

272000-H: SUPPLEMENTAL VOICE AND DATA COMMUNICATIONS

Related Sections

Basis Guideline: [272000](#) – “Voice and Data Communications”
[260500-H](#) – “Supplemental Common Work Results for Electrical”
[260533-H](#) – “Supplemental Electrical Materials and Methods”
[260913-H](#) – “Electrical Power Monitoring”
[5.4.1](#) – “Requirements for Telecommunication Rooms in UMHC Facilities”
For an explanation of the use of these guidelines, see [“Design Guidelines for UMHC Facilities”](#)

Applicability

The information expressed herein is unique to UMHC owned, operated, and leased facilities, and are intended to supplement the University of Michigan’s Architecture, Engineering, and Construction (UMAEC), design guidelines [16740](#) and [SBA-C](#) (Special Building Area for Telecommunication Rooms). All information presented in the referenced UMAEC guideline applies to UMHC facilities, unless explicitly stated otherwise below. Where differences and/or conflicts exist between the supplemental information noted below, and the information in the UMAEC guideline, this supplementary information shall take precedence.

Provide telecommunications rooms, conduits, cable trays, grounding and accessories as described below and in accordance with the Program Documents for all UMHC facilities.

Supplying ‘Utility’

Telecommunication/Data systems in most UMHC owned and leased buildings are operated and maintained by MCIT (University of Michigan Medical Campus IT). MCIT also has a presence in most UMHC facilities.

MCIT has a close working relationship with AT&T, especially in remote locations. MCIT also has AT&T do much of the wire and fiber work.

System Description

Communication Rooms

1. All Telecommunication Rooms shall be built, sized and placed in compliance with SBA-C-H.
2. The Building Entrance (BE) room is the main termination point in a building for interconnecting cables external to the building with cables internal to the building. The telecommunications and data equipment in this room includes patch panels, terminations, equipment racks, and electronic equipment.
3. Telecommunication Room (TR):
 - a. Distribution and termination rooms shall be located on each floor of a building to serve user outlets typically within 90 cable meters (approximately 300 cable feet).
 - b. Often, more than 1 TR per floor is required depending upon the size of the building or number of outlets per floor.
 - c. Install at least 3-4” raceways to interconnect the TR rooms and the TR rooms to the BE. Affirm exact number of conduits with MCIT, then add at least one more for fire alarm, security, intercom and other like systems, plus at least one additional one as a spare.
 - d. These locations also serve as an equipment room for telecommunications and data equipment, including patch panels, terminations, equipment racks, electronic equipment, intercom systems, nurse call systems, fire alarm and security systems, TV antennas,

etc. Coordinate room layout with all departments supporting equipment to be installed in these rooms.

- e. TR rooms shall be vertically 'stacked' within the building whenever possible.
- f. TR's are to be interconnected to the BE via a network of backbone cables for connection to equipment or locations external to the building.

Wiring for Telecommunications/Data

1. Telephone cabling, installed prior to 1985 was designed primarily to provide common carrier voice service. This cabling was voice grade, having unshielded twisted pair (UTP) wires, but was of limited use for data. Little of this wire remains in use, though some of it may be found abandoned in place in trays and other locations.
2. The cabling installed between 1985 and mid 1993 for telephone data outlets, typically utilized IBM-Type 2 cable. This cable provides 6 pairs of copper conductors, 4 UTP pairs for voice, telephone power, and limited data applications and 2 shielded twisted pairs (STP) for higher level data services. The data pairs are used for local area networks (LANS), wide area networks (WANS) and some point to point applications. Like the above noted cable type, little of this wire remains in use, though some of this type may also be found abandoned in place in trays and other locations.
3. The current standard cable run is composed of 4-pair Category 5E plenum rated cables per outlet.
4. In the near future it appears that Category 6 will become the standard. Confirm whether or not Category 6 will be utilized since minimum raceway sizes may need to be increased.
5. All station wire is home run from the outlet location to the nearest communication room. For transmission integrity reasons, no intermediate splices or terminations are allowed. In case of renovations, this often makes it necessary to modify existing conduit and/or install new computer runs.
6. Fiber is installed extensively, especially between the BE and the TR rooms. In limited applications, fiber is sometimes run to the 'desktop'.
7. Wiring for Nurse Call, Intercom, Fire Alarm, Security, CATV, etc., refer to applicable sections of these guidelines, or follow manufacturers' instructions for unique systems.
8. Provide a riser diagram showing the BE room, all TR rooms, and all interconnecting conduits, trays, and/or other raceways.

