, plumbing, etc.) shall not be installed in, pass through, or enter the room.
c. No equipment, hardware, piping, etc. shall be added in or near any MDF or IDF that will change the temperature or humidity of these rooms without written agreement from UCB OIT department prior to design and installation.

OIT HVAC Requirements

1. Environmental control HVAC systems shall be provided for the MDFs and IDFs so that the temperature in these rooms will meet the requirements for ASHRAE Class B. The HVAC systems shall be provided to maintain a continuous operational range of 41°F to 90 °F, with the maximum design load provided by the low-voltage consultant and approved by OIT. A positive pressure differential with respect to surrounding areas shall be provided. If a standby power source is available in the building, the HVAC system serving the MDFs and IDFs should be connected to the standby power.
2. The MDF rooms will have fan coil units placed outside the rooms, and the IDF rooms will have VAV boxes that can be placed within the rooms, unless a different design is necessitated by the heat loads. OIT approval is required for alternate HVAC designs. Only duct work will enter the rooms for cooling, unless written approval has been given from the UCB OIT department.
3. The maximum HVAC loads (BTU/Hr) and power consumption (Watts) for the MDFs and IDFs shall be determined by the telecommunications low-voltage consultant. If any DAS/BAS equipment is to be located within the MDFs and IDFs, additional HVAC loads (BTU/Hr) and power consumption (Watts) for this equipment shall be provided by the DAS/BAS Consultant.

OIT Mechanical, Electrical, and Plumbing Requirements

1. The communication MDFs and IDFs cannot be shared with other departments or purposes including, but not limited to, custodial, electrical, mechanical, storage, etc.
2. Equipment not related to the support of the MDF or IDF (e.g., piping, ductwork, pneumatic piping, electrical equipment, plumbing, etc.) shall not be installed in, pass through, or enter the room.
3. No equipment, hardware, piping, etc. shall be added in or near any MDF or IDF that will change the temperature or humidity of these rooms without written agreement from UCB OIT department prior to design and installation.
4. The communication MDFs and IDFs cannot be shared with other departments or purposes including, but not limited to, custodial, electrical, mechanical, storage, etc.
5. Equipment not related to the support of the MDF or IDF (e.g., piping, ductwork, pneumatic piping, electrical equipment, plumbing, etc.) shall not be installed in, pass through, or enter the room.
6. No equipment, hardware, piping, etc. shall be added in or near any MDF or IDF that will change the temperature or humidity of these rooms without written agreement from UCB OIT department prior to design and installation.
7. Power for all MDFs and IDFs in the building shall be provided by a separate supply circuit terminated on its own electrical panel with an isolated ground. This electrical panel shall be located in the room with the Main Distribution Frame (MDF). If the building is equipped with a standby power generator, the panel serving the MDFs and IDFs shall be connected to the standby power generator.
8. Electrical within new MDFs and IDFs shall be designed in compliance with the requirements of ANSI/TIA-569-
9. Power for telecommunications and data network equipment in the MDFs and IDFs shall be provided by installing the following for every rack on the right side standing on the back side installed at 12” AFF behind the 10” vertical wire manager as to not block clearance of any equipment or with the outlet or plugs. The grounded conduit with power shall comply with EMI clearance requirements within CU OIT standards: two (2) 5-20R double duplex outlets with a dedicated 120VAC, 20A circuit to each location; one (1) L5-30R outlet with a dedicated 120VAC, 30A circuit. In addition, one convenience 5-20R duplex power outlet should be placed on the wall of the MDFs and IDFs near the light switch. Refer to the prints and OIT standard MDFs and IDFs layout.

10. Lighting in the MDFs and IDFs shall be a minimum of 500 lx (50-foot candles) measured 1 m (3 ft.) above the finished floor, mounted 2600 mm (8.5 ft.) minimum above the finished floor. Lighting fixtures shall not be powered from the same electrical distribution panel as the telecom or data equipment in the room.
11. New MDFs and IDFs shall not be adjacent to any electrical room or room containing a transformer or motors. Electrical power systems in or adjacent to the MDFs and IDFs should be configured such that their electromagnetic fields do not interfere with telecom cabling or equipment.
12. Add Technology note to electrical sheet: All communication pathways to be installed by electrical contractor, refer to Technology prints for details.
13. Note the Electrical contractor must provide as-built drawings showing pathways for the IT subcontractor. A duplicate copy shall be supplied to CU OIT department.

