

Calvin College  
Communications Specifications  
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CALVIN  
College





This document supersedes all previously published wire and communication code documents. For additional information please contact the Network Operation Group or Telecommunication personnel at 616-526-6144

## COMMUNICATIONS ROOMS

### Main Distribution Frame (MDF)

- Each building or building complex must have a **central** communications room. MDFs have the following characteristics.
  - Usually houses an Avaya (Lucent) EPN (remote shelf) and UPS
  - Contain Level 0 or Level 1 network devices and Level 2 devices.
  - Termination point for all fire, security and alarm systems.
  - MDFs are connected by at least two 4" conduits.
    - Exterior conduits must be secured with a layer of protective concrete.
  - An MDF must have redundant non overlapping, non intersecting path to **two** other MDFs.
  - An MDF requires individual HVAC control.
    - Temperatures limits are 65° F to 85 °F
    - Humidity limits are 20 - 60% relative humidity
  - MDF Size
    - Minimum area should be 100 square feet.
    - The shortest wall must be at least 6' in length.
    - Ceiling height must be a minimum of 7'.
  - The room is to be secured with an EGD key.
  - The MDF must be dry and not susceptible to flooding.
  - The MDF is not shared with any other service or facility.
  - The room must be lighted with its own light switch.
  - Electrical requirements
    - Isolated circuits "orange power".
    - Requires at least one 20 amp circuit.
    - A minimum of 4 quad receptacles.
    - UPS backup.
    - Generator backup.

Current cabling standards limit cable length to 100 meters, or approximately 328 feet. This length is the sum of all vertical and horizontal distances, including the standard 10' ethernet cable between the wall jack and the end-user device (PC/Mac). When the 100 meter distance is exceeded, an **Intermediate Distribution Frame (IDF)** is required.

- **IDF characteristics:**

- Contains Level 2 network devices
- Termination point for all fire, security and alarm systems.
- An IDF is connected to the MDF by at least one 4" conduit.
  - Exterior conduits must be secured with a layer of protective concrete.
- IDF to IDF connectivity is accomplished with a minimum of one 2" conduit.
- An IDF requires individual HVAC control.
  - Temperatures limits are 65° F to 85 °F
  - Humidity limits are 20 - 60% relative humidity
- IDF Size
  - Minimum area should be 30 square feet.
  - The shortest wall length is 4 feet.
  - Ceiling height of 7' is required.
- IDF must be dry and not susceptible to flooding.
- The room must be lighted with its own light switch.
- The room is to be secured with an EGD key.
- The MDF is not shared with any other service or facility.
- Electrical requirements
  - Isolated circuits "orange power".
  - A minimum of two quad receptacles.

- **IDF by renovation: (IDFr)** When an IDF is created due to building renovations, the following minimums must be met.
  - Contains Level 2 network devices
  - Termination point for all fire, security and alarm systems.
  - An IDFr is connected to the MDF by at least one 4" conduit.
    - Exterior conduits must be secured with a layer of protective concrete.
  - IDF to IDF connectivity is accomplished with a minimum of one 2" conduit.
  - Where HVAC is not available ventilation is necessary. A 6" opening should be left at the top of all interior wall. A grated opening must be installed at the bottom of an interior wall to provide airflow.
  - Temperatures limits are 65° F to 85 °F
  - Humidity limits are 20 - 60% relative humidity
  - IDFr Size
    - Minimum area should be 20 square feet.
    - The shortest wall length is 3 feet.
    - Ceiling height of 7' is required.
  - IDFr must be dry and not susceptible to flooding.
  - The room must be lighted with its own light switch.
  - The room is to be secured with an EGD/EA key.
  - Electrical requirements
    - Isolated circuits "orange power".
    - A minimum of one quad receptacle.

## **CABLING**

### **MDF-MDF Cabling**

- MDFs are connected by a minimum 12 strand multimode fiber & appropriate number of copper pairs.
- Where MDFs are more than 1000 feet apart a composite ((6) single and (12)multi mode fiber) cable is required.

### **MDF-IDF Cabling**

- MDF are connected to IDFs by a minimum 6 strand multimode fiber, and appropriate number of copper pairs.

## House Cables

- There are two cable specifications. They are Category 5e and Category 6 (568 B). See the **Parts List** at the end of this document for cable standards.
- Data cables are blue.
- Voice cables are gray.
- Data cables are limited to 300 feet in length
- Face plate terminations are color coded. See Parts List for specifics.
- MDF/IDF data terminations use RJ 45 patch panels.
  - The panels are installed on floor mounted 19" equipment racks
  - Vertical wire management 4"-6" is required on all rack.
  - Horizontal wire management is required above and below every RJ45 panel.
- MDF/IDF voice cables terminate on 110 blocks.
- A three foot service loop is required on all voice and data cables *in the MDF/IDF*.
- House cables enter the MDF/IDF in conduit or wire mesh cable tray.
- Cables must be protected at all times via conduit, wiremold and/or cabletray.
- A minimum ¾" conduit is required from the faceplate to the cable tray. One inch is required when CATV is to be installed in the same conduit. This spec will change for CAT 6 cable.
- **Conduit must be metal** and bonded to the cable tray.
- "Free air" cables are not permitted.
- Cables can coexist with other low voltage cables only.
- Cable sequencing.
  - Cables must be sequentially numbered on the patch panel or 110 block.
  - Cables must be sequentially numbered on each face plate.
  - Voice and Data are numbered separately.
  - Cables within a room must be numbered sequentially.

