TELECOMMUNICATIONS ROOMS

Scope

Voice and data systems for the Ann Arbor, Dearborn and Flint Campuses are provided by the U-M Information Technology Central Services, ITSComm Department. Voice and data systems for University of Michigan Hospitals and Health Care (UMHHC) facilities are provided by the Medical Center Information Technology (MCIT) Division, but UMHHC projects often include ITSComm involvement as well.

Coordinate with ITSComm or MCIT through the Design Manager and provide telecommunications rooms as described below and in accordance with the Program Documents. On new building, building addition and total renovation projects, provide additional infrastructure for a Distributed Antenna System (DAS) to propagate cell phone and emergency responder radio frequencies throughout the building.

Related Sections

Design Guideline Technical Sections:
16010 – Basic Electrical Requirements
16050 – Basic Electrical Materials and Methods
16450 – Grounding
16740 - Voice and Data Systems

U-M Master Specifications:
260533 – Electrical Materials and Methods
272000 - Voice and Data Communications

U-M Standard Details:
16740 Series - Telecommunications Details

References

ANSI/TIA/EIA-568-C Commercial Building Standards for Telecommunications Cabling Standards
ANSI/TIA/EIA-569-C Commercial Building Standards for Telecommunications Pathways and Spaces
ANSI/TIA/EIA-607-B Commercial Building Grounding and Bonding Requirements for Telecommunications

Architectural Requirements

The Building Entrance (BE) room is the main termination point in a building for interconnecting cables external to the building (OSP cables) with cables internal to the building (ISP cables).
In addition, the BE may house voice/data racks, switches, routers, patch panels and terminations, DAS racks and distribution equipment, and electrical equipment of other systems. A BE may also serve as a combination BE and TR and serve local voice/data work outlets.

Telecommunications Rooms (TRs) are distribution and termination rooms that serve the voice/data work outlets in the immediate area. In addition, TRs may house voice/data racks and equipment, DAS distribution equipment and electrical equipment of other systems.

1. Locate the BE within 50 conduit feet of the telecommunication service entrance and relatively close to the TRs. Locate the TRs to allow star distribution of cabling.

2. Stack TRs vertically to provide short, direct, vertical paths for riser and network cables. See Figure 1.

3. Provide a minimum of one TR per floor. Provide additional TRs to ensure:
   - One TR for every 10,000 square feet of floor area being served.
   - One TR for every 300 voice/data outlets being served.
   - The cable distance to the farthest voice/data outlet does not exceed 295'.

4. When providing for a DAS, locate the DAS racks in the BE. Design the BE and one TR (two on floors over 25,000 square feet) on every other floor to house the DAS distribution equipment.

5. Size rooms according to the following rules:
   - Coordinate with ITSComm or MCIT to obtain the quantity and arrangement of voice/data and DAS racks in each room. Assume each rack will be 8' tall by 32.5" wide (including side-mounted cable managers) by 36" deep. See Standard Detail 16740010. Show the rack outlines on the plan drawings.
   - Size the rooms to provide the National Electrical Code minimum working space of 3' in front, 3' in back, and 2' on one side of each rack.
   - Provide backboard-covered wall space for non-rack equipment including patch panels, terminations, and other electrical equipment. Comply with NEC minimum working space requirements.
   - In rooms designed for DAS distribution equipment, designate a 6' wide by 4' tall section of backboard for the DAS.
   - When a room is not square, the minimum short wall length shall be 8'.
   - Minimum size for the BE shall be 12' x 12'. See Standard Detail 16740001.
   - Minimum size for the TRs shall be:
     - 12' x 12' for 10,000 square feet served.
     - 10' x 10' for 8,000 square feet served.
     - 8' x 10' for 5,000 square feet served.
     - See Standard Detail 16740002.