OIT IT Consultant Requirements in Architectural section

1.01 DESIGN DOCUMENTATION - GUIDELINES FOR TELECOMMUNICATIONS LOW-VOLTAGE CONSULTANTS

In reference to telecommunications low-voltage design work for Consultant Designed projects, UCB requires the telecommunications design effort be substantially complete and included in the publication of the initial design documentation set. The design elements expected in each phase, as a minimum, are listed below. The Consultant shall make it very clear what is new construction, and what is not, in renovation designs for existing buildings. All CAD drawings for telecommunications low-voltage infrastructure shall comply with the UCB OIT Telecom CAD Standards Guideline document attached to these specifications.

A. Schematic Design (SD) Phase documents shall be provided for review and comment by OIT.
   a. Legend and Symbol Schedule shall be complete.
   b. Site Plan shall be complete with all existing and new conduits, tunnels, handholes, manholes, and Outside Plant (OSP) copper, and fiber optic cabling.
   c. The CU OIT D7000 Specifications shall be used for all project designs. Any items in these specifications that do not apply to the specific project shall be deleted with a ~~strikethrough~~. Any additions to the specification for the specific project shall be highlighted with RED text. All changes to the specifications are subject to review and acceptance by OIT.
   d. The locations for all MDFs and IDFs shall be designed to be within a 150' radius of all areas to be served with the understanding to maintain ANSI/TIA distance standards for telecommunications cabling.
   e. New Main Distribution Frame and Intermediate Distribution Frame (MDFs/IDFs) shall be designed in compliance with the space, electrical, and environmental requirements of ANSI/TIA-569 – Commercial Building Standard for Telecommunications Pathways and Spaces. Smaller spaces or enclosures shall not be acceptable without prior written approval from UCB OIT.
   f. Architectural, mechanical, electrical and plumbing systems within MDFs and IDFs shall be designed and installed as specified in A0020, A0021 and D0000. If any DAS/BDA equipment is to be located within the MDFs and IDFs, the space and environmental requirements for these rooms will be revised to accommodate this additional equipment without impacting the OIT equipment in these rooms.
   g. Environmental control HVAC systems shall be included in the designs for the MDFs and IDFs so that the temperature in these rooms will meet the requirements for ASHRAE Class B. The HVAC systems shall be designed to maintain a continuous operational range of 41ºF to 90 ºF, with the maximum design load provided by the low-voltage consultant and approved by OIT. A positive pressure differential with respect to surrounding areas shall be provided. If a standby

power source is available in the building, the HVAC system serving the MDFs and IDFs should be connected to the standby power. The MDF rooms will have fan coil units placed outside the rooms, and the IDF rooms will have VAV boxes that can be placed within the rooms, unless a different design is necessitated by the heat loads. OIT approval is required for alternate HVAC designs.

