Computer Services & Telecommunications

Telecommunications Design Standards

Revision 10.1 May 2014

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UCF Computer Services & Telecommunications (UCF CS&T) Design Guidelines:

These Guidelines are for assisting the Architect / Engineer / Construction Manager Design Team (A/E/CM) in designing this project to UCF and Telecom Industry Standards.

1   **GENERAL**

1.1   All telecommunications requirements related to the project are to be included as part of the overall budget for the project. Some elements of the telecommunications system required by the project occurring off the building site may be provided for in the "infrastructure" portion of the project funds. The A/E/CM must verify the specific project situation in this regard. Additionally the A/E/CM must remain aware of the constantly changing technology of telecommunications and its impact on the overall construction budget.

1.2   At the completion of the project construction, all telecommunications systems shall be operational. During the design of the systems it will be necessary for the A/E/CM to interface with: UCF CS&T, and UCF Office of Instructional Resources (OIR) for specific requirements for the project.

1.3   The information in these UCF CS&T Telecom Design Guidelines is to be considered as the minimum requirement. However, quantities and sizes of items can change during the project design, according to the project's impact and needs.

1.4   Definitions:

1.4.1   Provide: Furnish, install, and test complete and ready for intended use.

1.4.2   Furnish: Supply and deliver to the project site, ready for subsequent requirements.

1.4.3   Install: Operations at the project site including: unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, protecting, cleaning, testing complete and ready for intended use, plus similar requirements.

1.4.4   OFOI: Owner Furnished Owner Installed: Equipment / materials furnished by, and installed by the Owner.

1.5   Codes and Standards:

1.5.1   All Telecom installation tasks shall be performed in accordance with the most recent issue of the following Codes and Standards, in addition to these UCF CS&T Telecom Design Guidelines. Where there is a perceived conflict between a Standard or Guideline, the A/E/CM and Subcontractors shall follow chain of command protocol to get the perceived conflict resolved with the UCF CS&T Project Manager (UCF CS&T PM).

1.5.1.1 NFPA-70.

1.5.1.2 NEC Current Edition.

1.5.1.3 ANSI/TIA/EIA-568-C.1 Commercial Building Telecommunications Cabling Standard.

1.5.1.4 ANSI/TIA/EIA-569-B Commercial Building Standard for Telecommunications Pathways

and Spaces.

1.5.1.5 ANSI/TIA/EIA-606-A Administration Standard for the Telecommunications
Infrastructure of Commercial Buildings.

1.5.1.6 ANSI/J-STD-607 Commercial Building Grounding and Bonding Requirements for
Telecommunications.

1.5.1.7 BICSI Telecommunications Distribution Methods Manual (TDMM) current Edition.

2   INFRASTRUCTURE REQUIREMENTS

2.1   The A/E/CM shall conduct an in depth survey and site verification to determine the
availability of existing telecommunications infrastructure and its adequacy to serve the
needs of the new facility. The results are to be reviewed with the UCF CS&T PM. New or
additional telecommunications infrastructure shall be engineered and installed if not
enough exists to adequately serve the new project. UCF CS&T will be actively participating
in new project designs.

2.2   Conduit Duct Banks:

2.2.1   The project's Main Distribution Frame (MDF) telecom room shall be connected to the
closest Maintenance Hole (MH) for interconnection with the campus
telecommunications conduit infrastructure, via a minimum two (2) Schedule 40 PVC
conduits four inches in diameter, encased in concrete. Where the duct bank is to be
placed under the new building's slabs on grade only, there is no need to encase that
portion of the duct bank in concrete, except at radius and sweep points.

2.2.2   New duct banks interconnecting MHs shall contain an appropriate number of conduits.
A minimum of four (4) Schedule 40 PVC conduits four inches in diameter, encased in
concrete, are required to accommodate future campus growth.

2.2.3   Duct bank Construction: 3,000 psi concrete shall fully encase the bank of conduits. Utilize
the Carlon brand (or equal) #S288NJN plastic base spacer and #S289NJN plastic
intermediate spacer system, which provides for 2 inches of concrete between the
conduits. Dig the trench, form as needed, and pour the concrete so there are 3 inches of
concrete below, on the sides, and above the bank of conduits.

2.2.4   Where duct banks tie into MHs, install a minimum of four #5 rebars to prevent shearing.
Holes shall be drilled into the MHs to a depth of half that of the wall thickness. The
rebars shall be epoxied into the holes and extend at least 3 feet 6 inches into the duct
bank encasement. Where new conduits tie into MHs other than by cast in place duct
terminators, mortar around conduits in side of the MHs, and brush finish the mortar.

2.2.5   Where one duct bank concrete pour ends then is scheduled to continue another day,
install a minimum of four #5 rebars into the end of the wet concrete, so that at least 24
inches of rebar is in the concrete, and 24 inches of rebar is out of the concrete to prevent
shearing. Before continuing with another pour, clean out all dirt from around and under
the ends of the conduits and rebar protruding from the earlier pour.

2.2.6   Duct banks shall have a minimum of 36" ground cover with buried "cable tape" placed
12 inches above the encasement, and above non encased duct banks under slabs on
grade. The buried cable tape shall be 6-inches wide, orange in color, and with
permanent print reading "CAUTION TELEPHONE CABLE BURIED BELOW." The tape
shall posses a high tensile strength, and a minimum elongation factor of 600%. Reef
Industries brand: #540 "Extra Stretch Terra Tape" buried cable tape shall be used. Any
deviations of these depths shall be coordinated with the UCF CS&T PM, since other
utilities might be affected.

2.2.7   Where the 4 inch conduits turn up through the building slab, manufactured rigid metal sweeps with a minimum 48-inch radius, shall be installed. As the conduits rise up through the building's slab and enter the telecom rooms, rigid metal nipples shall be installed as needed, spaced 4-inches off of finished walls, and spaced a minimum of 4 inches apart. The conduits shall also have plastic bushings on their telecom room end.

2.2.8   Conduit testing: Test all conduit runs containing new conduit installed end to end: between MHs, buildings, and stub out points. Testing is to be done by pulling a combination mandrel / stiff spine brush through each conduit. The mandrel / brush unit is available for loan out by UCF CS&T. In cases where the mandrel / brush unit becomes lodged in conduit, it shall be the Contractor's responsibility to recover the mandrel / brush unit and repair any conduit and duct bank problems at no additional cost to UCF. If the mandrel / brush unit becomes damaged, it shall be the Contractor's responsibility to repair / replace any damaged component of the mandrel / brush unit at no cost to UCF.

