DESIGN GUIDELINE 5.4
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 Emergency Responder Radio Coverage (ERRC) to enable communication between emergency responders at the exterior perimeter of the building and emergency responders within the building.

Related Sections

U-M Design Guideline Technical Sections:
6.0 DG 260513 – Medium, Low and Control Voltage Cables
6.0 DG 260526 – Grounding and Bonding for Electrical
6.0 DG 260533 – Electrical Materials and Methods
6.0 DG 272000 – Voice and Data Communications
6.0 DG 273523 – Emergency Responder Radio Coverage

U-M Master Specification Sections:
7.0 MS 260513 – Medium, Low and Control Voltage Cables
7.0 MS 260526 – Grounding and Bonding for Electrical
7.0 MS 260533 – Electrical Materials and Methods
7.0 MS 272000 – Voice and Data Communications

U-M Standard Details:
9.0 272000 Series - Telecommunications Details

Reference Documents:

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). A BE may also serve as a TR for the voice/data outlets in the nearby area. In addition, the BE may house voice/data racks, switches, routers, patch panels and terminations, an ERRC rack and headend equipment, and electrical equipment of other systems.

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

1. If the rooms will contain safety related systems or equipment, determine whether code requires the rooms to be separated from the remainder of the building by rated fire barriers.

2. Locate the BE within 50 conduit feet of the telecommunication service entrance to the building. If this is not possible, provide galvanized rigid steel conduits from the service entrance to the BE for the outside-plant cables.

3. Locate the TRs to allow for star distribution of cabling. Stack TRs vertically to provide short, direct, vertical paths for riser and network cables. See Standard Detail 27200001.

4. 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 horizontal and vertical cable distance to the farthest voice/data outlet does not exceed 295'.

5. When providing for ERRC, design the BE to house an ERRC rack and headend equipment. Design one TR (two on floors over 25,000 square feet) on every other floor to house ERRC node equipment.

6. Size rooms according to the following rules:
   - Coordinate with ITSComm or MCIT to obtain the quantity and arrangement of voice/data and ERRC 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 27200003 and include it on a drawing. Show the rack outlines on 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 front of wall-mounted equipment.
   - In rooms designed for ERRC equipment, designate a 6' wide by 4' tall section of backboard for ERRC.
   - When a room is not square, the minimum short wall length shall be 8’.
   - Minimum size for the BE shall be 12' x 12'.

- 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.

7. Minimum room height shall be 9’-0”.

8. Leave the rooms open to the decks above. No ceilings are allowed.

9. Cover three 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.

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

11. 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. Double doors shall not have center mullions.

12. 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 normal building power. The voice/data and ERRC equipment can operate at an elevated temperature during a power outage.

3. During project programming, assume an equipment heat load of 6,000 watts per room.
   - In rooms designed to house ERRC 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 chain-hung fluorescent fixtures to achieve a light level of 50 foot-candles minimum at 3 feet above the floor. Feed the lighting with generator-backed emergency lighting circuit when available. Otherwise, provide an emergency lighting battery pack fixture. Provide light switches. Time controls and occupancy sensors shall not be used.

5. Provide conduits and floor sleeves for telecommunication cables per Standard Detail 27200001. Conduits and floor sleeves shall be 4", shall extend into the room 4", shall be sealed water tight, and shall be fire stopped to match the wall construction. When providing for ERRC, provide 2 additional conduits or sleeves between the rooms for ERRC cabling. Provide spare conduits and sleeves for future use.

6. Extend cable trays a minimum of 6" into the room. Specify fire sealing of cable tray penetrations in fire rated walls using intumescent fire sealant bags or brick systems. Fire sealing shall be performed after cable installation.

7. Provide the following electrical power:
   - Dedicated 120 volt, 30 ampere, normal power circuits to NEMA L5-30R receptacles, and dedicated 120 volt, 20 ampere, normal power circuits to power strips on the voice/data racks. See Standard Detail 27200003.
   - If the BE is designed to house an ERRC rack, a dedicated 120 volt, 30 ampere, emergency power circuit to a NEMA L5-30R receptacle and a dedicated 120 volt, 20 ampere, emergency power circuit to a power strip on the ERRC rack. See Standard Detail 27200003.
   - Dedicated 120 volt, 20 ampere, normal power circuits to duplex receptacles 18" AFF and 10' apart on the voice/data plywood backboards.
   - In the BE and TRs designed to house ERRC equipment, two dedicated 120 volt, 20 ampere, emergency power circuits, each to a quad receptacle on the ERRC backboard.
   - One 120 volt, 20 ampere, normal power circuit to a duplex convenience receptacle on the wall near the door.
   - Coordinate all receptacle locations with ITSComm or MCIT.

8. 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 ERRC racks and cable managers.
- Ladder-type cable racks above the voice/data and ERRC racks.
- Uninterruptible power supplies (when required).
- Telecommunication and ERRC equipment, patch panels, cables, splice boxes and terminations.
- Equipment of other systems.