

# Telecommunications

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in design guideline and in conjunction with the manufacturer requirements and use the most stringent standard.

## A. General

1. Voice and Data telecommunications for campus are provided by the Office of Information Technology (OIT) located in Gordon Palmer Hall.
2. All designs for telecommunication additions or changes should be coordinated and reviewed by OIT.
3. The requirements below are general in nature and may be changed for a particular design, depending on the needs. All deviations must be approved by OIT.
4. Basic requirements for all new building structures will include underground service entrance ducts, Telecommunication Rooms (TRs), a conduit riser system between TRs, and a horizontal cable distribution system.
5. All telecommunication and data cables (fiber and copper) to all buildings will normally be installed by OIT, but in rare instances, may be specified for installation by a contractor in accordance with OIT specifications.
6. Telecommunications and networking electronic equipment will normally be provided (purchased and installed) by OIT but, in rare instances, may be specified for installation by a contractor in accordance with OIT specifications.

## B. Design and Construction Drawings

All design and construction drawings will have a communications riser diagram which illustrates all components of the building communications distribution system. Appropriate notes will be provided to describe the size of conduit and other special instructions to the contractor. In addition, electrical drawings for each floor will illustrate components of the floor distribution system and communications outlet locations. The information showing data and telecommunications outlet locations shall be on a separate AutoCAD "layer" from all other electrical. Additionally, it is strongly desired that an AutoCAD attribute be utilized to indicate the number of voice and data connections needed at each location. The attribute will facilitate counting of these connections by OIT staff. **OIT cannot begin wiring or provide accurate estimates without accurate drawings.** Drawings must be received in a timely manner.

## C. Outside Plant System

1. **Underground Conduit Banks:** The campus outside plant distribution system is an underground system consisting of conduit duct banks and concrete manholes.
  - a. Extensions of duct banks should include a minimum of four 4" PVC schedule 40 conduits.

- b. Duct banks should have concrete reinforcement with red die and require a minimum of 30" ground cover. If 30" depth cannot be met, OIT will work with the contractor to determine acceptable alternatives.
2. **Manholes:** The interior dimensions for a standard manhole are 6' long, 6' wide and 8' high. Manhole covers should be 30" iron, rated for traffic duty, and stamped with "TELEPHONE" on top. Manholes must include racks for cable, grounding buss bar, sump drain, and expansion plugs installed in non-used conduits. Telecommunications will require lockable manhole covers (confirm model/part during design). Specifications will be available upon request. Grounding and Bonding shall conform to NEC Article 250 and TIA/EIA-607 using a minimum conductor size of 6 AWG.
  - a. In some locations, a pull box will be an acceptable alternative to a manhole. In such cases, OIT would specify a Hubbell Quazite open bottom box with dimensions 36x60x36 deep (see Hubbell PN: PG3660BA36). An extra heavy duty lid (Hubbell PN: PG3660HHDO) with counter bore design that allows for the installation of LockDown LockOut handhole security devices and labeled "Communications" should be provided
3. **Building Entrance:** There will be two separate conduit entrances for communications into a building. There will be a minimum of two 4: diameter conduits for each of the entrance conduit runs. Conduit runs shall be comprised of schedule 40 PVC. Factory-made sweeps for turns shall be used with 36" to 48" radius. Typically, no more than two 90 degree bends between the manhole and the building will be permitted.
  - a. Each conduit shall be left clean and dry and also left with Jetline or similar pull line securely tied off at each end.
  - b. The project architect or electrical engineer is responsible for establishing with OIT representatives the location to which the conduit will be placed for connection to the OIT Manhole System.
  - c. Conduit shall be encased in concrete with red die and require a minimum of 30" of ground cover.
  - d. Conduits entering buildings shall enter on the ground level and have either a small, dedicated closet to serve as a fiber entrance, or a suitably sized pull box. Conduits should extend from this location to the nearest data closet.
  - e. Existing building renovations may not require the construction of a new Telecommunications duct bank.

## D. Building Service

1. **Number:** A building will have a minimum of one Telecommunications Room for housing voice and data communications equipment. This TR should measure approximately 120 ft<sup>2</sup> and be rectangular in shape. No dimension of this room should be less than 8'. Large buildings may require additional data closets and/or extra square footage.
2. **Placement:** Network wiring is limited to 90 meters from the wall outlet to the network switch. Therefore, Telecommunications Rooms must be no further than 90 meters, via the wiring route, from the most distant wall outlet served by that TR.
3. **Dedicated Space:** The only equipment permitted in the TR will be network, telephone, action card, digital signage, emergency PA, and access control equipment and wiring. No other building services shall share the space. Any other equipment installed in the Telecommunications Room must be approved by OIT.



