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**Basic Communications Requirements**

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A. Outside Plant (OSP) Cables:

1. Renovations of existing buildings will likely already have fiber and copper feeding the building and will likely remain and be re-used. Confirm this with BSU Engineering and BSU UTS.
2. New buildings or major building renovations that affect the existing MDF will need new single mode and new CAT 3 copper feeds. See "BSU Communications Standards" drawing for current cabling part numbers. This cable will most likely be routed through the existing utility tunnel or an existing communications manhole back to Robert Bell and/or Burkhardt Buildings. Confirm this with BSU Engineering. When existing the tunnel or manhole utilize two (2) 6" PVC conduits encased in concrete to create a communications duct bank to the new building MDF. Utilize Link Seals at tunnel and manhole penetrations. Utilize Quazite PD series 30x48x48D with Tier 15 minimum rated cover handholes as necessary. Cover shall be marked "COMMUNICATIONS". Where possible provide a gravity drain from the handhole(s) to nearest storm sewer structure. Require the contractor to terminate and test all OSP cabling.
3. Standard communications outlets are typically deep 4 squared boxes with single gang rings with a 1" EMT conduit stubbed to breaks in the corridor 4" EMT skeletal conduit system.
4. Coordinate with BSU Engineering for projector and monitor rough-in requirements as well as electronic classroom wiring requirements.
5. Communications cabling shall be plenum rated.
6. Coordinate card access system wiring requirements with BSU Engineering.
7. UTP cables shall be terminated in accordance with EIA/TIA 568B.

B. Main Distribution Frame (MDF):

1. BSU uses MDF and IDF terminology instead of the newer ER/TR room designation to remain consistent with historical naming convention.
2. Minimum room size of 12'x15'.
3. The consultant shall provide a 1/4" scale minimum layout of the MDF with all horizontal ladder racking around the perimeter of the room, all 19" equipment racks shown and all wall mounted equipment shown. Provide elevations of each wall and of each equipment rack to clearly convey the design intent and to ensure there is adequate rack space for all cabling terminations and equipment plus room for future growth. See "BSU Communications Standards" drawing for example.
4. Provide 12" ladder rack style cable tray around the perimeter of the room and above the equipment racks mounted at approximately 6" above the equipment racks. See "BSU Communications Standards" drawing for current part numbers.
5. All MDF walls shall be covered with 3/4" fire rated plywood painted gray to facilitate wall mounting of equipment.
6. Provide a grounding bus bar in the MDF and in each equipment rack.
7. Typical wall mounted equipment in the MDF may include: The main fire alarm control panel, door access control panel(s), the Metasys panel for monitoring and reporting of fire alarms to the BSU Campus Police dispatcher and the projector and monitor burglar alarm equipment.
8. All receptacles in the MDF shall be on emergency power and on UPS power where available.



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9. Provide a separate fan coil unit or DX cooling unit for the MDF. Confirm type with BSU engineering.
- C. Intermediate Distribution Frame (IDF):
1. BSU uses MDF and IDF terminology instead of the newer ER/TR room designation to remain consistent with historical naming convention.
  2. Minimum room size of 8'x10'.
  3. The consultant shall provide a 1/4" scale minimum layout of the IDF with all horizontal ladder racking around the perimeter of the room, all 19" equipment racks shown and all wall mounted equipment shown. Provide elevations of each wall and of each equipment rack to clearly convey the design intent and to ensure there is adequate rack space for all cabling terminations and equipment plus room for future growth. See "BSU Communications Standards" drawing for example.
  4. Provide 12" ladder rack style cable tray around the perimeter of the room and above the equipment racks mounted at approximately 6" above the equipment racks. See "BSU Communications Standards" drawing for current part numbers.
  5. All MDF walls shall be covered with 3/4" fire rated plywood painted gray to facilitate wall mounting of equipment.
  6. Provide a grounding bus bar in the IDF and in each equipment rack.
  7. Typical wall mounted equipment in the IDF may include: The fire alarm sub panels, NAC panels, transponder panels or amplifier panels and door access control panel(s).
  8. All receptacles in the IDF shall be on emergency power and on UPS power where available.
  9. Minimize the number of IDF's so as to minimize the number of Owner provided network switches required in the building but leave room for future growth. We do not necessarily need an IDF on each floor.
- D. Horizontal and Vertical Distribution:
1. All cabling shall be plenum rated. See "BSU Communications Standards" drawing for current cabling part numbers.
  2. Route all cabling down corridors to the extent possible using a "skeletal" conduit system made up of 10'0" lengths of 4" EMT conduit with 18" to 24" gaps between lengths of conduit. Do not use cable trays, j-hooks or bridle rings. De-bur conduits and do not install bushings. Skeletal conduits above hard or inaccessible ceilings shall be continuous. Do not fill conduits greater than 40% and design for future growth.
  3. Provide sleeves as required between floors. Allow for future growth.
  4. Horizontal and vertical cabling may include all station cables, riser or backbone cable between the MDF and IDF's and access control cabling. Do not route fire alarm cabling (if open fire alarm cabling is permitted on the job, BSU's preference is for all fire alarm cabling to be in conduit), or temperature control / BMS system cabling.
  5. Riser cables from the MDF to each IDF shall at a minimum consist of the following. All cables shall be furnished, installed, terminated and tested by the contractor:
    - a. One (12) fiber multimode cable.
    - b. One (12) fiber singlemode cable.