h. The maximum HVAC loads (BTU/Hr) and power consumption (Watts) for the MDFs and IDFs shall be determined by the telecommunications low-voltage consultant based on the projected equipment growth for each room. OIT's standard spreadsheet shall be used to determine and document the heat loads and power consumption. This spreadsheet is available from OIT. The completed spreadsheet shall be submitted to OIT for review with the SD documents. If any DAS/BDA equipment is to be located within the MDFs and IDFs additional HVAC loads (BTU/Hr) and power consumption (Watts) for this equipment shall be provided by the DAS/BDA Consultant, as specified in CU OIT D7080.11.
i. Bonding and Grounding (Earthing) systems for Telecommunications shall be designed and installed in compliance with ANSI/TIA-607.
j. Telecom cable designs shall use a star topology within buildings, with no intermediate cross connect points between the building MDF and each TR.
k. Floor plans shall include dividing lines identifying which MDF or IDF the station cabling will be routed to for each building area. Cable pathway designs shall be included to provide station cable routing to the designated MDF or IDF so that no station cable length shall exceed 290' from the MDF or IDF to the farthest outlet. Where building conditions prohibit meeting this requirement, additional MDFs or IDFs shall be provided.
l. Floor plans shall include the telecommunications outlet locations with numbers for each location (at SD phase the numbers may be XX to indicate numbers will be added on a future phase). The outlet locations shall include, but not be limited to jacks for: voice/data, elevator lines, wireless APs, security cameras, meters, building automation systems (BAS), Ccure access panels, fiber for fire alarm panels, etc. The outlet numbering shall be assigned as specified in the Labeling and Testing attachment to CU OIT standard D7050.124. Once an outlet number is assigned, it shall never change for any reason. Deletion of outlets will not change any of the other outlet numbers.
m. Copper riser drawings shall be provided to document the project requirements for: OSP OIT copper cable with protection; OSP CenturyLink copper cable with protection (provided by CenturyLink); and backbone OIT copper cable from the Main Distribution Frame (MDF) to each Intermediate Distribution Frame (IDF) location. Follow OIT "Riser Diagram Detail" fully to complete design.
n. Fiber riser drawings shall be provided to document the project requirements for: OSP OIT Multimode (62.5/125) and Single mode fiber cables; and OIT backbone Single mode fiber from the MDF to each IDF location. Follow OIT "Riser Diagram Detail" fully to complete design.
o. Infrastructure riser drawings shall be provided to document the requirements for pathways (conduit, cable trays, pull-boxes, J-hooks, etc.) for OSP and backbone cables. These drawings shall clearly indicate the size and quantity of all pathways. Follow OIT "Riser Diagram Detail" fully to complete design.
p. The rack layouts for the MDFs and IDFs are standard for OIT and shall be complete. The number of racks may change due to the number of outlets which is acceptable. Follow OIT "Standard MDF" and "Standard IDF" fully to complete design.

q. A detail of the MDF voice wall is required to indicate stacked protectors for OSP OIT copper backbone cabling, feeding from the bottom, at least four high. A ½ D-ring route shall be above the protectors, at a height of no more than 6 foot 3 inches, all the way across the 66-block run. The next row is 66 blocks for voice riser cable, stacked 6 high, with no gaps. The voice riser cable will be terminated on the left side first, all the way down to the bottom of the sixth block, then back to the top and terminated on the right side all the way down to the bottom of the sixth block, before terminating on the second row, and so on. Follow OIT "Standard MDF" and "Standard IDF" fully to complete design.

r. In the MDF, a shorter wall space shall be reserved for OSP CenturyLink copper entry cable protectors to be installed by CenturyLink. This wall space shall be setup like the space for the campus OSP copper protectors and riser, however, one row of six 66 blocks shall be included between the protectors and the riser. The additional row of 66 blocks shall be for horizontal station cables to be terminated on the outside pins only. The horizontal station cables will be installed on the left side first, all the way down to the sixth block, then down the right side of the 66 blocks. Follow OIT "Standard MDF" and "Standard IDF" fully to complete design.

s. If any DAS/BDA equipment is to be located within the MDFs and IDFs, the room designs and drawings shall be coordinated with the DAS/BDA Consultant.

t. Pathway (cable tray, conduit, J-hooks, etc.) designs shall be complete and shown on the floorplan drawings.

u. Details shall be complete including, but not limited to, cable tray, ladder rack, outlet box, wireless AP enclosures, Ccure, drain box, etc.

v. The project T file sheets must include the most recent "UCB Network Roles & Responsibility Matrix – Capital Projects" table. Contact OIT PM for the most current copy of this document.

