

Technical Specifications Florida Gulf Coast University

VOICE AND DATA COMMUNICATION CABLING

Approved Vendors (alphabetical order)

Aztek (CIP) Certified Installer Plus

Mr. Scott Coyne

4730 Enterprise Avenue

Suite #308

Naples, FL 34104

Phone: 239-659-0017

Fax: 239-659-0018

Cell: 239-825-6526

Email: scoyne@azteknnaples.com

ComDesign (CIP) Certified Installer Plus

Mr. Dave Janhonen

9601 16th Street North

St. Petersburg, FL 33716

Phone: 727-597-1600 ex.730

Fax: 727-578-8978

Cell: 727-235-3195

Email: djanhonen@comdesigninc.com

Fiber Solutions (CIP Certified Installer Plus)

Mr. Rodney LaVoie

12120 Metro Parkway

Fort Myers, FL 33966

Phone: 239-561-6814

Fax: 239-561-0832

Email: rodney@fiber-solutions.com

Telecommunication Conexions (CIP) Certified Installer Plus

Mr. Robert Radcliff

5485-3 Lee Street

Lehigh Acres, FL 33971

Phone: 239-303-9000

Cell: 239-470-7251

Email: comconex@aol.com

VOICE AND DATA COMMUNICATION CABLING

GENERAL

1.1 SUMMARY

- A. The work performed on this project will be in conformance with the current edition of National Electric Code, current version of the EIA-TIA guidelines, the current edition of the BICSI Telecommunications Distribution Methods Manual, and the current NFPA guidelines.
- B. All horizontal cabling solutions used in this project shall have been pre-tested in a worse case configuration as allowed by the EIA-TIA standards (four connector, full-length channel) by an independent 3rd party laboratory.

1.2 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. IDC: Insulation displacement connector.
- C. LAN: Local area network.
- D. PVC: Polyvinyl chloride.
- E. STP: Shielded twisted pair.
- F. UTP: Unshielded twisted pair.

1.3 SUBMITTALS

- A. Product Data: Include data on features, ratings, and performance for each component specified.
- B. Documentation that all proposed products have been pre-tested as a system and passed the test parameters set forth in Section 3.7 of this specification.
- C. Samples: For workstation outlets, jacks, jack assemblies, and faceplates for color selection and evaluation of technical features.
- D. The certified vendor shall accept complete responsibility for the installation, acceptance testing, documentation, and certification of the structured cabling system.
- E. The certified vendor shall, upon completion of the work, submit the test results to the Superior Essex / Ortonics nCompass alliance, and provide a copy of the warranty certificate to the owner.
- F. The certified vendor shall, upon completion of the work, supply an as built, providing locations of all data jacks with their appropriate labels to the owner.
- G. Certified vendors are encouraged to supply relevant information concerning their qualifications to perform work under this contract and any value-added benefits to their service offerings.

VOICE AND DATA COMMUNICATION CABLING

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** System installer must have availability to a registered communication distribution designer (RCDD) certified by Building Industry Consulting Service International. Provide copy of current RCDD Certificate with your quote. In addition, the installer must be currently certified by Superior Essex/Ortronics to install their products, and offer all warranties associated with certified installations
- B. **Source Limitations:** Obtain all connectivity products except twisted-pair cables and fiber optic cables through one source from a single manufacturer (Ortronics). All jacks, Patch Panels, Patch cords and faceplates shall be from a single source manufacturer of products. The cable can be from one source as connectivity manufacturer (Superior Essex). The products must perform as a solution and must be tested and must pass the test parameters set in Section 3.7 (Similar to Graybar Electric's VIP 2000 program) of this document.
- C. The bidder's staff shall be Certified Installers by the manufacturer listed in this document to install the material and provide the services necessary for proper performance of this contract. The vendor should supply any and all current Manufacturer certificates of training with the bid response for all the employees who shall work on this contract.
- D. The selected vendor shall be fully capable and experienced in the premise distribution systems specified. To ensure the system has continued support, The Owner will contract only with vendors having a successful history of sales, certified installations, service, and support of the selected system. During the evaluation process, The Owner may, with full cooperation of the vendor, visit the vendor's places of business, observe operations, and inspect installation records and question vendor provided references of similar systems. The vendor must have a minimum of three (3) years experience.
- E. The Contractor shall submit all documentation to support the warranty in accordance with the Manufacturer's warranty requirements, and to apply for said warranty on behalf of Florida Gulf Coast University. The warranty will cover the components and labor associated with the repair/replacement of any failed link, within the warranty period of 25 years as specified in the Superior Essex/Ortronics nCompass Alliance.
- F. Comply with NFPA 70.