General

1. All wiring shall be installed, supported, and removed in full compliance with NEC, particularly Article 800.
2. Abandoned wiring shall be removed as required by NEC 800.154.
3. Telecommunication outlets that are being moved to a new location:
 - a. If the existing cable is long enough to reach the new location (with 12" of slack), then cable may be reused if carefully handled during the move.
 - b. If the existing cable will be too short, it must be removed and replaced – no splices are allowed.
4. Arrange for MCIT to deactivate and disconnect cables, before moving, or removing them.
5. BE and TR room locations and sizes, building service, cable trays and raceways, and main riser raceways must be accommodated, and preferably shown on schematic design drawings.
6. All work in existing communication rooms and cable tray shall be coordinated with MCIT. This coordination allows needed interfaces and/or shutdowns to be arranged, thereby minimizing unexpected disruptions and rework.
7. Equipment installed in communication rooms and on relay racks shall be placed to maximize available space and rack-mount-units for future projects.

Raceways

1. In patient rooms, operating rooms, procedure rooms, and other like rooms, raceways shall be installed from the outlet box to the cable tray in the corridor or to the nearest TR if tray is not present.
2. In non-patient treatment areas:
 - a. Raceway shall be, at minimum, installed from the outlet box, to the space above ceiling (if the ceiling is accessible). In non-accessible ceiling areas, run the raceway to where the ceiling is accessible, the TR room, or to the tray.
 - b. Once above the accessible ceiling, dedicated telecommunications J-Hooks (installed every 5-feet) may be used to run/support the cables to the corridor wall where a sleeve shall be installed (and fire stopped when needed) to allow the cables to pass into the corridor. See 260533-H for other J-Hook system requirements.
 - c. No (above ceiling) cable shall lie directly on the ceiling.
3. All conduits for telecommunication (TC) service outlets are to be sized as noted on the drawings with a minimum size 1" diameter, and a maximum 4" diameter.
 - a. A single TC outlet box shall have one 1" conduit
 - b. Two TC outlets may be served with one 1-1/4" conduit
 - c. Three TC outlets may be served with one 1-1/2" conduit
 - d. For four or more in a wireway of a furniture system, and/or through surface raceway, contact the UMHC assigned electrical engineer.
4. To facilitate later installation of 'Wireless Networking Ports', all wall telephone locations shall have a 2-gang box installed (in the raceway serving the wall outlet box), 6" to 18" above the ceiling. If the ceiling is not accessible, install an access hatch.
5. Conduit fittings are to be used for all outlets on exposed work.
6. Conduit fill shall not exceed 70% of NEC allowed capacity. Risers and trays shall have 30% spare capacity as noted in Section 260500-H.
7. A nylon, braided polyester, or propylene pull cord (100# test) is to be installed in all conduits with a minimum of 12" slack at each end, neatly coiled and labeled.
8. Outlets installed in new walls shall be flush mounted. Exceptions to this would be outlets installed in an electrical, telecommunications, mechanical room, or other like 'utility' spaces. These may be surface mounted.
9. Outlets being installed in an existing wall:
 - a. Flex conduit may be used to feed new outlet boxes in existing walls where standard (stick) conduit cannot be installed. If this is done, two 3/4" flex conduits (to replace the 1" conduit) shall be installed for that new outlet. Do not use the flex raceways to feed more than one outlet in an existing wall installation.
 - b. Above the drop ceiling line (or wherever the flex can first be accessed), install a 4-11/16" square box. Terminate the flex conduits at this box and then continue the raceway using 1" standard conduit. Orient the flex and conduit, at the box, to allow the cables to be pulled straight through the box.
 - i. Support the flex conduit to maintain a radius of the flex at least as large as that required by the NEC. Also, minimize the amount of slack in the flex conduit.
 - ii. When installing outlets in existing walls the preference is to use solid raceways. If this is not possible, then use the flex option. If wall work is needed in any case, use standard conduit.
 - c. Where installing a jack on masonry wall, surface-mounting jack and conduit may be acceptable if allowed in the program statement.