2.2.9   Conduit measurements and pull lines: Install one minimum 1,250 pound strength detectable pull / measuring tape in one of the new 4 inch conduits in the new conduit duct banks. Provide the new duct bank's point-to-point measurements to the UCF CS&T PM. Example: Existing MH 200 to new MH 201, New MH 201 to new MH 202, new MH 202 to new building's MDF. Install one minimum 200 pound strength jet line in each of the other new 4 inch conduits in the new duct banks. Leave enough slack to reach five feet out of the MH then tie off the detectable pull / measuring tapes to the MH's interior pulling eyes for future access by electronic locating devices. If the detectable pull / measuring tape and the jet lines are placed into conduits entering a telecom room, tie the lines to a secure object in the telecom room.

2.3   <u>Maintenance Holes (MHs):</u> MHs and conduits support a building's energy management system, fire alarm system, telephones, video, and computer operations.

2.3.1   MHs shall be constructed of pre cast concrete. Typical sizes used at UCF are:
         4' x 4' square with 4 feet of headroom
         5' x 5' square with 4 feet of headroom
         6' x 6' square with 4 feet of headroom

2.3.2   MHs shall have a minimum of one 6-inch by 42-inch diameter pre cast concrete grade ring installed around the 42-inch diameter roof access. The cast iron covers: U.S. Foundry #651 ring with #CI-SSG cover shall have the word "COMMUNICATIONS" cast into it, and be equipped with pick bars to facilitate removal.

2.3.3   MH installation: Install a minimum of 12 inches of #57 or equivalent rock in de-watered or dry MH pits. When working inside of MHs in UCF's campuses, OSHA Regulation #1910.268 "Telecommunications" shall be followed. A minimum size #6 bare copper (solid or stranded) conductor shall be installed as the MH is installed. That conductor, as one piece, is to be a minimum 20 foot coil tossed outside of the MH, and a minimum 48 inch coil inside of the MH. This conductor is to be installed as follows:

2.3.3.1   Two piece MH: Run the conductor across the bottom half's joint before the top half of the MH is set on top of the bottom half of the MH.

2.3.3.2   One piece MH: Drill a hole just large enough for the conductor to pass through, at a point half way up an inside wall of the MH, then insert the conductor through the hole. Seal the hole with mortar on the inside and outside of the MH.

2.4   Outside Plant Copper Telephone Cable Facilities:

2.4.1   Appropriately sized (pair count) 24 AWG PE-89 DB or Bell Spec. 24 AWG ANNA type outside plant copper telephone cable shall be installed between the closest existing copper distribution point having the cable pairs available to serve the new project. This installation shall also include splicing, plus standard telecom cable racking installed in MHs as needed, in order to adequately support cables and splices.

2.4.2   Splices in MHs and cable vaults shall be composed of "Preformed" brand, stainless steel encapsulatable splice enclosures, and 3M brand, #4000 DPM type MS Square dry pluggable mini-splice modules. The splice enclosures shall be totally encapsulated when all splicing and cable pair testing is complete.

2.4.3   Building entrance protection for outside plant copper telephone cables entering building MDFs shall be composed of Circa brand 188 style building entrance protector units, equipped with a 110 wiring fields in and out for single 6, 12, 25, 50, 100, and 200 pair outside plant copper telephone cable entrance facilities. Use 188 style building entrance protector units equipped with 100 pair tip cables in and 110 wiring fields out for any 300 pair and above, outside plant copper telephone cable entrance facilities.

2.4.4   Building entrance protector units shall be equipped with CommScope brand: #4C1S balanced, or Circa brand: #C4B1S-BAL balanced solid state lightning protection modules.

2.4.5   Provide one (1) minimum 200 pound strength jet line in all 1 inch innerducts (when installed) which are found not to contain a pull tape or pull line.

2.4.6   Provide Tyco Electronics brand, #29812-000 type JM-BLA-10D104U innerduct plugs in each end of the new 1 inch innerducts. Tie the pull line to the back of the innerduct plugs.

2.4.6.1   Make an approximately 3 inch long slit in each end of the 1 ¼ inch innerducts, slide the pull line into the slit, wrap the pull line around the outside of the innerduct, then tape up each end of the innerducts and the exterior wrapped pull line with duct tape.

2.5   Outside Plant Fiber Optic Cable Facilities: (Reserved for future use)

2.5.1   Install the fiber optic cable as one continuous cable run, not containing any splices. Provide 10 foot service loops of the cable in certain MHs as directed by the UCF CS&T PM, and on each end of the cable run.

2.5.2   The outside plant fiber optic cabling installation shall also include standard telecom cable racking in MHs, equipment racks.

2.5.2.1   The fiber distribution centers shall be installed into a floor mounted equipment rack.

2.6   Cable TV Coaxial Cable: At the present time Bright House Networks (BHN) has a contract to provide cable TV service to the campus. BHN installs its own outside plant coaxial cable and equipment into the new project's MDF, via telecom duct banks.

3   REQUIREMENTS INSIDE BUILDINGS

3.1   Classrooms, conference rooms, offices, and labs require connections for telephone and data, plus CATV as needed.

3.2   The preferred method of transporting tele/data/TV cabling between the tele/data/TV outlet boxes and the telecom rooms is through home run conduits run in walls then above ceilings.

3.3   Outlet Raceways: Each tele/data/TV outlet shall be served by one 4-inch by 4-inch steel outlet box equipped with a single gang mud ring. Install one 1-inch metallic conduit in home-run fashion to the nearest telecom room.

3.3.1   For large quantities of outlets in parts of the new building, the 1-inch conduits may be run to cable trays. The cable trays shall then lead to the nearest telecom room. The ends of the 1-inch metallic conduit terminating at the cable trays, shall have insulating bushings installed on them (Example: Arlington brand, 1" bushing, #EMT100). Each office, classroom, and other designated rooms in the new building shall contain a minimum of two tele/data outlets. Additional outlet requirements shall be determined by room size and space utilization.

3.3.2   Except for conduits to serve tele/data floor outlet boxes in slabs on grade, all other conduit runs from outlet boxes in walls on ground floors should run up the walls, and above ceilings to the closest telecom room.

3.4   Cable Tray and Raceway System: Overhead cable tray systems for data transmission audio/visual, telephone wiring and conduit shall be provided as a telecommunication distribution system throughout the facility. That tray system shall be an open steel mesh, also know as a wire basket tray system designed for ease of access. The cable tray system shall be "UL Classified" as suitable for use as an electrical conductor for grounding and bonding. Where practical, provide home run conduits from outlets to frame rooms, as a primary choice of raceway.

3.4.1   Cable tray brands approved by UCF CS&T for installation are: Snake Tray, Cablofil brand "EZ Tray", Cooper B-Line brand, and T. J. Cope brand "Cat-Tray" cable tray.