1.5 WARRANTY

- A. Certified Installer Plus-Enterprise Solutions Partner (CIP-ESP) tier or Certified Installer Plus (CIP) tier. Appropriate Warranty Applications should be properly completed online through the Ortronics ConCert certified contractor website prior to initiating the installation.
- B. The Warranty Submittal must be completed online within 10 days of installation completion. Copies of all certification test reports must be submitted as part of the Warranty Submittal, and be kept on file by the registrant to be re-submitted when requested by Supplier. Data must be saved and submitted in raw data and summary formats. Test data must be submitted via online upload to the Ortronics ConCert Certified Contractor website. E-mail or disc may be used if the online upload is unsuccessful (please contact the Warranty Administrator for detailed instructions).

VOICE AND DATA COMMUNICATION CABLING

1.6 COORDINATION

- A. Coordinate layout and installation of data communication cabling with FGCU, Information Technology Services. Call 590-1188 and ask for the Director or Assistant Director of Information Technology Services.

1. Meet jointly with the Owner before work begins.

- Record agreements reached in meetings and distribute to other participants.
- Adjust arrangements and locations of distribution frames, cross-connect and patch panels in equipment rooms and wiring closets to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

B. Construction of the data path to the location

- All data conduits must be brought to the MDF of each building per architectural drawings
- Prior to bringing the conduit into the MDF, it must terminate within a pull box on the outside of the building, and then continue from there into the MDF
- Tie into existing fiber paths wherever possible
- Minimum size of conduits for data paths should be 4", and include inner duct (see 2.1 A 5)

C. Minimum size of MDF and IDF wiring closets

- Each floor of every building must have at least one identified MDF or IDF
- The MDF in each building must have a 4 post rack, plus one additional, empty 2 post or 4 post rack for future growth.
- Per installation requirement, there must be a space of **at least** 3 feet in the front, rear, left and right side of the rack.
 - MDF minimum size assuming a 30" deep and 24" wide 4 post rack, and one additional empty two post rack 18" deep and 24" wide: 102 inches deep (8.5'), 120" wide (10')
 - IDF minimum size assuming a 30" deep and 24" wide 4 post rack: 102 inches deep (8.5'), 96 wide" (8')
 - If the building is to support food services, additional space is needed for food services vendor networking equipment
- These sizes are minimum guidelines, and any final design must be approved by ITS
- No fluorescent lights must be installed in the wiring closets, use wall mounted LED lighting instead to decrease possibility of EMI
- Wiring closets must have adequate cooling via building HVAC systems
- Door to the IT room must open to the hallway
- Door to the IT room must not have windows in them

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- Copper Cable:

VOICE AND DATA COMMUNICATION CABLING

- a. Superior Essex DataGain® CAT 6+ U/UTP Cable, Plenum, Jacket Colors #7 or #2 (Purple/Blue depending on color of existing cabling). For new construction Jacket Color #7 (Purple) will always be used, unless specified by ITS.
 - 1) ESSEX P/N# 54-272-7B – CMP PURPLE
 - 2) ESSEX P/N# 54-272-2B – CMP BLUE
- NOTE: No PVC Cable of any type should be placed in any building.
2. Fiber Optic Cable:
 - a. Any fiber cabling should be a composite cable with 48 strands of 9/125nm single mode and 24 strands of 62.5/125nm multimode fiber. Two cables one consisting of 48 strands 9/125nm single mode and the other having 24 strands of 62.5/125nm multimode fiber can be substituted if composite cable is not obtainable and FGCU Information Technology Services has approved the change. The fiber shall be run from the Network Operations Center (NOC) to the first floor MDF of the building under construction. No splices shall be permitted. If distance is not provided, bid per linear foot for time and material.
 - b. Fiber optic cable must be labeled in each pull box with weather/waterproof label. Source and destination of each cable must be indicated, as well as the type of fiber and the strand count.
 - c. The installation of fiber optic shall include a 30 feet service loop in every other pull box, unless the boxes are closer than 75 feet together. If pull boxes are closer than 75 feet, vendor must contact the owner to determine the location of the service loop.
 3. Ground bars:
 - a. Chatsworth
 1. Part Number for 19” rack 13622-000
 2. Rack mount Bracket –11216-719
 3. Wall mount kit 10622-101
 4. Wall mount insulators and brackets-10622-000
 - b. B-Line
 - c. SouthWest Data
 - d. Pre-approved Equal
 4. Horizontal Power Distribution Outlet’s
 - a. Panduit
 - b. Hubbell
 - c. Ortronics