Physiological Monitors

Monitoring system conduits normally are 1-1/4" minimum. Confer with Biomed and electrical engineer for these installations.

Other Communication Applications

1. Low voltage systems shall be in conduits, cable trays or J-Hooks. J-Hooks may only be used as noted above.
2. Communication system raceways (other than telecommunications) shall have a 3/4" minimum conduit, or as requested by the manufacturer of the system being installed.

Communication Room Power and Utilities

1. All Communications Rooms shall be designed and installed in full compliance with SBA-C-H.
2. Electrical contractor is to install, in the communication room, additional dedicated life safety circuits for fire alarm, emergency lights, selected intercoms, and nurse call systems as shown on drawings. Confirm space requirements and power needs of fire alarm amplifiers and supervisory cabinets, nurse call centrals, and intercom centrals.
3. Electrical contractor is to provide and install dedicated 120V 20A normal power circuits for patient TV and broadband cable plant power supplies system as shown on drawings or as required by broad band subcontractor, for proper installation and operation.
4. A quadplex electrical receptacle on dedicated critical power circuit is to be installed on each telephone backboard and cabinet. Mount receptacles 18" AFF.
5. Communication rooms are to be 1-hour fire rated.
6. Adequate, switched emergency lighting is to be installed. Occupancy sensors are preferred.
7. The TR's and BE should be interconnected by 4" sleeves or continuous 4" conduit.
 - a. An adequate number of spare sleeves or conduits should be provided for future use and for Local Area Networks.
 - b. A minimum of 20% growth shall be provided for in riser conduit and power for all MCIT installed equipment and systems.
8. Electrical contractor is to install and provide power and receptacles for 2, or more, 9-foot-high electrical relay racks 19" wide, provided and installed by MCIT.
 - a. Verify voltage and ampere size needed for these. (For SD assumes 208-volt single-phase, 30-ampere, until more specific information is available from MCIT). These are to be on emergency power systems (Critical or Equipment).
 - b. Rack installation is to provide a minimum front and back clearance of three feet. A minimum side clearance of three feet on one side is to be maintained. All necessary clearances for personnel and equipment movement and fire fighting are to be maintained. **Note:** *One side of a rack may be placed, if needed, against the wall.*

Telephone Data Outlet Boxes

1. With new construction, or open wall renovations, the boxes should be 4-11/16" square and at least 2-1/8" deep to accept the 1" and 1-1/4" conduits. The box should have a 2 gang faceplate and/or 2 gang mud ring (if flush mounted in a wall). This size box is adequate to handle all of the outlet configurations.
2. For outlets being installed in existing walls, use two gang, deep, GEM boxes 4"X4"X 3-1/2" deep.
3. The preference is that all outlet boxes should be flush mounted in finished areas. Typically, MCIT provides cover plates for all outlets being activated. Any other boxes should have a two gang blank cover plate installed.
4. Standard telephone/data outlets
 - a. Typically telephone/data outlets will be mounted at 18" or building standard (if different). Each such outlet can accommodate up to two voice circuits and two data circuits.
5. Wall telephones
 - a. Wall telephones will typically have a double gang box with a single gang mud ring. Full capacity raceways will extend from this box at 48", to a standard telephone/data outlet as noted above.
 - b. The only exceptions to this will be wall telephones in corridors, or other public spaces. Typically, these exceptions will be help, house, pay, or security related applications. In those locations only the box at 48" is required.
6. Layouts