## Typical Configurations

- **Office:** A *typical* office had the following characteristics.
  - Two comm. boxes are installed on opposing walls.
  - Consideration must be given to potential furniture arrangements.
    - Clear filing cabinets and drawer openings
    - Avoid book cases, whiteboards and trip hazards.
  - Comm. boxes should be near a “dedicated” electrical outlet.
    - Avoid coffee pots, space heater, copy machines on the same
    - circuit as the end-user device.
  - Only one of the two comm. boxes will be wired.
  - An office comm. box will contain 1 voice and 2 data cables. Voice cables will be terminated on two RJ 11 USOC jacks, W/BL & W/O on jack A and W/G & W/BR on jack B. Data cables will be terminated to one RJ 45 jack each. A CATV cable may be required.
  
- **Classroom/Lab.** A typical Classroom/Lab will have the following characteristics.
  - A comm. box at the front of the classroom/lab will contain 1 voice, 2 data and 1 CATV cables.
  - Other comm. boxes will support a maximum of 4 data cables.
  - Configuration is dependent on room function.
  
- **Dorm Room.** A typical Dorm room will have the following
  - A single gang box will be installed.
  - Consideration must be given to potential furniture arrangements and doorways.
    - Avoid trip hazards.
  - An dorm comm. box will contain 1 voice and 2 data cables. Voice cables will be terminated on two RJ 11 USOC jacks, W/BL & W/O on jack A and W/G & W/BR on jack B. Data cables will be terminated to one RJ 45 jack each. One CATV cable is required.

## Exterior cables

- Exterior cables are to be pulled through conduit. Direct burial is not acceptable.
- Conduits should be protected with concrete where economically feasible.
- Critical path conduits must be protected with concrete
- Manholes are required every 300 feet.

# PARTS LIST

## GENERAL

Item	Manufacturer	Part Number
19" rack	CPI	46353-503
Horizontal wire management	Panduit	CMPH1
Vertical wire management	Panduit	WMPVHC45E
Cable Tray	Cablofil <a href="http://www.cablofil.com">www.cablofil.com</a> or <a href="http://www.gsmetals.com">www.gsmetals.com</a>	CF54/200 or CF54/300 (150-500 per fill required)

## CAT 6

Item	Manufacturer	Part Number
Data Cable (Blue)	Belden	Mediatwist 1872A
Voice Cable (Gray) -	CAT 5 Belden	DataTwist 350 1700A
Data Jack (Yellow)	Panduit	CJ688T3YL
Voice Jack	Panduit	CJ66EI
Face Plate – <i>Match Bldg Paint</i>	Panduit	CFP2xx, CFP4xx, CFPF6xx
Data RJ45 Patch Panel	Panduit	DP4868WGP
Voice 110 block Feeder	Panduit	P110KB1005
Voice 110 block Station	Panduit	P110KB1004
CATV “F” Connector - <i>Match Face Plate</i>	Panduit	CMFxx
Wall Mount voice Jacks	Suttle	SE 630 A4

## CAT 5E

Item	Manufacturer	Part Number
Data Cable (Blue)	Belden	DataTwist 350 1700A 006
Voice Cable (Gray)	Belden	DataTwist 350 1700A F2V
Data Jack (Orange)	Panduit	CJ5E88TOR
Voice Jack - <i>Match Face Plate</i>	Panduit	CJ66xx
Data RJ45 Patch Panel	Panduit	DP485E88TGY
Voice 110 block Feed Cables	Panduit	PA110KB1005
Voice 110 block Station Cables	Panduit	PA110KB1004
Face Plate – <i>Match Bldg Paint</i>	Panduit	CBxx
CATV “F” Connector - <i>Match Face Plate</i>	Panduit	CMFxx
Sloped Recessed Insert - <i>Match Face Plate</i>	Panduit	CHSRE2xx

## Exterior Cable

Item	Manufacturer	Description
Fiber Cable	Siecor	62.5/125 micron
Copper Feed	<any>	Category 5

## Miscellaneous

Item	Manufacturer	Description
Security cameras	Axis 213 ptz, 212 ptz, 225 fd,	
Security camera cables		Use Data Cable
Card Reader/Swipe Cable		