Pre-Approved Equal
 5. Inner duct
 - a. Pre approved Equal
 1. 1 ¼ Plenum
 2. 1 ¼ Non-Plenum Riser rated
 3. 3” three cell MaxCell
 - b. Inner duct must be installed in the full length of the conduit that it is installed in. If the conduit does not have any inner duct in it, the vendor must install one of the three options above. MaxCell is the preferred type of inner duct for installation in conduit outside of buildings. If a vendor uses the last path in existing MaxCell/Inner duct, the vendor must install a new pathway at the same time AND notify ITS to let them know that the conduit needed additional inner duct.

VOICE AND DATA COMMUNICATION CABLING

6. Racks
Each MDF and IDF will need racks. We require that the first rack in each MDF and IDF be a four post rack utilizing the square hole mounting systems, as long as there is enough space to allow for installation. If a four post rack cannot be installed, a two post rack should be considered next. If neither option works, contact ITS to consider alternatives. Racks shall be of the following manufacture.
 - a. Ortronics
 - 1) 2 post 7 foot tall with numbered U's standard screw hole pattern
Part Number: OR-MM6706 Appropriate number of 2 post Ortronics racks to support the installation
 - 2) Part Number: OR-MM67SVR One four post rack per MDF/IDF is required. This should be an Ortronics Server rack with square holes.
7. Patch Panel
 - a. Part Number: OR-PHD66U48 Cat 6 patch panel for data
 - b. OR-PHD5E6U48 48 port cat 5e patch panel for analog termination in MDF
 - c. Part Number: OR-PHD5E6U24 24 Port cat 5e patch panel for analog termination in IDF's
8. Faceplate
 - a. IMPORTANT: In existing buildings the vendor must check on what type of faceplate/jack is pre-existing. If it is TracJack the vendor must use TracJack, if it is Series II, the vendor must use Series II. Any deviations must be approved by FGCU Information Technology Services
 - b. New Construction: TracJack 2-port OR-40300548/TrackJack 4-port OR-40300546 Single Gang Plastic TracJack Faceplates.
 - c. Existing Buildings: TracJack 2-port and 4-port OR-40300548/OR-40300546 Single Gang Plastic TracJack Faceplates or Ortronics OR-40300158- Single Gang Plastic Series II Faceplates.
9. Jacks
 - a. IMPORTANT: See 8.a Faceplate note for instructions on what jacks to use in existing/new buildings.
 - b. Ortronics Clarity 6 and Clarity 5E, Center Tuned, 8-position, 180° exit, fog white Enhanced TracJacks
 - c. Ortronics-OR-S22600, Clarity Enhanced Category 6 Series II Modules – Dual Category 6 jack, 8-position, 180° exit, universal T568A/B wiring
 - d. Ortronics OR-40300164, Series II blank snap in module
10. Vertical Wire Management - (One on the end of each rack and one in between each rack)
 - a. Part number: OR-MM6VMS704
11. Cable tray and cable support
 - a. Chatsworth
 - b. Panduit
 - c. Ortronics
12. Fiber adapter panels
 - a. OR-615STMM6-L ORMMAC adapter panel, 6 ST simplex multimode adapters
 - b. OR-615SCDSM3C-L ORMMAC adapter panel, 6 LC simplex singlemode adapters

VOICE AND DATA COMMUNICATION CABLING

- c. OR-61500020 - ORMMAC blanking panel
- 13. Fiber Rack mount Cabinets. ORMMACII rack mount cabinet. Use the appropriate size based upon number of fiber terminations.
 - a. FC02U-P
 - b. FC03U-P
 - c. FC02U-C (splice tray if needed for fusion spliced ends)
 - d. FC03U-C (splice tray if needed for fusion spliced ends)
- 14. Surge protection for copper cables running to an area outside of the location must be provided, and pass Power over Ethernet (PoE):
 - a. ITW Linx CAT6-75/POE RJ45
- B. There is no differentiation between data and voice cables. All data runs that terminate in the MDF or IDF are to be considered data and will be Cat 6 runs using Cat 6 patch panels and Cat 6 jacks.
- C. The vendor will run 12 Cat 6 runs from the MDF to each IDF. They shall be terminated on 24 port patch panels in the MDF as well as in the IDF. The patch panels for these should be located in the first rack or the same rack as the fiber bays are located. **Check with the customer for clarification and final placement.**