B. Design Development (DD) Phase documents shall be provided for review and comment to OIT.

a. All room designs should be nailed down so the Terminal room sheets with the floor layout, rack layout, and wall layouts shall be complete to include, but not be limited to:

i. The ladder racking in each MDFs and IDFs.

ii. The copper, coaxial, and fiber cable routing with the location of the 20-foot coils on the fiber cables shown on the room layout.

iii. The relay rack locations with the front and back labeled. These shall be next to the wall and working from left to right.

iv. All grounding detail.

v. The wall details shall be confirmed for all walls and all numbering added.

b. The spreadsheet with HVAC loads and power consumption shall be updated and re-submitted to reflect any design changes and associated projected equipment growth for each MDFs and IDFs.

c. Environmental control system designs for the MDFs and IDFs shall be updated as necessary to meet ASHRAE Class B requirements with the updated heat loads from the low-voltage consultant.

d. The outlets shall be numbered on the floorplans, if not complete on SD phase. This includes outlets for wireless APs in the locations identified in the design from the 802.11 wireless designer.

e. CU OIT standard specifications shall be updated as required to reflect specific project requirements. All deletions shall be made with a ~~strikethrough~~ to the original text, and all additions shall be made with RED colored text, so that deviations from the original CU OIT standard specifications are clearly identified.

f. Conduit designs for locations with gypsum ceilings shall be completed.
g. Terminal room designs shall be confirmed to include enough panels and racks for the number of outlets to be installed.

C. Construction Document (CD) Phase
a. This phase shall be used for final design updates to the T, TD, AV and EI drawings and CU OIT specifications for the project.
b. The spreadsheet with HVAC loads and power consumption shall be updated and re-submitted to reflect any design changes and associated projected equipment growth for each MDF and IDF.
c. Environmental control system designs for the MDFs and IDFs shall be updated as necessary to meet ASHRAE Class B requirements with the updated heat loads from the low-voltage consultant.
d. The 95% CD documents shall be submitted to OIT-DL-REVIEW <oitreview@colorado.edu> with 10 business days allotted for review and comment by OIT.
e. Final revisions shall be made to the CD documents to incorporate all OIT comments, and the 100% CD documents shall be submitted to OIT-DL-REVIEW <oitreview@colorado.edu> for final approval prior to construction.
f. When complete, all 100% CD drawing files shall be provided to the OIT Infrastructure Engineering Department in CAD format.
g. The Termination Schedule Jack Position Sheet shall be submitted by the Consultant during this phase, as specified in D7040.13 line 5.

D. Construction Phase
a. Design changes during construction shall be documented with updated T, TD, and EI drawings submitted to OIT as ASI (Architect's Supplemental Information), COB (Change Order Bulletin) and/or RFI (Request for Information) documents, as appropriate.
b. All ASI, COB, and RFI documents shall be submitted to OIT-DL-REVIEW <oitreview@colorado.edu> with 10 business days allotted for review and comment by OIT.
c. Final revisions shall be made to ASI, COB, and RFI documents to incorporate all OIT comments, and the final version of these documents shall be submitted to OIT-DL-REVIEW <oitreview@colorado.edu> for final approval prior to construction changes.
d. Updated Termination Schedule Jack Position Sheets shall be submitted by the Consultant to reflect changes during construction, as specified in D7040.13 line 5.