3.5   "J" Hooks and Cable Slings: "J" Hooks and cable Slings are to be Category 5E Compliant, for transporting tele/data/TV cabling. These devices shall be spaced 4 to 5 feet apart, and securely fastened or hung from building structure components. Follow Manufacturer's cable loading limits Guidelines when choosing which J Hooks or slings to use, and how to hang them.

3.6   Riser Cabling: Appropriately sized Plenum rated (CMP) (Note: furnish outside plant flooded cabling for under slab on grade conduit routes) copper and fiber optic cabling shall be installed, connecting the MDF and IDFs together in order to establish a complete structured cabling system.

3.6.1   Copper voice riser cabling: Connect the MDF to each individual IDF, with minimum 25 pair 24 AWG (unless otherwise noted) voice grade, Plenum rated (CMP) cabling (outside plant flooded cabling for under slab on grade) in home run fashion. No daisy chaining of cabling between telecom rooms.

3.6.1.1   Copper voice riser cable pairs allocated to the MDF and IDFs shall be terminated in the MDF on an appropriate sized 110 wiring block, with 110C-5 connecting blocks. Provide the 110 wiring block 6 ½ inches to the right of any OFOI building entrance protector (BEP) units, which are equipped with 110 fields in & out. Insure that the top of the 110 wiring block lines up with the top of the BEP's 110 field, which is typically at 72 inches in height.

3.6.1.2   The other end of each copper voice riser cable shall be terminated in a 24 port patch panel in the MDF and in each IDF. Leave the cable's 25th pair un-terminated and coiled up behind the patch panel.

3.6.2   Cross Connect Jumper Management on Plywood Backboards: In the MDF, provide Allentel brand, #GB13B metal 4 inch closed distribution rings (D Rings) oriented horizontally between building entrance protectors and the voice riser cabling 110 block, for OFOI cross connect jumpers. The 4 inch D Rings require 6 1/2 inches of space between protectors and the 110 wiring block. The Telecom Subcontractor shall coordinate the D rings' exact route and locations with the UCF CS&T PM.

3.6.3   Fiber optic riser cabling: Connect the MDF to each individual IDF with minimum (unless otherwise noted) 24 strand single mode fiber optic cabling (outside plant dry blocked cabling for under slab on grade) in home run fashion. No daisy chaining of cabling. Server Rooms can be fed from the MDF or closest IDF, unless otherwise noted.

3.6.3.1   Fiber optic cabling will be terminated in fiber distribution centers mounted in floor equipment racks.

3.6.4   CATV riser cabling: The CATV riser system will be designed and installed by UCF CS&T utilizing Belden cable. Please furnish a 4 inch conduit sleeve pathway, plus space in cable trays, for the CATV riser system.

3.7   Telecom Rooms: Telecom rooms shall be of a minimum square footage of 100 square feet in size, and shall have both an HVAC supply and return vent.

3.7.1   HVAC: Absolutely no HVAC equipment or any associated chilled water, refrigerant, or condensate water piping is to be installed in Telecom Rooms. HVAC equipment and piping to serve Telecom Rooms shall be installed elsewhere.

3.7.1.1   Telecom Rooms used as MDFs, typically contain UCF provided network electronics generating at least 30,000 BTUs per hour of heat load, and are to be cooled at a constant 68 degrees Fahrenheit.

3.7.1.2   Telecom Rooms used as IDFs, typically contain UCF provided network electronics generating at least 15,000 BTUs per hour of heat load, and are to be cooled at a constant 72 degrees Fahrenheit.

3.7.2   Electrical: Each wall of each Telecom Room shall have a minimum of one dedicated quad 120 Volt AC, 20 Amp L5-20R electrical receptacle fed by emergency generator power. The A/E/CM and the Electrical Subcontractor shall coordinate with UCF CS&T PM, on the exact locations of those receptacles in the Telecom Rooms.

3.7.2.1   Each Telecom Room shall have a minimum of: Two dedicated L630R electrical receptacles served by commercial power, and two dedicated L1430R electrical receptacles served by emergency generator power. Those receptacles are typically installed on the wall behind Telecom equipment racks. The A/E/CM and the Electrical Subcontractor shall coordinate with UCF CS&T PM, on the exact locations of those receptacles in the Telecom Rooms. All electrical lights, electrical receptacles, card access systems, and HVAC units serving all Telecom Rooms, shall be supplied via emergency generator power during commercial power outages.

3.7.3 <u>Telecom Terminal Back Boards:</u> Telephone terminal backboards shall consist of 3/4" BC plywood. All surfaces of the plywood, including cut outs for electrical devices, shall be painted with fire retardant paint, electrical gray in color, before the plywood is attached to walls. Attach the painted plywood backboards so their "good" side (B side) is showing into the telecom rooms.

3.7.4 <u>All Equipment Racks:</u> Will be Hoffman or CPI brand unless otherwise specified by the UCF PM

3.7.4.1 Equipment Rack Base Isolation: Rack Base Insulator Kit will be installed under each equipment rack.

3.7.4.2 <u>Vertical Cable Management for Equipment Racks:</u> Six inch vertical cable management will be used for all standard installations. Three inch managers can be used if space is limited.

3.7.4.3 <u>Horizontal Cable Management for Equipment Racks</u>: A minimum of one U horizontal cable managers will be used between patch/jack panels and one/two U network switches.

3.7.4.4 Floor mounted equipment racks shall be secured at their top, with horizontal ladder racking to prevent swaying of the equipment racks.

3.7.5 <u>Additional Items for Equipment Racks Containing Category 5E Patch Panels:</u> If the projects includes voice specific circuits to be mounted in the equipment racks, the voice patch panel will be installed at the top of the equipment rack.

3.7.5.1 <u>Horizontal Cable Management of OFOI Cross Connect cables:</u> Utilize one Hubbell brand, #HC119MS3N Basic Panel, 1.75 inches high by 3.5 inches deep, or similar 1U manager below installed patch/jack panels.

3.7.5.2 Utilize Hubbell brand forty eight port Category 5E Compliant patch or jack panel, for terminating all 4 pair 24 AWG Category 5E station cables terminating in the particular MFD / IDF. Provide one of the following between each 48 port Category 5E Patch Panel, plus below the bottom most patch panel: Hubbell brand Basic Panel, 1.75 inches high by 3.5 inches deep or similar 1U manager. That Basic Panel is for horizontal management of OFOI Category 5E cross connect patch cords.

3.7.6 <u>Additional Items for Equipment Racks containing OFOI Network Electronics:</u> Provide one Leviton brand, #550-192, or Hubbell brand, #PR10120 flush mount horizontal power strip, equipped with NEMA 5-20R electrical receptacles. Provide the power strip on the equipment rack which will contain owner furnished owner installed network electronics. Mount the unit six Rack Units above the top of the rack's foot plates.