2.2 MOUNTING ELEMENTS

- A. Cable Trays: Comply with Division 16 Section "Cable Trays."
 - 1. No cable tray should be filled more than 50% when the job is completed.
- B. Raceways and Boxes: Comply with Division 16 Section "Raceways and Boxes."
- C. Backboards: 3/4-inch (19-mm), interior-grade, fire-retardant-treated plywood (4' x 8') as to meet all NEC requirements.
- D. Distribution Racks: Freestanding modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.

2.3 TWISTED-PAIR CABLES, CONNECTORS, AND TERMINAL EQUIPMENT

- A. Cables: Listed as complying with Category 6 of TIA/EIA-568-C. See Section 1.1 B for technical specifications of system performance. Cable and Connectivity products must have been pre-tested in a worse case configuration as allowed by EIA-TIA Standards. The channels shall perform to specifications listed in Section 3.7.
- B. Conductors: Solid copper.
- C. Workstation Outlets: Jack-connector assemblies mounted in single gang faceplate. If the Installer works in an existing building, the Installer must match the existing faceplates and mounting hardware.

VOICE AND DATA COMMUNICATION CABLING

1. Faceplate: High-impact plastic; color as selected in Part 2.
2. Mounting: Flush, unless otherwise indicated.

D. Plenum Cable: Listed for use in plenums.

2.4 IDENTIFICATION PRODUCTS

- A. Comply with Division 16 Section Basic Electrical Materials and Methods and the following:
1. Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations. See section 3.6.B Identification.
 2. No handwritten labels will be accepted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Employees of the vendor shall perform the installation of the structured cabling system. All work shall be performed and supervised by technicians and managers qualified to install and test the structured cabling system in accordance with manufacturer's requirements.

- A. All telecommunications outlet/connectors, patch panels, cross connects, cabinets, plywood backboards, and other components shall be labeled using a mechanically imprinted label or a system as defined by Owner.
- B. All four pairs of each unshielded twisted pair (UTP) cable shall be terminated on a single port. The splitting of cable pairs between different jacks is not permitted. Terminating cable pairs shall be to manufacturer's recommendations.
- C. All wall outlets must have a minimum of 2 terminated data drops in each location unless otherwise specifies.

VOICE AND DATA COMMUNICATION CABLING

- D. Each horizontal and backbone cable shall have a service loop. A one (1) foot service loop shall be installed at the work area outlet end in the outlet box. A ten (10) foot service loop shall be installed at the Telecommunications Closet or Main Closet end.
- E. Each distribution rack shall be connected to the ground bus in the Telecommunications Closets in accordance with the applicable code requirements and as per EIA/TIA 607.
- F. Each rack shall be at least 3 feet from the rear wall and at least 3 feet from the left and right walls and at least 3 feet from the wall in front of the rack. Installers must consult with owner prior to installation.
- G. No Equipment shall be mounted directly behind the racks. Equipment that is wall mounted may be mounted on the left or right side and in front of the racks as long as the spacing specified in subsection E (directly above) is followed. Placement of any equipment in the MDF and IDF's is the sole discretion and direction of FGCU Information Technology Services. Verify wall placement of any devices, before mounted, with FGCU Information Technology Services. Placement of these devices should have been discussed at the pre-installation meeting.
- H. In the MDF one rack shall be left empty for future customer use. This rack will be located on the left side of all racks
- I. The fiber termination bay shall be mounted at the top of the rack that will be left open for customer use. The fiber termination bay shall be mounted no less than 6 RU's from the top and no more than 8 RU's. (RU's are rack units and should be indicated on the sides of the rack)
- J. The patch panels may be mounted in racks 2 through X starting 6 RUs from the top if there are fiber termination bays, otherwise, they may start at 2 RU from the top and must stop 12 RU's from the bottom. All patch panels must be spaced at least 2 RUs. No patch panels, other than the 24 port riser cables to each IDF, may be placed in the rack designated for customer use.
- K. All voice and data equipment shall be properly grounded in the telecommunications closets to meet the manufacturer's requirements.
- L. All penetrations, regardless of wall construction, shall be sleeved with an appropriate size conduit so that not greater than a 40% fill ratio is achieved. The sleeves shall be labeled per EIA/TIA 606A. Sleeves must be used regardless of new construction or in case cable is reused during a remodel.
- M. Appropriate fire barriers shall be placed around the cables in the sleeves, and unused sleeves shall be properly fire stopped, as required.

