READ THIS FIRST

Notice to the Design Engineer; please refer to the Port of Seattle, Facilities and Infrastructure standards for reference before editing this specification.

This Project Spec Document **REQUIRES** an approved Competition Waiver per [CPO-6](http://compass.portseattle.org/corp/legal/Documents/CPO-6%2001%2006%2010%20FINAL.pdf) for Systimax Solutions Communication Backbone Cabling (including UTP copper backbone and tie cables, UTP cat 6/6a copper termination hardware, fiber optic cable, fiber optic cable termination and splice hardware) and Horizontal Cables (including optic fiber cable, patch panels, connectors, couplers, UTP copper backbone, data patch panels, blocks, wall plates, boxes, jumper/patch cords).

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Tab) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of “Communications Cabinets, Racks, Frames, and Enclosures” Work is shown in the Contract Documents.
   2. GOVERNING CODES, STANDARDS, AND REFERENCES
      1. References to codes and standards called for in the Specifications refer to the latest edition, amendments, and revisions to the codes and standards in effect on the date of these Specifications.
         1. ANSI/TIA-569 (American National Standards Institute/Telecommunications Industry Association) Telecommunications Pathways and Spaces
         2. ANSI/TIA-606 (American National Standards Institute/Telecommunications Industry Association) Administration Standard for Telecommunications Infrastructure
         3. ANSI/TIA-607 (American National Standards Institute/Telecommunications Industry Association) Generic Bonding and Grounding (Earthing) for Customer Premises
         4. ANSI/TIA-758 (American National Standards Institute/Telecommunications Industry Association) Customer-Owned Outside Plant Telecommunications Infrastructure Standard
         5. TIA-862 (Telecommunications Industry Association) Structured Cabling Infrastructure Standard for Intelligent Building Systems
         6. ASTM A36 (American Society for Testing and Materials) Standard Specification for Carbon Structural Steel
         7. ASTM A513 (American Society for Testing and Materials) Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
         8. ASTM A1011 (American Society for Testing and Materials) Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
         9. BICSI (Building Industry Consulting Service International) Telecommunications Distribution Methods Manual (TDMM)
         10. FCC (Federal Communications Commission) 47 Part 68 Code of Federal Regulations, Title 47, Telecommunications
         11. IEEE (Institute of Electrical and Electronics Engineers) National Electrical Safety Code (NESC)
         12. NECA (National Electrical Contractors Association) National Electrical Installation Standards
         13. NETA (National Electrical Testing Association)
         14. NFPA 70 (National Fire Protection Agency) National Electric Code
         15. UL (Underwriters Laboratories)
         16. Washington State Department of Labor & Industries
   3. SUBMITTALS
      1. Submit materials data in accordance with of Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, and installation instructions for all products.
      2. Submittals shall include the following:
         1. Product Data: For cable runways, equipment frames, termination wallboards, and associated accessories.
         2. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.
            1. Detail equipment assemblies, and location and size of each field connection.
            2. Equipment frames: Include workspace requirements and access for cable connections.
            3. Termination wallboards: Include workspace requirements.
         3. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
   4. QUALITY ASSURANCE – NOT USED
   5. PROJECT CONDITIONS
      1. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and work above ceilings is complete.
   6. COORDINATION
      1. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier or telecommunications service provider.
         1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
         2. Record agreements reached in meetings and distribute them to other participants.
         3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
         4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
      2. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.
2. PRODUCTS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. MANUFACTURERS
     1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1. Cable Runway:
           1. CPI Chatsworth
           2. Commscope
           3. B-Line, Eaton
           4. Or Approved Equal.
        2. Equipment Frames:
           1. CPI Chatsworth
           2. APC
           3. Commscope

NOTE: Middle Atlantic equipment frames for Fiber to Backstand (FTBS) applications only.

* + - * 1. Middle Atlantic
        2. Or Approved Equal
      1. Cable Management:
         1. CPI Chatsworth
         2. Leviton
         3. Commscope
         4. Or Approved Equal
  1. CABLE RUNWAY
     1. Cable Runways: Cable runways shall have the following characteristics, at a minimum:

For other cable runway types seek variance from START committee.

* + - 1. Type: UL Classified tubular steel stringer cable runway.
      2. Stringers: 3/8” x 1-1/2” steel tube.
      3. Rungs: 1/2” x 1” steel tube, welded rungs, welded on interior face of stringers at 9” spacing.

For runways widths other than 18” seek variance from START committee.

* + - 1. Width: 18”
      2. Finish: Black powder coat.
    1. Fittings:
       1. General: Materials shall be heavy duty, UL Classified, and black finish when available for use with 1-1/2” tubular steel stringer cable runway.
       2. Stringer butt splices: Heavy duty, UL Classified, steel, black finish, (4) 3/8”-16 bolts, nuts, lock washers per splice, for 1-1/2” tubular steel stringer.
       3. Junction splice: Heavy duty, UL Classified, steel, black finish, minimum (1) 3/8”-16 bolts, nuts, lock washers per splice, for 1-1/2” tubular steel stringer.

Coordinate with Structural Engineer when specifying all threaded rod size.