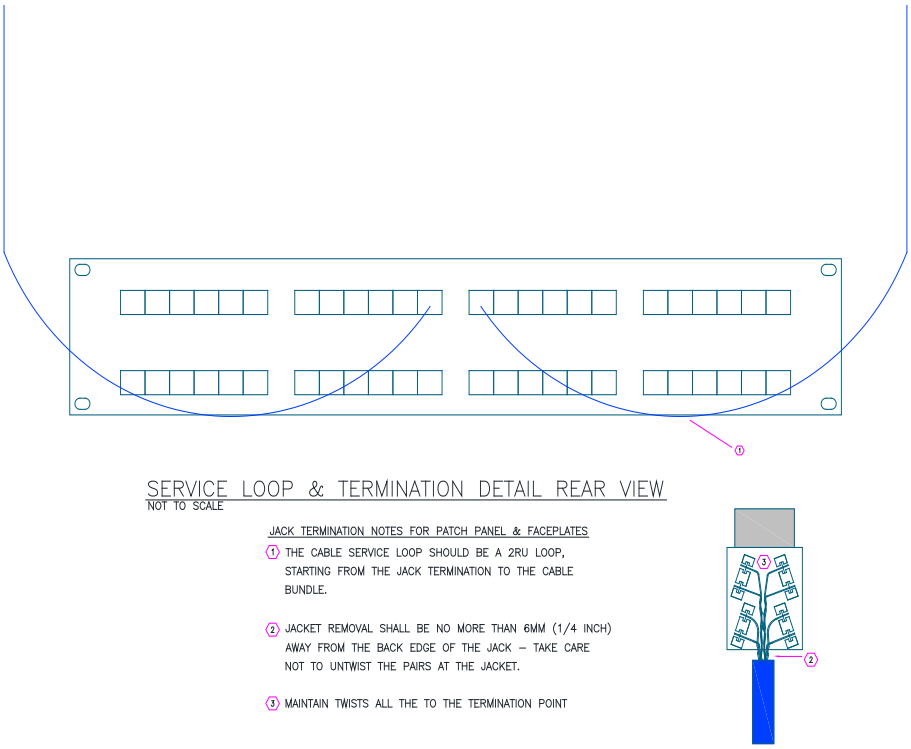
E. Submittal Review
a. The Consultant shall review and provide summary comments on product submittals to CU OIT.
b. The Consultant is NOT authorized to approve product submittals. Final approval of submittals will be provided by CU OIT when they are complete and correct.

F. As-Built Documents
a. Shop Drawing from the consultant must be submitted and approved by OIT no later than 30Days before beginning work on capital construction projects.
b. After construction is complete, final as-built T, TD, AV and EI drawings for all communications infrastructure and cabling shall be provided to OIT Infrastructure Engineering Department in CAD format for final acceptance and work closeout, as specified in D7040.13 line 6.
c. Communication as-built files shall be a part of the final punch list and will not be considered complete until UCB OIT receives the final as-built CAD files. Final payment shall be withheld until the as-built CAD files are received and approved by OIT.

G. ASI, COB and/or RFI

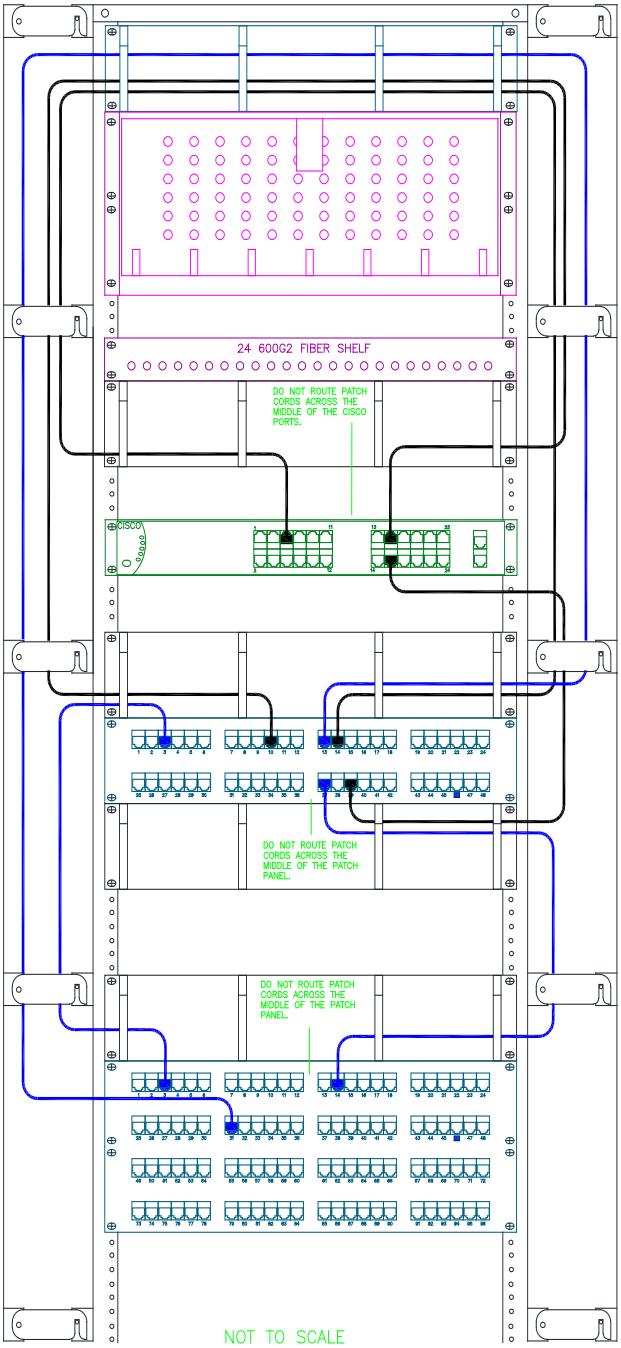
a. Updated and changed documentation shall be submitted through CU Facilities and provided to OIT for review and approval with Full sheet submitted and the Terminal Schedule in excel format.