VOICE AND DATA COMMUNICATION CABLING

- N. All cabling shall be continuous without splices from the work area to the Telecommunications Closets.
- O. All cables installed by vendor shall be properly contained in conduit, cable tray, raceway, or duct. Where none of these support media are available, the individual cables shall be formed into cable harnesses, neatly run, properly dressed, supported and secured with the appropriate Velcro to the under slab or metal structure at intervals not to exceed 60 inches. Where possible, the cables should be supported by a J-hanger on the walls and in the Halls and corridors, **every 48 inches.**
- P. All UTP cables MUST NOT be painted, or spray coated. Covering the cable in any kind of substance will void the manufacturer's warranty. **If this is an issue, contact ITS pre-construction to discuss options.**
- Q. All exposed cabling is to be installed and routed in a neat and professional manner. Proper manufacturer system training provides instruction in this area. All exposed cable bundles must be secured using Velcro ties at a minimum of every 48-60 inches. All cable ties used shall be hand tightened only to a point where the sheath does not kink.
- R. If conduit is used, the maximum bend between cable pulling points shall not be more than 180 degrees total over a maximum of 100 feet. Conduit shall be run in such a way as to minimize the distance from the wiring closet to the jack.
- S. Horizontal fill ratios for conduit, cable trays, raceways and ducts shall conform to standards and manufacturer's recommendations.
- T. Minimum clearance between cables and power sources shall be according to TIA/EIA568-B.1 standards.
- U. All optical fiber and copper cables shall be handled, installed, and supported in accordance with the manufacturer's guidelines. During the laying of the cable, the installer shall take care not to overstress the cable. After the cable is installed, the installer shall make sure that all parts of the cable are supported properly and shall be stress free at both ends and throughout their length.
- V. Appropriate attention shall be given to the handling of copper and optical fiber cables to ensure that the bending radius conforms to the manufacturer's requirements. At no time shall the cable's static or dynamic bending radius be less than four (4) times the diameter for copper and ten (10) times the diameter of fiber.
- W. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.
- X. In the MDF/IDF, secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals with Velcro ties.

VOICE AND DATA COMMUNICATION CABLING

- Y. Wiring within Wiring Closets and Enclosures: Provide conductors of adequate length. Train conductors to terminal points with no excess. Use lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
- Z. Separation of Wires: Comply with TIA/EIA-569-A rules for separating unshielded copper voice and data communication cabling from potential EMI sources, including electrical power lines and equipment.
- AA. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
- BB. Wireless networking will be deployed throughout the FGCU campus. **An additional data run per access point**, per floor will be required. The location of the access points will be determined after the building drawings are 100% and before the wiring has begun. The vendor is required to meet with the customer to make sure they understand where the location of these data drops will be and plan accordingly. The drops for the access points will be terminated in a surface mount box and be terminated on the patch panel in the IDF. These should be labeled like any other data port.
- CC. Axis TV is a campus wide alerting and information system used. If the building is designated with Axis TV locations the following requirements need to be met. All data runs to Axis TV locations will terminate on the first floor MDF. They shall be terminated in an appropriate patch panel (12 port/24port). Use of a special ZERO SKEW CAT5E UTP is required.
- DD. COAX cable may be specified in the design of the building. All coax runs are to be home run back to the MDF. Each run should be clearly labeled as to the location of the endpoint and the length of the run. Sufficient service loop needs to be left on the cable runs to allow for proper termination. Quad Shielded RG-6 plenum rated cable must be used.
- EE. Any copper cable running to a location outside of the originating building, must be surge protected with a POE capable surge protector. See products.**
- FF. Fiber Terminations: All fiber will be terminated using fusion splicing of pre-terminated ends (pigtailed). The following fiber will be terminated in the prescribed manner.
- Multimode fiber will be terminated with ST (Sam Thomas) connectors.
Singlemode fiber between the MDF and each IDF will be terminated with LC (Lucy Charles) connectors.
The single mode fiber run from the NOC to the MDF. The first 20 strands will be terminated with LC (Lucy Charles) ends. The last four strands will be terminated with APC LC (Angle Polished connector Lucy Charles) connectors.