* + - 1. Runway support bracket: Accommodates [1/2”][5/8”] all threaded rod, steel, for 1-1/2” tubular steel stringer.
      2. Standoff supports: Provides 12” spacing between decks, accommodates parallel or perpendicular runways, steel, black finish, minimum (2) 3/8”-16 bolts, nuts, washers per support, for 1-1/2” tubular steel stringer.
      3. Cable retaining posts: Removable, minimum 7” height above stringer, steel, black finish, for 1-1/2” tubular steel stringer.
      4. Cable runway radius drops: Removable, metallic construction, compatible with stringer or rung mounting.
  1. EQUIPMENT FRAMES
     1. General: Equipment frames shall have the following characteristics at a minimum:
        1. Equipment mounting channels:
           1. Punched on the front and rear flange with the 19” EIA-310-D Universal Mounting hole pattern.
           2. Factory marked and numbered RMU (Rack Mounted Unit) locations.
        2. Factory provided grounding lug.
        3. UL Classfied
        4. Equipment frames shall be powder coated black in color.

Designer to remove Equipment Frames not used in project.

* + 1. Equipment racks 2-post:

For 2-post rack dimensions other than 45 RU seek variance from START committee.

* + - 1. Dimensions: 45 RU (Rack Unit) 7’ high, 19” wide rack spacing.
      2. Construction: 6061-T6 high strength aluminum extrusion, two (2) top angles, two (2) base angles, two (2) mounting channels, self-support base, and heavy-duty assembly hardware.

Designer shall coordinate static loading of equipment frames with Structural Engineer.

* + - 1. Two post frame shall be rated for 2-post rack: 1500 lbs of equipment
    1. Equipment racks 4-Post:

For 4-post rack dimensions other than 45 RU seek variance from START committee.

* + - 1. Dimensions: 45 RU, 7’ high, 19” wide rack spacing, 29” between front and rear channels.
      2. Construction: Aluminum extrusion, two (2) top angles, two (2) base angles, four (4) mounting channels, self-support base, and heavy-duty assembly hardware.

Designer shall coordinate static loading of equipment frames with Structural Engineer.

* + - 1. Four post rack shall be rated for 2000 lbs of equipment.
    1. Floor mount cabinets:

For cabinet dimensions other than 42 RU, 7’ high seek variance from START committee.

* + - 1. Dimensions: 42 RU, 19” wide rack spacing, 29” between front and rear channels.
      2. Construction: Aluminum extrusion.
         1. Doors: Hinged, ventilated, and lockable front and rear. Single front door. Split rear doors.
         2. Side Panels: Removable and lockable.
         3. Feet: Adjustable for leveling.
         4. Cable Access: Roof and base.

Designer shall coordinate static loading of equipment frames with Structural Engineer.

* + - 1. Cabinet shall be rated for 2500 lbs of equipment
      2. Accessories:
         1. (2) integrated PDUs per cabinet. PDU electrical characteristics per Contract Drawings.
    1. Swinging wall mount cabinets:

For cabinet dimensions greater than 26 RU seek variance from START committee.

* + - 1. Dimensions: [26] RU, 19” wide rack spacing.
      2. Construction: Aluminum extrusion.
         1. Access: Hinged front door. Hinged rear panel.
         2. Side Panels: Steel sheet.
         3. Cable Access: Top and bottom of rear panel.

Designer shall coordinate static loading of equipment frames with Structural Engineer.

* + - 1. Swinging wall mount cabinet shall be rated for 300 lbs of equipment.
    1. Micro Distribution Cabinets

Refer to [Communications Systems Standards](http://www.portseattle.org/Business/Construction-Projects/Airport-Tenants/Documents/design_standards/CommStandards2018.zip) Appendix 14a & 14b

* + - 1. Minimum size: 24”W x 66”H x 36”D
      2. Fabricated 0.125” aluminum mill finish [stainless steel] [NEMA-3R][NEMA 3RX]
      3. 19” EIA adjustable equipment mounting channels front and rear
      4. Doors front and rear; with lockable 3 point latch.
         1. Lock shall be 4-59 key.

Designer shall deterimine heating, cooling, and ventilation characteristics based on project requirements.

* + - 1. Heating, Cooling, Ventilation:
         1. Side mounted at top exhaust fan; must be accessible for maintenance purposes.
         2. Fan thermostat
         3. Humidistat and heater
         4. Louvered opening with accessible filter at bottom.
      2. Rack mounted power distribution unit
    1. Tenant Demarc Cabinets

Refer to [Communications Systems Standards](http://www.portseattle.org/Business/Construction-Projects/Airport-Tenants/Documents/design_standards/CommStandards2018.zip) appendix DMARC Gen3.1 for tenant equipment rack/cabinet options and TIE cable requirements.