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- c. One RG-11 Coaxial cable (CATV) looped to each IDF
  - d. One 25 pair CAT 5E riser cable for equipment security points and copper phone lines.
- E. Station Cabling and Rough-in
- 1. Standard outlet and jacks. On new construction and major renovation projects utilize CAT 6A cabling and jacks. On minor renovation projects, see BSU Engineering for direction. Rough-in shall be a deep 4 square box with single gang ring and 1" EMT conduit stub to gap in the corridor skeletal conduit system.
  - 2. The standard office shall have 2 outlets with one jack at each outlet. One outlet shall be on the "back wall" of the office and the other on the "side wall" on the side opposite the door. Each outlet should have a duplex receptacle immediately adjacent.
  - 3. Wireless Access Points. Provide floor plan to BSU UTS department for layout during design. Provide jack above the ceiling at each WAP location. See "BSU Communications Standards" drawing for jack part number.
  - 4. Misc. jacks for MEP equipment. Provide one jack at each of the following: The main fire alarm control panel, each electrical meter, each BMS system control panel, the fire pump controller, each elevator controller, each BTU meter, the UPS (if there is one), each door access control panel and the Metasys panel used for fire alarm system monitoring and reporting.
  - 5. Provide a communications outlet wiring schedule on each sheet showing each outlet number and the number and types of jacks at each outlet. See BSU "Example Comm Wiring Schedule" drawing for example. Outlet numbers shall be 4 digits for floors 0 through 9<sup>th</sup>. On new projects begin outlet numbers on each floor with the floor designation followed by the outlet number in sequence starting from "1", not "0". For example the first outlet on the second floor would be 2001. If there are say, 3 jacks in that outlet they will be jack #'s 2001-1, 2001-2 and 2001-3. For renovation projects consult BSU Engineering for the starting outlet number to be used on each floor. Number the jacks in the patch panels correspondingly.
  - 6. Terminate all 4 UTP station cables in accordance with EIA/TIA 568B standards and require the contractor to test the connectivity (jacks + cable + patch panel) solution as a system with a lifetime warranty. See "BSU Communications Standards" drawing for jack, cable and patch panel part numbers. The installing contractor must be certified to install this solution in order to qualify for the warranty.
  - 7. Provide dust covers for all jacks either in an outlet box or patch panel. See "BSU Communications Standards" drawing for part number.
- F. Owner provided (furnished + installed) communications and A/V equipment. The contractor shall provide all other communications and A/V equipment not listed below and shall provide all required rough-ins and cabling for this equipment or devices.
- 1. BSU will furnish and install the following items and will schedule installation directly with the contractor.
    - a. Video projectors, both short throw and ceiling mounted.
    - b. Flat screen monitors.
    - c. Classroom emergency call boxes.
    - d. Campus Ethernet network switches in the MDF and IDF racks.
    - e. Wireless Access points.