6. Minimum room height is 9'-0".

7. Leave the room ceilings open to the decks above. No ceilings are allowed.
8. Cover the walls from 6” AFF to 8'-6”AFF with ¾ inch Class B fire retardant plywood backboards (smooth side out). Backboards shall be rigidly installed. Do not paint backboards. The fire rating stamps must remain visible.

9. Paint or seal the floors. No carpeting is allowed. Provide vinyl tile flooring only when requested by ITSCComm or MCIT.

10. Doors shall be 36” wide by 80” high minimum and shall swing outward. Doors should be located near a corner of the room, and shall have storage room function hardware. Doors shall not have door sills, and double doors shall not have center posts.

11. When noted in the Program Documents, provide or prepare the doors for card readers and electrified door hardware.

**Mechanical/Electrical Requirements**

1. Ductwork, piping, and other mechanical system components are not permitted in a BE or TR unless they serve the room.

2. Provide the BE and TR’s with cooling 24 hours/day, all year around. Fan coil units located outside and ducted to the rooms are preferred. Room temperature shall be maintained between 68 degrees F (20 degrees C) and 77 degrees F (25 degrees C).
   - No room humidification or dehumidification is required.
   - Feed the cooling system with generator standby power only when the room contains DAS distribution equipment. Otherwise, feed the cooling system with normal power.

3. During project programming, assume an equipment heat load of 6,000 watts per room.
   - In rooms designed to house DAS racks or distribution equipment, add 2,400 watts.
   - Add the heat loads of other electrical equipment in the room including uninterruptible power supplies (UPSs), fire alarm panels, security panels, card access control panels, CCTV panels, and Power Over Ethernet (POE) power supplies.
   - The resultant heat loads will be worst case. Confirm the heat loads during design and reduce the cooling to match the confirmed heat loads.

4. Provide fluorescent lighting of at least 500 lux (50 foot-candles) 3’ above the floor. Feed the lighting with emergency power when generator emergency power is available. Provide light switches. Time controls and occupancy sensors are not allowed.

5. Provide conduits and floor sleeves for telecommunication cables per Figure 1. Conduits and floor sleeves shall be 4", shall extend into the room 4", shall be sealed water tight, and shall be fire stopped. When providing for a DAS, provide 2 additional conduits or sleeves between the rooms for DAS cabling. Provide spare conduits and sleeves for future use.

6. Extend cable trays a minimum of 6” into the rooms.
7. Provide:
   - Dedicated 120 volt, 20 ampere circuits to duplex receptacles 48" AFF and 10' apart on the plywood backboards.
   - In rooms designed to house DAS distribution equipment, two dedicated 120 volt, 20 ampere circuits to quad receptacles on the DAS backboard.
   - Dedicated 120 volt, 30 ampere circuits to NEMA L5-30R receptacles and dedicated 120 volt, 20 ampere circuits to power strips on the voice/data racks and DAS racks. See Standard Detail 16740010.
   - One 120 volt, 20 ampere circuit to a duplex convenience receptacle on the wall near the door.

8. Coordinate all receptacle locations with ITSComm or MCIT. Feed the voice/data racks and backboard receptacles with generator standby power only when the voice and data system is required to support life safety functions. Feed the DAS racks and DAS backboard receptacles with generator emergency power. Feed the convenience receptacle with normal power.

9. Provide a 1" x 12" x ¼" thick copper ground bus bar in the BE and each TR. Connect it to the unit substation room ground bus bar and to the ground bus bars in the receptacle panels feeding the BE and TR receptacles. Use No. 6 AWG green insulated, stranded, copper ground cables. The resistance to building ground shall be 1 ohm maximum.

**Division of Responsibilities**

The following BE and TR equipment will be provided by others.
   - Voice/data and DAS racks and cable managers.
   - Ladder-type cable racks above the voice/data and DAS racks.
   - Uninterruptible power supplies (when required).
   - Telecommunication and DAS equipment, patch panels, cables, splice boxes and terminations.
**Figure 1 - Typical Building Telecommunications Room Riser Diagram**

No Scale