3.8 <u>Telecommunications Grounding and Bonding:</u> The ANSI /EIA / TIA - 607: "Commercial Building Grounding and Bonding Requirements for Telecommunications" Industry Standard shall be followed when designing and constructing UCF building projects.

3.8.1 The Project's MEP's Registered Communications Distribution Designer (RCDD) and Electrical Engineer shall collaborate on the design of the project's Telecommunications Bonding Backbone design.

3.8.2 Minimum sized grounding busbars for use as the Telecommunications Main Grounding Busbar (TMGB) in MDFs, are CPI brand, #40153-012 and #40153-020 or similar, depending on the building's Telecommunications Bonding Backbone (TBB) design, such as amount of upper floors, amount of IDFs, plus amount of items to be bonded to ground in the IDF

3.8.3   Minimum sized grounding busbars for use as the Telecommunications Grounding Busbar (TGB) in IDFs are CPI brand, #13622-010 and 13622-012 or similar, depending on the amount of items to be bonded to ground in the particular IDFs.

3.8.4   Minimum sized grounding busbars for use as intermediate TGBs in IDF Rooms, are CPI brand, #13622-010 and 13622-012 or similar, depending on the amount of items to be bonded to ground in the particular IDF which is beyond the Industry Standard 13 feet of #6 AWG conductor length away from the room's primary TGB.

3.8.5   Two hole compression type connectors shall be installed on the ends of all grounding and bonding conductors being connected to TMGBs, TGBs, and intermediate TGBs.

3.8.6   Busbars shall be cleaned prior to fastening the conductors to the busbars, and an anti-oxidant shall be applied to the contact area, to control corrosion and reduce contact resistance.

3.8.7   The following items shall be bonded to the Project's TBB via the TMGB and TGBs: Building entrance protectors for outside plant (OSP) copper telephone cabling facilities, OSP copper cables, equipment racks, ladder racks, cable trays, metallic conduits for outside plant / riser / structured cabling, metallic raised computer floor components, and network electronic equipment cases.

3.9   CATV System: Bright House Networks (BHN) will serve the Project via their existing underground outside plant coax distribution system, via coax cable to be installed through 4" building entrance conduits into the MDF of UCF buildings as needed. BHN demarks in the Project's MDF with a tap, plus an amplifier as needed, then stops.

3.9.1   UCF CS&T will design and install a CATV riser system for the Project.

3.9.2   The A/E/CM shall install the horizontal RG-6 CATV cabling and F Connector outlet system between the Telecom rooms and the CATV outlet locations utilizing Belden cable and connectors.

3.9.3   The RG-6 cable standard for the University is Belden RG-6 Plenum rated cable, part number: 9116P 8771000. Utilize Belden connector: DB6PL2 ("Double Bubble" compression style) F-connector.

3.10   Horizontal Telecom Cabling System: The Telecom system structured cabling shall be an ANSI / TIA / EIA–568–B compliant system using Plenum Rated (CMP) Category 5E cable with a yellow colored jacket, plus Hubbell brand T568-B type RJ-45 jacks and associated Telecom outlet components. The cabling system shall be provided in compliance with UCF CS&T Design Guidelines and Telecommunications Industry Standards, and shall be able to handle 100 Base-T and 1000 Base-T+ Ethernet technology, for the transport of 1 Gbps Ethernet to the desktop.

3.10.1 The only indoor 4 pair 24 AWG Category 5E Plenum rated (CMP) yellow jacketed structured cabling to be used on UCF projects, is:

3.10.1.1 Mohawk Wire & Cable brand, MegaLAN, #M56093.

3.10.2 Gel filled cable is to be used for all structured cabling installations in conduits under slab on grade. Provide Mohawk brand, #M58762 VersaLAN 4 pair 24 AWG UTP Category 5E indoor / outdoor flooded cable, UL Listed as passing the UL 1581 Vertical Tray Flame Test, and emits Limited Smoke per UL 1685. By using this cable, no transition point from flooded cable to conventional UTP cable is needed.

3.10.3 Telecom Designer, Contractor / Installer Certifications:

3.10.3.1 The Telecom Subcontractor and their Technicians installing Structured Cabling shall be Factory Trained and Factory Certified by Hubbell, Inc. to install structured cabling in compliance with Hubbell's 25 Year Mission Critical Warranty.

3.10.3.2 The Telecom Subcontractor shall furnish UCF with a copy of the BICSI RCDD Certification of their technician on staff.

3.10.3.3 The Telecom Subcontractor shall furnish UCF with a copy of the Hubble 25 Year Mission Critical Warranty Certificate of each Foreperson, Lead Technician, and Installation Technician on the Project.

3.10.4 Warranty: The Telecom Subcontractor shall provide Hubbell, Inc. with all test results and all Hubbell 25 Year Mission Critical Warranty paper work, in order to have structured cabling system they install to be Warranted by Hubbell, Inc.

3.10.5 UCF Typical two RJ-45 Jack, Telecom Outlets: That outlet shall include the following components:

3.10.5.1 Two 4 pair 24 AWG, Category 5E compliant, Plenum rated (CMP) station cables.

3.10.5.2 One Hubbell brand, #IMF1OW single gang "iStation" Modular Face Plate Frame, Office White in color.

3.10.5.3 One Hubbell brand, #IM2K1OW "iStation" 2 Port Flat Keystone Inserts, Office White

in color. Place the Keystone Insert in the top 3rd of the Face Plate Frame.

3.10.5.4 One Hubbell brand, #IMB160WUF "iStation Blank Insert with UCF Logo, Office White in color. Place that Blank Insert in the center 3rd of the Face Plate Frame.

3.10.5.5 One Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jacks, Black in color. Place jack in the faceplate's top left.

3.10.5.6 One Hubbell brand, #HXJ5EGL Category 5E, T568-B RJ-45 jack, Gold in color. Place jack in the faceplate's top right.

3.10.5.7 Two Hubbell #SFB type, blank inserts. Color should match electrical faceplates color. Place those blank inserts in the faceplate's bottom 3rd.

3.10.5.8 If the wall outlet is to receive a TV connection, provide one Plenum rated (CMP) RG-6 CATV coaxial cable. In lieu of the Hubbell brand, #IMB160WUF "iStation Blank Insert with UCF Logo, Office White in color in the center 3rd of the Face Plate Frame, provide one Hubbell brand, #IM2K1OW "iStation" 2 Port Flat Keystone Insert, Office White in color. Provide one Hubbell brand, #SFFX female "F" connector, Office White in color, in the 2 Port Flat Keystone Insert's left hand port. Provide one Hubbell brand, #SFB10 Blank Connector, Office White in color in the 2 Port Flat Keystone Insert's right hand port. Provide compression type F Connectors on both ends of the coax cable.