- a. Boxes are to be recessed in a neat and symmetrical arrangement.
7. Covers
 - a. Covers are to be stainless steel. Add a blank cover plate for inactive future use boxes.
8. Rework of existing outlet boxes
 - a. Up through 1994 many of the standard telephone/data outlets had single gang mud rings. When adding new outlets to existing walls, look first at retrofitting an existing adjacent outlet from one gang to two-gang. If this is done raceway work is reduced, and some wiring costs may be saved. In general, do not make this conversion on a wholesale basis.
9. Other Communication System's outlet boxes
 - a. Outlet boxes for other communication systems shall be sized similar to those of telephone/data outlets unless otherwise required by the manufacturer of the system. Coordinate size of face plate and mud ring with manufacturer.
10. Refer to drawings for symbols, outlet locations, outlet dimensions, mounting heights and contractor's responsibility for cabling and equipping outlets. All outlets which are the contractor's responsibility for conduit only are to include labeled pull cords as noted below. Where surface mounted raceways must be used, they are to be similar in regards to cross section, strength, painting, and ease of installation and modification.

Power Poles and Modular Open Plan Furniture

1. Open plan furniture is to have telecommunications cabling and electrical power made available at all workstation locations.
2. A minimum bend radius of 6" is to be achievable for each cable to each workstation in each raceway.
3. EMT conduit sized to serve all workstations for a power pole is to extend from the tray to a ceiling mounted or well supported 6" x 6" junction box in the vicinity of the proposed power pole location and one or more six foot tails of Greenfield flexible conduit size for all workstations served and terminated to the junction box is to be provided by the contractor for connection to the power pole. Typically, the run from the boxes to the proposed power pole locations should be planned for 4 feet or less. The 6-foot length then allows needed flexibility for minor adjustments in final furniture placements.
4. In cases where modular furniture is designed with partitions placed full width flush with walls, care is to be taken to avoid placing communications outlets behind such partitions in inaccessible, or difficult to access locations.
5. Final wiring from the junction box to the modular furniture is to be UMTel's for telephone system wiring, and the responsibility of the Contractor for all other communications and power wiring.

Labeling

All conduits, outlets, pull cords, and cables are to be labeled as follows:

Outlet Labeling

1. All labels are to be permanent. The label is to be visible when the final face plate and trim are installed.
2. The label is to consist of the following. Coordinate naming with MCIT before proceeding:
 - a. The room number of the room in which the device outlet is installed
 - b. The compass direction of the wall on which the outlet is installed
3. To determine the outlet number, face the wall and count outlets proceeding from left to right.

Conduit Labels

1. Riser conduits are to be labeled with a distinctive riser designation, a unique riser conduit number, and the room number from which the riser originated (typically the service entrance location). Riser conduits are to be labeled in all communications closets both at the point of entry, and the point of exit.

2. Conduits from outlets are to be marked with the outlet location at the cable tray and at least once in every twenty feet of conduit.

Pull Cord Labels

1. Each pull cord is to be labeled at the cable tray end with the outlet label of the outlet to which the cord is pulled, and the approximate length of the pull cord.
2. Pull cords are to be neatly labeled with indelible pen on plastic markable label tags attached securely to the pull cord.

Cabling Labeling

Cables are to be labeled at each end, in such a way that the marking will not be disturbed through the splicing and termination process. They are to be labeled where they enter or exit the cable tray system from the conduit system. They are to be labeled at each pull box. Cable labels are to consist of a two-character system code followed by a one-digit system number, followed by a five-digit cable number. The two-character code is to be as follows:

NC	Nurse Call
IC	Intercom
OS	Overhead sound, background music
PTCS	Broadband cabling for Patient TV antenna systems
TV	Video and television coax cable
FA	Fire Alarm cabling
SE	Security cabling
CL	Clock system cables
SG	Other signal cables, e.g., physiological monitoring

Note: MCIT will identify their own cables.