VOICE AND DATA COMMUNICATION CABLING

3.3 GROUNDING

- A. Comply with Division 16 Section "Grounding and Bonding."
- B. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- C. Bond shields and drain conductors to ground at only one point in each circuit.
- D. Signal Ground Terminal: Locate in each equipment room and wiring closet; isolate from power system and equipment grounding.
- E. Signal Ground Bus: Mount on wall of main equipment room with standoff insulators.
- F. Signal Ground Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

3.4 INSTALLATION IN EQUIPMENT ROOMS AND WIRING CLOSETS – See MDF and IDF drawing

- A. Mount patch panels, terminal strips, and other connecting hardware on cable management racks, unless otherwise indicated.
- B. Group connecting hardware for cables into separate logical fields.
- C. Use patch panels to terminate cables entering the space, unless otherwise indicated.
- D. All IDF's must be connected directly to the MDF via Fiber. A 24 strand single mode fiber shall be used. Terminate the fiber with LC connectors. The use of LC pig-tails fusion spliced onto the fiber is the only acceptable termination method.

3.5 INSTALLATION STANDARDS

- A. Comply with requirements in TIA/EIA-568-B.
- B. If working in existing data cabling, installer must match existing cabling in the building.

3.6 IDENTIFICATION

- A. In addition to requirements in this Article, comply with applicable requirements in Division 16 Section Basic Electrical Materials and Methods and TIA/EIA-606.
- B. System: Use a unique alphanumeric designation for each cable, label cable, jacks, connectors, and terminals to which it connects with same designation. Use logical and systematic designations for facility's architectural arrangement.

VOICE AND DATA COMMUNICATION CABLING

1. Each wall outlet should be labeled with the MDF/IDF room number that it is terminated in. The jacks and cables must be labeled with sequential alphanumeric characters and sequential numbers. The patch panel that the wire will terminate on should be the letter used to label the jack. For instance if you have 4 patch panels labeled A, B, C and D, the wires and the jacks should be labeled A1,A2...A48, then B1,B2...B48 and so on.
2. The patch panels themselves must have the room numbers below the ports. For instance if on patch panel B, ports 5,6,7 and 8 go to room 123, then R123 should be below each port.

Example:	Top of Jack	IDF - XXX
	Bottom of Jack	C1,2,3,4

Note: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.

- C. Workstation: Label cables within outlet boxes.
- D. Distribution Racks and Frames: Each patch panel will be labeled using alphabetic characters, starting with A. The labeling should be top to bottom. Start on the left most rack, work your way down, move to the next rack, and continue with the next letter in the sequence.
- E. Patch Panels: Label each connector with corresponding room number.
- F. Within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware.
- G. Cables, Label each cable within 4 inches of each termination, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
- H. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project, in software and format selected by Owner.
- I. Cable Administration Drawings: Show building floor plans with cable administration point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606. Also provide these drawings in electronic format (PDF preferred) to the customer.

VOICE AND DATA COMMUNICATION CABLING

- J. Upon completion of the work by the Installer, the Installer will provide the customer with 5% of spare parts used to terminate the data infrastructure.

3.7 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Category 6 UTP performance compliance shall be verified with test unit capable of testing up to 350MHz, with test parameters being Attenuation, Insertion Loss, NEXT Loss, ELFLEXT, PSNEXT Loss, PSEFLEXT, return Loss, Length and Wire-map, as a minimum. Each Horizontal and Backbone cable link shall be tested and results will be submitted both as hard copies and on a Compact Disk (CD). The Owner reserves the right to have an independent RCDD inspect, test and accept before payment is made. Any and all rework that is attributed to non-compliance with accepted installation standards and practices presented in this document will be at the Contractor's expense. Permanent Link adapters should be used for UTP testing, unless the Ortronics Certification and Warranty calls for a different testing method.
 - 2. Performance testing shall be used to ensure that the system is capable of meeting the desired specification. All parameters per TIA/EIA 67 shall be verified using a level III accuracy field tester. All testing shall be in accordance with ANSI/TIA/EIA 568B and to the performance requirements set forth in Part 3.7 Section B.
 - 3. Upon completion of testing, the Contractor will provide the Owner with a complete record of all testing performed Compact Disk (CD) and hard copy of all test results in binder form. The Owner reserves the right to randomly test any cabling. If problems are discovered, it is the responsibility of the Contractor to make corrections.
 - 4. Fiber-Optic Cable Procedures: There is one primary field test parameter for an end-to-end optical fiber cabling system; attenuation testing. Attenuation testing is to be performed by the certified vendor.
 - 5. Since optical attenuation at one wavelength is independent of the attenuation at a second wavelength, the attenuation of the link should be measured at both standard wavelengths (850nm and 1300nm) for backbone lengths.
 - 6. Attenuation testing for optical fiber shall be done after the fiber is installed. The total optical attenuation through the cross-connect from any terminated fiber to any other terminated fiber shall not exceed 2.0 dB.
 - 7. The Installer must provide The Owner with one hard copy and one electronic copy of test results. The contractor shall provide final documentation consisting of end-to-end insertion loss. The contractor shall be responsible for submitting all test results for all data runs (both fiber and copper) to Superior Essex/Ortonics so that coverage under the Superior Essex/Ortonics nCompass Alliance can be awarded.
- B. Remove malfunctioning units, replace with new units, and retest as specified above.