D7030.3121 - Back of Patch Panel Service Loop Detail.

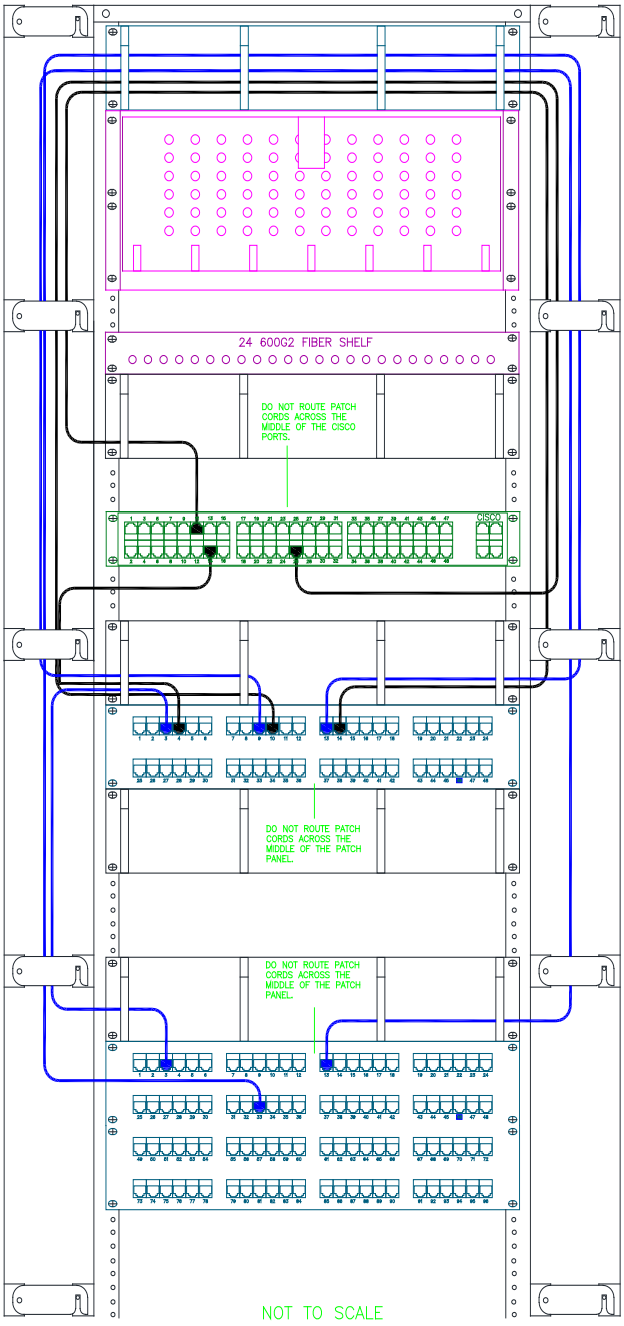


D7030.3141 - Patch Cord routing Details.