3.10.6 UCF Typical TV Outlets: UCF installs flat screen TVs, equipped with one data connection provision. Coordinate with UCF's Office of Instructional Resources, on the needed height of the TV outlet. That outlet shall include the following components:

3.10.6.1 One RG-6 coax cable for CATV.

3.10.6.2 One 4 pair 24 AWG, Category 5E compliant station cable.

3.10.6.3 One Hubbell brand, #IMF1OW single gang "iStation" Modular Face Plate Frame, Office White in color.

3.10.6.4 Two Hubbell brand, #IM2K1OW "iStation" 2 Port Flat Keystone Inserts, Office White in color. Place one of those Keystone Inserts in the top 3rd of the Face Plate Frame, and place a second Keystone Insert in the bottom 3rd of the Face Plate Frame.

3.10.6.5 One Hubbell brand, #IMB160WUF "iStation Blank Insert with UCF Logo, Office White in color. Place that Blank Insert in the center 3rd of the Face Plate Frame.

3.10.6.6 One Hubbell brand, #SFFX female "F" connector, Office White in color, in the top 2 Port Flat Keystone Insert's left hand port.

3.10.6.7 One Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jack, Black in color, in the bottom 2 Port Flat Keystone Insert's left hand port.

3.10.6.8 Two Hubbell brand, #SFB10 Blank Connector, Office White in color. One in the top 2 Port Flat Keystone Insert's right hand port, and one in the bottom 2 Port Flat Keystone Insert's right hand port.

3.10.7 UCF Typical One RJ-45 jack, Wireless Ethernet Access Point Outlets, and IP Camera Outlets: That outlet is to be mounted above drop ceilings in buildings, and shall include the following components:

3.10.7.1 One 4 pair 24 AWG, Category 5E compliant, Plenum rated (CMP) station cable.

3.10.7.2 One Hubbell brand, #ISM1OW One Port Surface Mount Box, Office White in color.

3.10.7.3 One Hubbell #HXJ5EBK Category 5E, T568-B RJ-45 jack, Black in color.

3.10.8 UCF Typical Four RJ-45 Jack, Telecom/TV Outlets in Concrete Floors: Where floor boxes are required to be installed in concrete, they shall be equipped with the appropriate brackets and access hatch. All floor boxes are to be flush with the finished floor.

3.10.8.1 Provide one 1-inch conduit for tele/data/TV cabling to two floor box chambers situated 90 degrees from each other in the boxes. The two chambers connect together by leaving a plastic barrier component out during initial on-site assembly. Install this conduit back in the closest telecom room.

3.10.8.2 Provide one appropriate sized conduit for electrical service to the other two floor box chambers situated 90 degrees from each other in the boxes. Those two chambers also connect together by leaving a plastic barrier component out during initial on-site assembly.

3.10.8.3 Provide two duplex electrical outlets, one in each electrical chamber of the floor boxes along with the appropriate wiring. Both duplex electrical outlets together, are to be served by one appropriately sized breaker, with no other outlets on the breaker.

3.10.9 Typical Telecom floor boxes to be set into slabs on grade shall include the following basic floor box components:

3.10.9.1 One Wiremold / Legrand - Walker #RFB4-CI-1 floor box.

3.10.9.2 Two Wiremold / Legrand - Walker #CILT-4TKO communications brackets.

3.10.9.3 Two Wiremold / Legrand - Walker #CIHT-D internal duplex electrical receptacle brackets.

3.10.9.4 Four 4 pair 24 AWG Category 5E compliant outside plant rated cables. See Section 3.11.2.

3.10.10 <u>Typical Telecom floor boxes to be set into upper floor slabs</u> shall include the following basic floor box components:

3.10.10.1 One Wiremold / Legrand - Walker #RFB4-SS floor box.

3.10.10.2 Two Wiremold / Legrand - Walker #RFB-4TKO-SS communications brackets.

3.10.10.3 Two Wiremold / Legrand - Walker #RFB-RB-SS internal duplex electrical receptacle brackets.

3.10.10.4 Four 4 pair 24 AWG, Category 5E compliant, Plenum rated (CMP) station cables.

3.10.10.5 One Wiremold / Legrand - Walker #S40BBTC type Floor Port Flanged Cover Assembly, flush with the finished floor, no cutouts provided. Coordinate with the Project's Interior Decorator on what specific finish the cover assembly should be. Choices: Die-cast aluminum with brushed aluminum finish (AL), Die-cast zinc with plated brass finish (BS), or painted black finish (BK).

3.10.10.6 In each Wiremold / Legrand - Walker #RFB-4TKO-SS communications bracket, provide One Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jack, Black in color, one Hubbell brand, #HXJ5EGL Category 5E, T568-B RJ-45 jack, Gold in color, and two Hubbell brand, #SFB10 Blank Connectors, Office White in color. The order of those components, from left to right is: Black jack, blank, gold jack, blank.

3.10.10.6.1 If the floor box is to receive a TV connection, provide one RG-6 coaxial cable into one of the floor box's Telecom chambers. Provide compression type F Connectors on both ends of the coax cable. In lieu of one of the blank inserts, provide one female "F" connector insert. Provide one Hubbell brand, #SFFX female "F" connector, Office White in color.

3.10.11 <u>Wall Telephone Outlets:</u> Provide one Category 5E station cable and one Hubbell brand, #P630S1GJ8 single gang stainless steel wall mount faceplate with one factory installed RJ-45 jack, gray in color.

3.10.12 <u>Cubicle Furniture Outlets:</u> Coordinate with the Project's Interior Designer and Furniture Supplier on what brand and model of cubical furniture will be provided. Contact Hubbell's local Factory representative, for assistance in choosing appropriate compatible Telecom Furniture Plates.

3.10.12.1 Provide four Category 5E compliant, Plenum rated (CMP) station cables.

3.10.12.2 Provide two Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jacks, Black in color. Place those jacks in the faceplate's top left and bottom left ports.

3.10.12.3 Provide two Hubbell brand, #HXJ5EGL Category 5E, T568-B RJ-45 jacks, Gold in color. Place those jacks in the faceplate's top right and bottom right ports.

3.10.13 <u>Other UCF Telecom outlets</u> specified from time to time are listed below. The UCF CS&T PM will provide specifics about those outlets during design, as needed.

3.10.13.1 One, six, eight, ten, and twelve RJ-45 jack Telecom outlets.

3.11 <u>Tele/Data Outlet Labeling:</u> Typically a room's main entry is from the exterior of a building, from a public corridor, or from another room. As the room is entered through that main entry door, the first outlet on the wall to your left will be the starting outlet. For example, if Room 101D is entered, and the room has more than one Telecom outlet, that outlet will be 101D-1. Going clockwise, the next Telecom outlets on the walls in Room 101D will be

101D-2, 101D-3, etc. If only one Telecom outlet is in a room, the outlet would be known by the room's number (example: 101D).