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- f. All general office and computer lab PC's except for those for a specific building system such as a laptop for the BMS system.
  - g. All VOiP telephones.
  - h. All patch cables to patch from patch panel jacks to network switches or from a jack to PC or VOiP phone.
  - i. CBORD access control equipment in Residence Halls only. (Note: Academic buildings do not use CBORD equipment.)
- G. Conference rooms with monitors or projectors (small/medium with no sound system). Provide rough-in and cabling for either a short throw projector or a wall mounted flat screen monitor. Confirm which option with BSU during design meetings.
- a. Short Throw Projector or flat screen monitor – RACO 256 extra deep (3 1/2") box with two gang ring and one (1) orange CAT 6A data jack and one (1) fog white CAT 6A security jack, one (1) HDMI connector and one (1) mini stereo jack. Provide one (1) 2" EMT stub to above accessible ceiling. Mount at projector location 12" below ceiling or behind and above monitor mount. Also provide a 120V duplex receptacle at this location. Also provide HDMI and audio cables from input plate to this box for connection to PC or laptop.
  - b. Input plate for PC or laptop connection – RACO 256 extra deep (3 1/2") box with two gang ring and one (1) orange CAT 6A data jack and one (1) fog white CAT 6A security jack, one (1) HDMI connector and one (1) mini stereo jack (EXTRON HD-BASE wall plate transmitter to fit in Ortronics coverplate). Provide one (1) 2" EMT stub to above accessible ceiling. Mount at +18" AFF to center. Also provide a 120V duplex receptacle at this location. Also provide HDMI and audio cables from input plate to projector.
  - c. Note: Some monitor locations may require coaxial cable and an F connector. Confirm with BSU during design meetings.
- H. Electronic classrooms and/or large conference or meeting rooms. Provide the following in each electronic classroom and large conference or meeting room, either EXTRON type or AMX type. Confirm this requirement and all part numbers with BSU Engineering and BSU UTS departments during design meetings as these tend to change frequently with changes in technology.
- a. Emergency call box rough-in near the instructor station. Deep 4 sq box with single gang ring and CAT 6A jack. Mount at +50" AFF to center. Emergency call box will be Owner furnished and installed.
  - b. Input plate for PC or laptop connection (non-AMX) – EXTRON AAP AV Plate # AAP 102 and RACO 256 extra deep (3 1/2") box with two gang ring and one (1) orange CAT 6A data jack and one (1) fog white CAT 6A security jack, one (1) HDMI connector and one (1) mini stereo jack. Provide one (1) 2" EMT stub to above accessible ceiling. Mount at +18" AFF to center. Also provide a 120V duplex receptacle at this location. Also provide HDMI and audio cables from input plate to projector.
  - c. Input plate for PC or laptop connection (non-AMX) – EXTRON AAP AV Plate # AAP 102 and RACO 256 extra deep (3 1/2") box with two gang ring and one (1) orange CAT 6A data jack and one (1) fog white CAT 6A security jack, one (1) HDMI connector and one (1) mini stereo jack. Provide one (1) 2" EMT stub to above accessible ceiling. Mount at +18" AFF to center. Also provide a 120V duplex receptacle at this location. Also provide HDMI and audio cables from input plate to projector.



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- d. Input plate for PC or laptop connection (AMX) – AMX DX-LINK Plate transmitter in Ortronics coverplate and RACO 256 extra deep (3 1/2") box with two gang ring and one (1) orange CAT 6A data jack and one (1) fog white CAT 6A security jack, one (1) HDMI connector and one (1) mini stereo jack. Provide one (1) 2" EMT stub to above accessible ceiling. Mount at +18" AFF to center. Also provide a 120V duplex receptacle at this location. Also provide HDMI and audio cables from input plate to projector.
- e. Sound system – Some classrooms and large meeting rooms will require a sound system with an above ceiling AV enclosure for the amplifier. Confirm this requirement with BSU during design meetings.
- f. Projector pan. Provide Peerless CMJ500R1 ceiling plate with power, data and A/V outputs. Install pan above the ceiling tile with devices installed flush with the tile. Projector will be furnished and installed by Owner.
- g. AMX control station. Some rooms may require an AMX MCP-106, AMX MCP-108 or AMX MSD 701 AMX controller for projector screen, lighting, sound or other control. Confirm this requirement with BSU during design meetings.
- I. Access Control Systems – Academic Buildings. On new building and major renovations we will typically install card readers at exterior doors and some interior doors. BSU uses a Stanley/Best system. The contractor shall furnish and install all control panels, readers, door position switches, electric strikes, cabling etc. BSU will provide the IP address for each controller. Confirm exact requirements with BSU during design meetings.
- J. Access Control Systems – Residence Halls. BSU Residence halls use a CBORD system in their facilities. Provide all rough-ins and all wiring for this system in the project. CBORD equipment and programming will be furnished and installed by BSU.
- K. Outdoor Emergency Phones. On new projects or renovation project with new or modified parking areas provide new outdoor emergency phone(s). Confirm quantity and location with BSU Public Safety and BSU Engineering. Phones shall be free standing tower type on a concrete base with two (1) 2" conduit back to the MDF or IDF for communications and (1) 1" conduit for 120V power. Feed with two (2) direct burial rated CAT 6A cables back to MDF or IDF with entrance protector and six (6) count multi-mode fiber cable. Phone tower shall be custom color RAL 7016 to match BSU standard exterior equipment color. Phone and accessories shall include:
  - a. Emergency phone tower: TALKAPHONE ETP-MTE ECO
  - b. Emergency phone: TALKAPHONE VOIP-500E SINGLE BUTTON NATIVE VOIP.