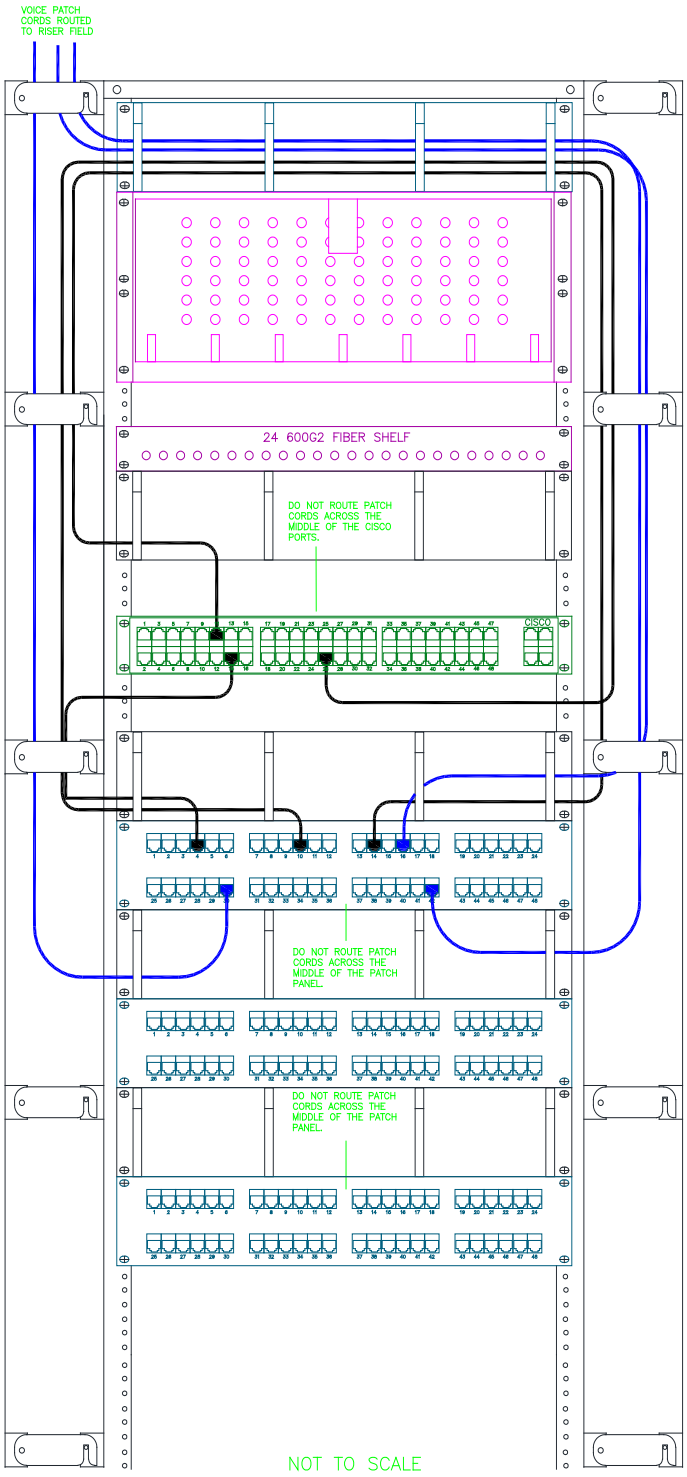
Patch Cord Routing 24 Port Equip and 96 Voice Patch Panel Detail


24 600G2 FIBER SHELF
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE CISCO PORTS.
CISCO
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE PATCH PANEL.
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE PATCH PANEL.
NOT TO SCALE

Patch Cord Routing 48 Port Equip and 96 Voice Patch Panel Detail



Patch Cord Routing 48 Port Equip and Voice to Wall Field Detail


VOICE PATCH CORDS ROUTED TO RISER FIELD
24 600G2 FIBER SHELF
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE CISCO PORTS.
CISCO
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE PATCH PANEL.
DO NOT ROUTE PATCH CORDS ACROSS THE MIDDLE OF THE PATCH PANEL.
NOT TO SCALE