3.11.1   Any additional Telecom outlets in floor boxes and / or in lab tables would be counted after the outlets in the walls are counted. Count those additional outlets in a clockwise direction, starting to the left of the room's main entry door.

3.11.1.1   Telecom Outlet Labeling Specifics: the top left black colored jack is "A", the top right gold colored jack is "B", the bottom left black colored jack is "C", and the bottom right gold colored jack is "D". Example: if you are going to label the top left jack in the second Telecom outlet in Room 101D, the label is to read "101D-2-A". One more example: that same outlet's bottom right jack's label is to read "101D-2-D". In the Telecom Rooms, each jack's Category 5E station cable's corresponding patch panel port label is to be labeled identically.

3.12   Wireless Ethernet Access Point (WAP) Outlets labeling: Let's say that the WAP outlet is in Room 101D. The label is to read "101D-WAP".

3.12.1   Since WAP outlets are to be installed above drop ceilings, place the appropriately labeled machine printed label on the ceiling grid, facing downward, directly below the location of each WAP outlet. The label's type face must be large enough to be read by someone standing on the floor and looking up at the label.

4   SPECIFIC REQUIREMENTS INSIDE BUILDINGS:

4.1   Fire Alarm Panels: UCF CS&T will install two analog telephone lines for the fire alarm when requested to by the Owner's Rep., via a UCF Telecommunications Request Form.

4.1.1   Fire Alarm Circuit Cabling: Provide one 4 pair 24 AWG Category 5E cable in a 1 inch conduit, between the closest telecom room and the fire alarm dialer panel. Terminate the telecom room end of the cable onto a port of a 48 port Category 5E Compliant patch panel.

4.1.2   The Fire Alarm Contractor is to provide two RJ-31X jacks, then terminate the Category 5E cable onto those two jacks inside of the fire alarm dialer panel. Terminate the white/blue pair of the Category 5E cable to one RJ-31X jack, and terminate the white/orange pair of the cable to the other RJ-31X jack).

4.2   Building's Main Custodial Closet: Provide one two RJ-45 jack Telecom outlet with the following components, on a wall away from the slop sink, for UCF Building Services' Kronos Time Clock system and Key Tracker system. See Section 3.11.7 for that outlet's configuration.

4.3   Elevator Cab Phones: Provide one permanently in cab, panel mounted emergency telephone in each Elevator. Those telephones will not utilize a conventional handset. They shall be push button activated to automatically call the UCF Police Department's Public Safety Answering Point for on campus buildings, and call other designated agencies for off campus buildings.

4.3.1   Raceway for Elevator Equipment Room Telecom Cabling: Provide one 4 inch by 4 inch square outlet box with single gang mud ring, 44 inches AFF, in the Elevator Equipment Room. Provide one 1 inch conduit from that outlet box, to the closest telecom room or Telecom cable tray. Provide one 1 inch conduit from that outlet box, to the Elevator Equipment Control Panel.

4.3.2   Elevator Equipment Room Telecom Cabling: Provide one 4 pair 24 AWG Category 5E cable from the closest telecom room, into the outlet box discussed in Section 4.3.1. Provide one 4 pair 24 AWG Category 5E cable from that outlet box, to the Elevator Equipment Control Panel. Terminate the telecom room end of the cable onto a port of a 48 port Category 5E Compliant patch panel. The Elevator Contractor is to terminate the white / blue pair of the cable in the elevator control panel, plus make all connections to the cab phone.

4.3.3   Elevator Equipment Room Telecom Outlet: That outlet shall include the following components:

4.3.3.1   One Hubbell brand, #TPF1OW Secure-IT single gang four port tamper resistant face plate.

4.3.3.2   Two Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jacks, Black in color. Place those jacks in the faceplate's top left hand and right hand ports.

4.3.3.3   Two Hubbell brand, #SFB10 Blank Connectors, Office White in color. Place those blank connectors in the faceplate's bottom left hand and right hand ports.

4.3.4   Elevator Equipment Room Telecom Outlet Terminations: Terminate the Category 5E cable from the Telecom Room, to the left hand jack. Terminate the Category 5E cable from the Elevator Equipment Control Panel, to the right hand jack.

4.3.5   UCF CS&T will install the elevator cab phone circuits when requested by the Owner's Rep., via a UCF Telecom Work Order Request Form. UCF CS&T will provide a cross connect cable for inside of the Elevator Equipment Room Telecom outlet.

4.4   Indoor Emergency Telephones: Permanently wall mounted emergency telephones shall be provided inside of buildings on every floor, in an accessible location. The telephones will not utilize a conventional handset, but shall be push button activated to automatically dial 911 to call the UCF Police Department for on campus buildings, and call other designated agencies for off campus buildings. The UCF CS&T PM will coordinate determining these phones locations with the UCF Emergency Management Coordinator, and the UCF Police Department.

4.4.1   Raceway for Indoor Emergency Telephones' Telecom Cabling: Provide one 4 inch by 4 inch square outlet box with single gang mud ring, 44 inches AFF, at the specified location. Provide one 1 inch conduit from that outlet box, to the closest telecom room or Telecom cable tray.

4.4.2   Indoor Emergency Telephones' Telecom Cabling: Provide one 4 pair 24 AWG Category 5E cable from the closest telecom room, into the outlet box discussed in Section 4.4.1.

4.4.3   Indoor Emergency Telephones' Telecom Cabling Terminations: Terminate the telecom room end of the cable onto a port of a 48 port Category 5E Compliant patch panel. Provide one Hubbell brand, #HXJ5EBK Category 5E, T568-B RJ-45 jack, Black in color. Terminate the telephone outlet end of the cable with that jack. Leave the terminated cable coiled up in the outlet box. Provide one single gang blank outlet box cover plate.

4.5   IP Cameras: UCF utilizes both stationary, and Pan / tilt / zoom (PTZ) cameras. UCF provided Power over Ethernet network electronics will power the IP cameras.

4.5.1   Stationary Cameras: Provide the same structured cabling and associated components as specified in Section 3.11.8.

4.5.2   Pan / Tilt / Zoom (PTZ) cameras: Provide the same structured cabling and associated components as specified in Section 3.11.8. Also one two conductor 18 AWG (18/2) cable from the closest telecom room, directly into the camera. The Camera Installer shall provide the PTZ power supply, and connect the 18/2 cable to it in the telecom room.

4.6   Access Control System (ACS): UCF CS&T requires a Signal System Processor (SSP) exclusively for controlling access to all Telecom Rooms in the Project. UCF CS&T's SSP shall not be integrated with the End User's SSP. Provide one two RJ-45 Jack, Telecom Outlet in the ACS cabinet containing both SSPs.