* + - 1. Structured media enclosure, indoor:
         1. Steel construction, 20 gauge enclosure, 18 gauge cover
         2. 28.16” H x 14.3”W x 3.63” D
         3. Hinged door
         4. Factory knockouts up to 2”
         5. Capacity for Data, Voice, Audio, Video distribution modules
         6. Suitable for flush, or surface mount
      2. Outdoor:
      3. Minimum size: 24”W x 66”H x 36”D
      4. Fabricated 0.125” aluminum mill finish [stainless steel] [NEMA-3R][NEMA 3RX]
      5. 19” EIA adjustable equipment mounting channels front and rear
      6. Doors front and rear; with lockable 3 point latch.
         1. Lock shall be 4-59 key.

Designer shall deterimine heating, cooling, and ventilation characteristics based on project requirements.

* + - 1. Heating, Cooling, Ventilation:
         1. Side mounted at top exhaust fan; must be accessible for maintenance purposes.
         2. Fan thermostat
         3. Humidistat and heater
         4. Louvered opening with accessible filter at bottom.
      2. Rack mounted power distribution unit
  1. EQUIPMENT FRAME CABLE MANAGEMENT
     1. Vertical cable managers:
        1. Two-post frames

For Two-post frame vertical cable management other than below seek variance from START committee.

* + - * 1. Nominal 7’ high vertical wire managers, 8” wide by 8” deep.
        2. Front and Rear cable organizers with cable guides at 1 RU spacing.
        3. Front and Rear removable or hinged covers.
        4. Snap on/off protective covers front and rear.
      1. Floor mount cabinets
         1. Vertical cable management rings with strain relief
    1. Horizontal cable managers:

See Division 27 Standard Appendices 3, 13, 14a, and 14b for 1 RU and 2 RU Horizontal Cable Manager usage. Edit below to match project needs.

* + - 1. 19” EIA-310-D rack mountable.
      2. 1 RU high
         1. Minimum (5) 4” support rings.
      3. 2 RU high
         1. Minimum 4” cable guides spaced minimum 1-3/4” apart.
         2. Snap on/off protective cover.
  1. TERMINATION WALLBOARDS
     1. Wallboards: 8’ x 4’ x 3/4” AC Marine Grade fire retardant pressure treated plywood. Wallboards shall be free of surface defects such as knots and cracks.
     2. Paint: White, non-conductive, and fire retardant.
     3. Cabling restraints and routes:
        1. 6-inch D-Ring-type cable restraints shall be utilized for backbone and horizontal cabling on the wallboards.
        2. Nylon saddles shall be used to secure the 25 pair cables to the wallboards.

1. EXECUTION
   1. GENERAL
      1. Install system components and appurtenances in accordance with the manufacturer’s installation instructions and as shown on plans and details.
      2. Each device shall be mounted such that its horizontal dimension is level and in no case out of level by 0.03” over 3’ in any direction. In cases where more than one device is mounted, they shall be aligned vertically.
      3. Contractor shall provide structural support and seismic bracing for cable runways as specified in Section 27 05 28 – Pathways for Communications Systems.
      4. Comply with mounting and anchoring requirements specified in Section 26 05 48 - Seismic Controls for Electrical and Communication Work.
   2. EqUIPMENT Frames
      1. Interior floor mounted:
         1. Provide galvanized steel plate between floor and rack such that there is no direct contact between aluminum and concrete.
      2. Micro Distribution Cabinets:
         1. 120 VAC receptacles, (2) 4-plex from (2) circuits.
         2. Install Rack mounted power distribution unit in bottom third and rear of cabinet.
         3. Conduit shall be bottom entry, or penetrate bottom third of side panel. If conduit penetrations deviate approval must be obtained from Resident Engineer.
         4. Do not penetrate the roof of the cabinet.
         5. Telecom grade Condulet is allowed for conduit penetrations into the MDC cabinet.
   3. Termination wallboards
      1. Communication rooms shall be furnished with communication distribution backboards and accessories on all wall surfaces.
      2. Coordinate power outlet locations prior to placement of plywood backboards.
         1. Existing Conditions: Cutouts shall be provided around existing power and telecommunication outlets.
         2. New Construction: power and telecommunications outlets and light switches shall be surface mounted on the plywood backboards.
      3. Unless detail drawings illustrate differently, each backboard shall be installed and oriented with the 8’ dimension vertical, and “A” side exposed.
      4. Provide two layers of white, non-conductive, and fire retardant paint. Do not paint over fire rating seal.
      5. Cabling restraints and routes: Each cable termination location shall be provisioned with industry standard, cable restraint hardware. Provide sufficient quantities to ensure cables routed on plywood backboards are restrained at intervals not exceeding 1 foot. All cables shall be routed parallel and perpendicular to communication room floors.
   4. GROUNDING SYSTEM AND CONDUCTORS
      1. Bonding and grounding shall meet the requirements specified in:
         1. Section 27 05 26 – Grounding and Bonding for Communications Systems
   5. IDENTIFICATION AND LABELING
      1. Identification and labeling shall meet the requirements specified in:
         1. Section 27 05 53 – Identification and Labeling
2. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

10/15/2014 New Section

10/15/2014 Added Sole Source and Salient Characteristics Note to Part 2

10/11/2018 Updated Specification to current standards and renamed

09/11/2020 Updated Specification to current F&I standards

01/14/2021 Revised Specification for clarity

02/25/2022 Updated Section number and title, updated with MDC and Demarc content