VOICE AND DATA COMMUNICATION CABLING

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and extending wiring to establish new workstation outlets. Refer to Division 1 Section Demonstration and Training.

3.9 WORKING WITH EXISTING DATA

- A. Any time a data run is worked on at FGCU, the data run must be tested and certified, as well as labeled. At no point in time should a data run be considered working, unless it had been certified.
- B. If a data run will not pass certification, it must be replaced.
- C. Test results must be sent to the The Owner as specified in section 3.7

VENDOR CHECK LIST

Use contractor submittals to check product submitted is same as product installed.

- Patch Panels and Wire Management are installed and terminated as indicated. Wiring must be terminated as TIA/EIA-568-B, unless specifically authorized by ITS.
- Rack or Cabinet is mounted properly. Floor mount rack is secured properly.
- 12" Cable tray is secured to top of rack and to wall mounted properly. All Vertical cable management is installed as per drawings .A minimum of 3 feet of clearance is observed from the front and rear mounting surfaces of the rack or Cabinet.
- Fiber Cabinet is mounted properly. Contractor installed appropriate inserts as required for each fiber type. All fiber cables are terminated and no fiber is left un-terminated. Fiber cable is neatly coiled within the fiber termination panel. Each cable is labeled as per specifications. All fiber are terminated and installed per the color code. Dust caps installed on all connectors unless connected to equipment.
- Cat 6 Copper Cables were tested and passed the requirements set forth in section 1.4 .
- All patch panels and jacks have been labeled properly per specifications.
- Inner duct has been installed between MDF and IDF for all fiber and Backbone copper.
- All jacks are labeled correctly per specifications.
- Prepare and submit all warranty documentation to the Superior Essex / Ortronics nCompass alliance.(See below – To Submit Warranty)

VOICE AND DATA COMMUNICATION CABLING

- Prepare cable schedule and Cable admin drawings as per section 3.6 H + I.
- Submit spare parts to FGCU, per section 3.6 J

To Submit Warranty:

Certified Installer Plus-Enterprise Solutions Partner (CIP-ESP) tier or Certified Installer Plus (CIP) tier. Appropriate Warranty Applications should be properly completed online through the Ortronics ConCert certified contractor website prior to initiating the installation.

The Warranty Submittal must be completed online within 10 days of installation completion. Copies of all certification test reports must be submitted as part of the Warranty Submittal, and be kept on file by the registrant to be re-submitted when requested by Supplier. Data must be saved and submitted in raw data and summary formats. Test data must be submitted via online upload to the Ortronics ConCert Certified Contractor website. E-mail or disc may be used if the online upload is unsuccessful (please contact the Warranty Administrator for detailed instructions).

<http://www.ncompass-systems.com/~media/67ea7dab0c044b67ab479c4f820197f0.ashx>

VOICE AND DATA COMMUNICATION CABLING

Quick Summary

All information in this summary and the attached document is based on a four (4) story building with an MDF on the first floor, and a single IDF on each subsequent floor. The MDF and all IDF's should be stacked as to facilitate cable runs and conduit placement.

Cable Types:

Superior Essex NextGain CAT 6 U/UTP Cable, Jacket Colors #7 or #2 (Purple/Blue depending on color of existing cabling). For new construction Jacket Color #7 (Purple) will always be used, unless specified by FGCU Information Technology Services.

Quad Shield RG-6 Plenum coax cable white in color.