5   REQUIREMENTS OUTSIDE BUILDINGS:

5.1   Outdoor Emergency Telephones: Emergency telephones shall be provided outside of buildings. The telephones will not utilize a conventional handset, but shall be push button activated to automatically dial 911 to call the UCF Police Department for on campus buildings, and other designated agencies for off campus buildings. Each of these phones will require appropriate sized conduit and cabling for 120 VAC electrical power, plus one 1 inch conduit and cabling for a telephone circuit. The UCF CS&T PM will coordinate determining these phones locations with the UCF Emergency Management Coordinator, and the UCF Police Department.

5.1.1   Phones away from buildings shall be tall Pedestal type units equipped with a speaker phone. The pedestal shall be painted safety yellow in color, and have the word "EMERGENCY" in reflective black lettering on it, on the pedestal's right and left sides. Provide the following outside plant (OSP) telephone materials:

5.1.1.1   One 3 pair 24 AWG outside plant telephone cable. Install in the 1 inch conduit, between the emergency telephone and the closest telecom room.

5.1.1.2   Two 3M brand, #4460-D small bullet bonds. Apply one bullet bond to each end of the 3 pair OSP cable.

5.1.1.3   Building Entrance Protection: Two Circa Telecom brand, #1357-1SB single pair solid state balanced station protectors. Install, then terminate the white/blue pair of the 3 pair OSP cable onto a protector inside of the emergency telephone, and onto a protector in the telecom room.

5.1.1.4   Appropriate materials for bonding the emergency telephone, the protectors, and both ends of the OSP telephone cable with bullet bonds to ground.

5.1.2   Phones to be mounted on the exterior of buildings shall be wall mounted units equipped with a speaker phone. The case shall have the word "EMERGENCY" in reflective black lettering on it, on the pedestal's right and left sides. Provide the following telecom materials:

5.1.2.1   One 4 pair 24 AWG Category 5E cable in a 1 inch conduit within the building, between the Code Blue telephone and the closest cable tray or telecom room. If the conduit is placed under slab on grade, outside plant grade Category 5E cable shall be used, per Section 3.11.2.

5.1.2.2 Building Entrance Protection: Two Circa Telecom brand, #1357-1SB single pair solid state balanced station protector. Install, then terminate the white/blue pair of the Category 5E cable onto the protector, inside of the Code Blue telephone, and in the telecom room.

5.2 Irrigation Controller Circuits: Irrigation time clocks shall have an underground 1 inch PVC conduit provided between them and the closest telecom room. Provide the following telecom materials:

5.2.1 One 3 pair 24 AWG outside plant telephone cable: Superior Essex brand, BDW A type, #04-101-85, or General Cable brand, #2095134, or equal. Install in the 1 inch conduit, between the irrigation controller and the closest telecom room.

5.2.2 Two 3M brand, #4460-D small bullet bonds. Apply one bullet bond to each end of the 3 pair OSP cable.

5.2.3 Building entrance protection: Two Circa Telecom brand, #1357-1SB single pair solid state balanced station protector. Install, then terminate the white/blue pair of the 3 pair OSP cable onto the protector inside of the irrigation controller, and onto the protector in the telecom room.

5.2.4 The Irrigation Contractor is to do the connection in the irrigation controller, between the protector and the Irrigation Controller. UCF CS&T will install the circuit when requested by the Owner's Rep., via a UCF CS&T Telecommunications Request Form.

5.3 Stationary and Pan / Tilt / Zoom (PTZ) IP Cameras: Provide the same structured cabling and 18/2 cabling plus associated components as specified in Sections 4.5.1 and 4.5.2.

5.3.1 Lightning protection for stationary and PTZ exterior IP Cameras: On the interior side of the building's exterior walls, where the exterior cameras' cabling penetrates the wall, provide the following materials:

5.3.1.1 One approximately 12 inch by 12 inch plywood backboard (See Section 3.9.A).

5.3.1.2 One Porta Systems brand, #505E4 type 4 pair Category 5E building entrance protector on a DIN Rail, equipped with four Porta Systems brand, #LVP65E solid state, 65 volt protector modules.

5.3.1.3 One appropriate sized grounding conductor run from the closest ground bonding point.

5.3.1.4 One appropriate sized grounding busbar.

5.3.1.5 The appropriate amount of grounding lugs needed to complete proper bonding to ground.

5.3.1.6 One #10 solid, green insulated conductor from the grounding busbar, out to the camera.

5.3.1.7 For PTZ cameras only: One Ditek brand, #DTK-2LVLPLV low voltage line protector, for protecting the 18/2 PTZ power system.

Glossary and Acronyms

ADA	American with Disabilities Act
A.F.F.	Above Finished Floor
AHECTA	Association of Higher Education Campus Television Administrators
Aerial Service	Telecommunications cabling installed on supporting structures such as poles, buildings and other structures
Alternating Route	A secondary communications path used to reach a destination if the primary Path is unavailable
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
BICSI	Building Industry Consulting Service International
RCDD	Registered Communication Distribution Designer
BHN	Bright House Networks
Backboard	A ¾ plywood board coated with fire retardant paint used in telecom room for mounting equipment
Backbone Cable	Line or set of lines that local area networks connect to for a wide area network connection or within a local area network to span distances efficiently
Bridge Tap	A conductor that connects the non-current carrying parts of electrical equipment raceways or enclosures to the system grounding conductor
B.E.P.	Building Entrance Protection
Buried Cable	A cable installed under the surface of the ground in such a manner that it cannot be removed without disturbing the soil
CS&T	Computer Services and Telecommunications
Cable Bend Radius	The Radius that a cable can bend before risk of damage or decrease in transmission performance
CATV	Community Antenna Television (Cable TV)
Cable Tray	A ladder, trough, solid -bottom or channel raceway system intended for, but not limited to the support of telecommunications media

Coaxial Cable	A cable consisting of an inner core and an outer flexible braided tube, both of conductive material separated by an insulator, used to transmit high-frequency signals at high speeds- typical for CATV
Conduit Duct bank	A routing of conduit for the purpose of electrical wiring. Electrical conduits may be made of metal, plastic, fiber, or fired clay.
Cross Connection	A connection in which computing devices are connected via cable network switch, hub or routers
D Ring	Distribution ring used for cable management and routing
Decibel (DB)	A unit for measuring the relative strength of a signal
Demarcation point (d-marc)	A point at which two services may interface and identify the division of responsibility (i.e.) a service provided handoff
EIA	Electronics International Associates is a standards association that publishes test procedures
Electrode Conductor	A conductor, not necessarily metallic, through a current enters or leaves a nonmetallic medium, as an electrolytic cell, arc generator vacuum tube, or gaseous discharge tube
Electromagnetic	The interference in signal transmission reception resulting from the radiation of electrical or magnetic electrical and magnetic fields
EMT	Electro metallic tubing
Entrance Protector	The Building entrance protector terminate, protect, and distribute central office cable pairs on the subscriber premises. These are ideal for use in multi-tenant dwelling and PABX installations
Equipment Ground	A conducting connection between an electric circuit or equipment and the earth
Equipment Room	A room in which telecommunications equipment is housed
Exposed Cable	Cable that is visible to the eye and exposed to the elements IE no protective member to hinder contact
F Connector	A plug and socket for interconnecting coaxial cable commonly used to interconnect television receivers, videocassette recorders and cable or antenna sources
Faceplate	Covering of a station location that is intended to provide a termination point at the station end, in addition to, protecting cabling end hardware from damage or injury
FCC	Federal Communication Commission