4. **HVAC:** Telecommunication room HVAC shall be available on a 24 hours-per-day, 365 days-per-year basis. A stand-alone unit should be considered for TRs. The system shall be operable regardless of outdoor temperature and controlled independently of other parts of the building. A hard-wired thermostat should be located in the TR. If a standby power source is available in the building, consideration should be given to also connecting the HVAC system serving the Telecommunications Rooms to the standby supply. The temperature and humidity shall be controlled to provide continuous operating ranges of 18 °C (64 °F) to 24 °C (75 °F) with 30% to 55% relative humidity. The ambient temperature and humidity shall be measured at a distance of 1.5 m (5 ft) above the floor level, after the equipment is in operation, at any point along an equipment aisle centerline. For initial programming assume an equipment heat load per room of 12000 BTU per hour. Confirm projected heat loads during design phase; some rooms may have a much higher heat load.
5. **Backboard:** Provide a ¾ inch plywood backboard on all walls. The backboard must be painted gray with fire retardant paint designed for such purposes. Alternatively, fire rated plywood with regular paint may be used; in this case, at least one fire retardant stamp shall be left exposed on each sheet of plywood. The backboard should start 12” above the floor and be 8’ high and cover the perimeter of the room.
6. **Electrical:** Provide a single-circuit plug-mold for each wall, mounted 18” AFF and running the full length of the backboard, with outlets 12” on center for powering equipment. Circuit draw will be less than 20 A.
  - a. For initial programming, assume three NEMA 5-20 outlets and three NEMA L5-30 outlets in addition to the plug-mold listed above. These circuits should be powered from a power system that has stand-by power capability, if it is available in the building. Each of these outlets should be on a dedicated circuit. Confirm final power requirements with OIT during design phase.
  - b. Install a contiguous intra-building grounding and bonding system, in compliance with NEC Article 250 and TIA/EIA-607, using a minimum conductor size of 6 AWG to be located on one plywood backboard with ground bus bar as directed.
7. **Flooring:** The Telecommunications Room must have a hard floor (e.g., concrete or tile). Carpeting is not acceptable. A sealed concrete floor is the standard. Alternates must be approved by OIT.
8. **Ceiling:** The ceiling in the TR will be open (no false/suspended ceilings) so that there is easy access to the conduit, raceways, cables, etc. entering the TR.
9. **Lighting:** Lighting shall be a minimum of 50 foot candles, measured three (3) feet off of the floor, with non-EMI generating lights on a separate switch inside the TR. Coordinate the placement of fixtures with room layouts supplied by OIT for each project. Temporary lighting may be required during the project.
10. **Smoke Detector:** The TR must have a smoke detector.
11. **Water:** Designs should not include water sources (with exception of sprinklers required by code) near the Telecommunication Room, particularly in the ceiling area above the TR. In cases where this cannot be avoided, an acceptable preventative system (e.g., drip pan, rubber membrane) must be approved by OIT.
12. **Key:** The Telecommunications Room door must be keyed with a DC Key and a card reader. The door should be equipped with an electric strike. Before equipment is installed in the TR, a lockable door must be installed. A temporary door may be used until a permanent door arrives. OIT must be given keys for access.



13. **Wall Outlets:** The Contractor is to provide voice and data communications outlet boxes at locations shown on the project drawings. For voice and data connections totaling less than four, a double-gang box with a single-gang plaster ring should be used. For voice and data connections greater than four in a single box, a triple-gang box with a double-gang plaster ring should be installed. From each outlet box a 1" conduit should be run to above an accessible ceiling area or cable tray. For outlet boxes terminating more than four connections, two 1' conduits should be used. Blank box covers should be installed on boxes not to be immediately used. Conduits must have bushings installed at both ends. UA Telecommunications will provide wiring, network outlet covers, and wiring terminations.
14. **Floor Boxes:** All floor boxes installed should be capable of supporting data, AV, and electrical in the same box. Floor box requirements should be carefully reviewed with OIT networking and AV solutions during the design phase.
15. **Wiring Trays:** The building should be designed with a cable-tray system in the hallways to be provided by the contractor. Appropriately sized conduit paths should be provided across area with hard ceilings and within risers.

Conduit pathways built for telecommunication cabling have more stringent bending and pull box requirements than electrical cabling. These conduit pathway requirements must be adhered to (i.e. a telecommunications conduit can have no more than 180 degrees of cumulative bends between pull points whereas a conduit installed for electrical wiring may have 360 degrees of cumulative bends between pull points).

16. **Wireless outlet needs:** OIT will provide locations for wireless access point outlets upon receipt of 60% drawings. These requirements will need to be incorporated into the final design and listed on the communications layer as described above. Wireless locations will be designated on drawings with an OIT provided symbol.

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