48 strand single mode/24 strand multimode hybrid cable from NOC to MDF of the building

24 strand single mode from MDF to each IDF

12 Cat 6 runs from MDF to each IDF on their own patch panel

ZERO SKEW CAT5E UTP plenum cable to each Axis TV location. This should be black in color. These will all be terminated in the MDF on a patch panel. A cat 5e patch panel is acceptable.

Data/Cable/Other Runs:

Patch panels must be installed starting at 2 RU from the top if no fiber bays are located in the rack, otherwise, they must be installed starting 6 RU from the top. There must be a 2 RU gap in between all patch panels in the rack. Patch panel installation may not exceed 12 RU free space at the bottom of the rack.

In general each drop gets two data outlets, unless otherwise specified.

AP's get one drop to each location.

Coax runs will be as depicted on the completed architectural drawings. All coax will terminate in the MDF.

Zero Skew cable will be used for each Axis TV location and will terminate in the MDF. These will be determined when the plans are at a 100% and you should expect at least one (1) run per floor minimum.

From the MDF to each IDF install 12 cat 6 data runs. All patch panels must be 48 port.

VOICE AND DATA COMMUNICATION CABLING

Fiber runs and terminations:

Fiber will need to be run from the NOC to the MDF of the building. No splicing of any fiber run will be allowed.

All fiber is to be terminated using a fusion spliced, pre-terminated connectors.

All multimode fiber will be terminated using ST connectors.

All single mode fiber will be terminated using LC connectors.

The single mode fiber from the NOC to the MDF will be terminated in the following manner: The first 20 strands will be (blue, standard network) LC connectors. The last 4 strands will be APC LC connectors.

Racks, Fiber Bays, Wire management, and patch panels.

Racks:

Part Number: OR-MM67SVR

One four post rack per MDF/IDF is required. This should be an Ortronics Server rack with square holes.

Part Number: OR-MM6706

Appropriate number of 2 post Ortronics racks to support the installation.

Fiber Bays:

Part Number: FC02U-P

Part Number: FC03U-P

All fiber bays should be Ortronics, black in color. The bay that goes in the NOC should be as small as possible and still support the required number of fibers.

Part Number: FC02U-C

Part Number: FC03U-C

All fiber bays should be Ortronics, black in color. The bay that goes in the NOC should be as small as possible and still support the required number of fibers.

We listed both patch bays and splice bays. Use as appropriate.

Wire management:

Part number: OR-MM6VMS704

Vertical wire management

Part Number: OR-MM6HMF2RU

Horizontal wire management

Patch Panels:

VOICE AND DATA COMMUNICATION CABLING

Part Number: OR-PHD66U48

48port cat 6 patch panel

Part Number: OR-PHD5E6U48

48 port cat 5e patch panel for analog termination in MDF

Part Number: OR-PHD5E6U24

24 Port cat 5e patch panel for analog termination in IDF's

The entire room should be properly secured with ladder rack and cable tray in order to provide proper support of all cables that enter the room.

Ladder rack should be used to secure the fiber/data/tie cable from the conduit to the ladder rack around the room.

All part numbers are from the Ortronics catalog dated 2012/2013. If the part number has changed or been altered, specific written permission to deviate is required. Only FGCU Information Technology Services can authorize a deviation from the specifications listed above.

VOICE AND DATA COMMUNICATION CABLING

ITS Construction Check List

Building Name: _____

Contractor: _____

Wiring Contractor: _____

Pre-Construction:

- 3 feet of space are between the rack and each wall
- Pullbox/vault outside the MDF prior to conduit entering the
- Minimum of two 4 inch conduits running into MDF of the building

During Construction:

- 3 feet of space are between the rack and each wall
- Enough space between patch panels in each rack
- Leave at least 12 free RU in each rack (from bottom up)
- Additional, empty rack in the MDF
- Vendor labeled every data jack inside the rooms correctly (IDF/MDF room number, patch panel letter, and jack #)
- Vendor labeled every room on the patch panel
- Wiring closets are left tidy, and any construction material has been removed
- 48 strand SM and 24 strand MM hybrid to MDF
- 24 strand SM to each IDF from MDF
- 12 copper runs to each IDF from MDF
- Fiber labeled appropriately
- Conduit has innerduct/Maxcell

Post constructions:

- ITS received as-build plans showing location of all data runs with associated room numbers
- ITS receives copies of test results for fiber and copper cabling
- ITS received Superior Essex warranty documents
- ITS received spare parts
- Outside data runs are surge protected