Foot-Candle	In the lighting industry, foot-candles are a common unit of measurement used to calculate adequate lighting levels of workspaces in buildings or outdoor spaces
Gas Tube Protector	An arrangement of electrodes in a gas within an insulating, temperature-resistant envelope. Although the envelope is typically glass, power tubes often use ceramics, and military tubes often use glass-lined metal. Gas tubes are tubes whose electrical characteristics are substantially influenced by the pressure and composition of gas contained inside
Telecom Ground Bus Bar	A grounded metal bar in a telecom closet where grounding and bonding conductors can be connected and divert lightning strikes and power surges form electronic equipment
Grounding Electrode	Provide the essential function of connecting the electrical system to the earth
HVAC	Heating Ventilation and Air Conditioning
Horizontal Channel	A pathway for cabling that extends cabling in a lateral manner
ICEA	Insulated Cable Engineers Association is a professional organization dedicated to developing cable standards for the electrical power, control and telecommunications industry
IDF	Intermediate Distribution Frame
IEEE	Institute of Electrical and Electronics Engineers, Inc
ISDN	Integrated Services Digital Network
ISO	International Standards Organization
Innerduct	Additional conduit placed inside a larger diameter conduit (subduct) used for pathways and protection of network cabling
LAN	Local Area Network
Loose Buffer	Loose buffer means the buffer tube in diameter in the outer jacket of the cable is much bigger than the outer diameter of optical fiber placed .There is a gel present in the space between the fibers and outer jacket for protection from the elements
Maintenance Loop	A term used for the amount (in feet) of cabling that is required and left at segmented points for future repair that might be needed to cabling
Marker Tape	A strip of identifiable plastic tape that running above the pathway of the newly placed conduit/cable to prevent damage to the conduit/cable directly underneath

MDF	Main Distribution Frame
Media	The physical carriers of electrical energy or electromagnetic radiation (IB). The various types of wire and optic fiber cable used for transmitting voice or data signals. Typically, wire cables include twisted pair, coaxial and twinaxial. Optical fiber cable includes single, dual, quad, stranded and ribbon
MHz	One MHz represents one million cycles per second. The speed of microprocessors, called the clock speed, is measured in megahertz
Multimode Fiber	Multimode fiber is optical fiber that is designed to carry multiple light rays or modes concurrently, each at a slightly different reflection angle within the optical fiber core. Multimode fiber transmission is used for relatively short distances because the modes tend to disperse over longer lengths
NEC	National Electric Code
NESC	National Electric Safety Code
NFPA	National Fire Protection Agency
Network	A **network** is a series of points or nodes interconnected by communication paths
Non Plenum Rated Cable	Not rated for plenum spaces**.** A Non-Plenum cable is cable that is laid in the spaces where ductwork facilitates air circulation for heating and air conditioning systems
OFOI	Owner Furnished Owner Installed
OIR	Office of Instructional Resources
OSHA	Occupational Safety and Health Administration
OSP	Outside Plant
Pathway	A decided path or route taken
PBX	Private Branch exchange System. A PBX system, sometimes known as a phone switch or phone switching device, is a device that connects office telephones in a business with the public telephone
PE Cable (Polyethylene Cable)	A thermoplastic material commonly used to make outdoor **cable** jacketing
PM	Project Manager
PSI	Pounds per square inch
Plenum Cable	Cabling that is laid in the **plenum** spaces of buildings. The **plenum** is the space that can facilitate air circulation for heating and air conditioning

Pull Box	Pull box is used for long cable wiring, where you have to splice the cables or leave slack of cable
Relay Rack	A standardized frame or enclosure for mounting multiple equipment modules
RFI	Request for Information
RFP	Request for Proposal
RG	Short for **R**adio **G**uide, RG is a designation for different types of coaxial cable, which is a type of wire that consists of a center wire surrounded by insulation and then a grounded shield of braided wire
Riser Cable	A type of inside cable intended for use in non-plenum vertical applications such as between floors of a building
Service Entrance	The location where the incoming electrical line connects to the building infrastructure
Single Mode Fiber	Optical fiber technology, single mode fiber is optical fiber that is designed for the transmission of a single ray or mode of light as a carrier and is used for long-distance signal transmission
STP	Shielded Twisted Pair
Sump (Manhole/MH)	Area at the bottom of a mineshaft into which water drains and is then pumped away
T-1 (Carrier)	High-capacity telephone line suitable for high speed digital access to the Internet, handling 24 voice or data channels simultaneously
TBB	Telecommunication Building Backboard
Telecommunications Room	The area of the building that contains horizontal cabling in an area of a building
Telecom	Telephone/data division of University of Central Florida
TIA	Telecommunication Industry Association
TGB	Telecommunications Grounding Bus bar
TMGB	Telecommunications Main Grounding Bus bar
MH Telecom Utility Vault	Underground vault used to house an access point for making connections or performing maintenance on underground and buried public utility, telephone and electricity
Telecom	Systems used in transmitting messages over a distance electronically

**Telecommunications
Bonding Backbone (TBB)** Route exposed cables from grounding bars in the telecommunications rooms to telecommunications room main grounding bar

TBBIBC Telecommunications bonding backbone interconnecting bonding conductor

Terminal Block A cluster of five captive screw terminals at which a telephone pair terminates; the center terminal is for the ground wire and two other terminals are used for the tip and ring wires

Terminal Box An enclosure which includes, mounts, and protects one or more terminals or terminal boards; it may include a cover and such accessories as mounting hardware, brackets, locks, and conduit fittings

Tight Buffer In a fiber optic communication cable, one type of component used to encapsulate one or more optical fibers for the purpose of providing such functions as mechanical isolation, protection from physical damage and fiber identification

TSB Telecommunication service backboard

UCF University of Central Florida

UPS Uninterruptable Power Supply

USOC Universal service order codes

UTP Unshielded twisted pair

WAN Wide Area Network

WAP Wireless Access Point

Wire Mold Brand names for surface raceway that allows cable to extend from point A to point B

Workstation Refers to a computer terminal or a PC connected to a network