

SECTION 27 21 29

DATA COMMUNICATIONS SWITCHES AND HUBS

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***<THIS ENTIRE DOCUMENT can be edited to meet specific client and project needs>***

1. GENERAL
   1. SECTION INCLUDES
      1. NETWORK SWITCHES
         1. AT-IE220-6GHX
   2. GENERAL REQUIREMENTS
      1. The specified network switch product shall be a switching/routing platform designed for use in an appropriate network system.
   3. PROPOSAL SUBMITTALS
      1. Follow all requirements noted on the Form of Proposal and head-end bidding documents if provided.
      2. System Integrator shall provide the following submittals as part of the project submittal package.
      3. Complete product and technical data specification data sheets that include all material and equipment and shall be available freely online. Include any installation manual(s) and warranty information.
         1. A bill of material of all equipment with counts, part numbers and manufacturer.
         2. Software manufacturer, name, and version.
         3. New or additional feature licenses.
         4. Third-party software if required by the project.
         5. Locations and details for all components to be installed under this scope of work.
         6. Placement Diagram showing the proposed location of all system hardware devices.
         7. System Calculation of all network bandwidth and power requirements to ensure proper planning of networking infrastructure, based on the requirements outlined within these specifications.
      4. features to meet or exceed the products named before bid submittal and with pre-approval.
   4. PRE-CONSTRUCTION SUBMITTALS
      1. After the project award, the contractor shall provide any additional submittals not included in their original pre-bid submittal package.
      2. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
      3. Location Drawings: For network infrastructure. Include plans, elevations, sections, details, and attachments to other work.
   5. CLOSEOUT SUBMITTALS
      1. After project completion, the contractor shall provide additional project close out submittals required.
      2. Operation and Maintenance Data: For switches, routers, power supplies, access points, media converters, small form factor pluggables, to include in emergency, operation, and maintenance manuals.
      3. Lists of spare parts and replacement components recommended to be stored at the site for ready access (if applicable).
      4. Complete hardcopy printout and electronic copy from the equipment manufacturer which outlines system and equipment configuration, includes model number, IP address, and MAC address at the time of installation and other system settings.
   6. DISCLOSURE OF NON-CONFORMING EQUIPMENT
      1. Project owner desires to make an informed decision regarding the Contractor's proposed project approach, mobilization, staging and overall implementation schedule of tasks.
      2. The contractor is required to disclose, separate from any cut or advertising sheets, any functional, operational, or electrical requirements of these specifications that they are not able to perform, and/or which fall outside the scope of their quotation.
   7. ONGOING SUPPORT AND WARRANTY
      1. The product manufacturer shall provide a limited lifetime warranty for the switch, to be free of defects in material and workmanship for the lifetime of the product.
   8. DELIVERY, STORAGE, AND HANDLING
      1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
      2. Handling: Handle materials to avoid damage.
   9. PROJECT CONDITIONS
      1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
   10. SEQUENCING
       1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
   11. RELATED SECTIONS
       1. Division 28 - Electrical.
   12. REFERENCES
       1. Code of Federal Regulations (CFR).
       2. Institute of Electrical and Electronics Engineers (IEEE):
          1. 802.3 Ethernet Standards.
       3. International Electrotechnical Commission (IEC).
       4. Federal Communications Commission (FCC):
          1. FCC Rules and Regulation of Title 47 of CFR Part 15 Subpart B Class A.
       5. Underwriters Laboratories (UL):
          1. UL listed.
       6. United States Military Standard (MIL-STD):
          1. MIL-STD-810F - Environmental Engineering Considerations and Laboratory Tests.
       7. National Defense Authorization Act (NDAA):
          1. A series of United States of America Federal Laws that include equipment sourcing guidance and standards.
   13. DEFINITIONS
       1. Abbreviations:
          1. ARP - Address Resolution Protocol.
          2. NTP - Network Time Protocol.
          3. PPPoE - Point to Point Protocol over Ethernet.
          4. POE – Power Over Ethernet
          5. RTP - Real-Time Transport Protocol.
          6. RTCP - Real-Time Control Protocol.
          7. RTSP - Real-Time Streaming Protocol.
          8. SFP – Small Form-factor Pluggable
          9. SMTP - Simple Mail Transfer Protocol.
          10. SNMP - Simple Network Management Protocol.
          11. SSL - Secure Sockets Layer.
          12. TCP - Transmission Control Protocol.
          13. UDP - User Datagram Protocol.
          14. UPnP - Universal Plug and Play.
2. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer:
         1. Allied Telesis Incorporated, which is located at: 10521 19th Ave SE, Suite 200 Everett, WA 98208
         2. Phone: (408) 519-8700
         3. Web: <https://www.alliedtelesis.com/>
      2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
   2. NETWORK SWITCHES
      1. AT-IE220-6GHX
         1. EQUIPMENT
            1. Manufacturer: Allied Telesis Incorporated
            2. Model AT-IE220-6GHX
            3. Alternates: None
         2. GENERAL SPECIFICATIONS
            1. The Power over Ethernet managed switch shall be an AT-IE220-6GHX model.
            2. The switch features 4 fixed 10/100/1000 Base-T electrical ports.
            3. The switch features 2 shared 1/10 G SFP+ slots.
            4. The switch shall support the Ethernet data IEEE 802.3 protocol using Auto-negotiating and Auto-MDI/MDI-X features.
            5. The switch shall comply with IEEE 802.3at/af/bt Power over Ethernet.

The AT-IE220-6GHX shall support IEEE 802.3bt Power over Ethernet detection and 54 VDC power injection at port1 to port2.

The AT-IE220-6GHX shall support IEEE 802.3at Power over Ethernet detection and 54 VDC power injection at port3 to port4.

The AT-IE220-6GHX shall transmit DC Voltage to the Cat5/5e/6 cable and transfer data and power simultaneously to remote PD (Powered Device) equipments.

The AT-IE220-6GHX shall Auto-detect of PoE IEEE802.3at / 802.3af / 802.3bt equipment; protect devices from being damaged by incorrect installation.

The AT-IE220-6GHX shall support total distance up to 100 meters on PoE ports.

The AT-IE220-6GHX shall support 30/90 watts PoE power outputting maximum for compatible PoE device, depending on the port.

* + - * 1. The switch shall provide Power 1, Power 2, FAULT, Link / Act status, at/af/bt PoE In-Use indicating LEDs for monitoring proper system operation.
        2. The switch shall provide an RJ45 serial connection for local management of the device.
      1. DATA SPECIFICATIONS
         1. Data Interface: Ethernet IEEE 802.3z
         2. Data Rate:

Port1 to Port4: 10/100/1000 Mbps

Port5 to Port6 SFP: 1/10 Gbps

* + - * 1. Data Inputs: 6
        2. Operation Mode: Simplex or Duplex
      1. STATUS INDICATORS
         1. System

Power 1/2: Off; Steady green - Switch is receiving DC input power and is operating normally.

Fault: Off; Steady amber – Switch is booting up; Amber flashing five times – Switch is in alarm condition; Amber flashing six times in two seconds – Indicates the switch’s temperature has exceeded threshold.

* + - * 1. 10/1000BASE-T/100BASE-TX Interface (port1 to port4)

Link/Activity/Speed: Off – Port has not established a link; Flashing green - Rx or Tx activities at 1000Mbps; Steady green - Port has established a link and is active (1000Mbps); Flashing amber - Rx or Tx activities at 10/100Mbps; Steady amber- Port has established a link and is active (10/100Mbps).

PoE: Off - No link or no power output; Steady green - PD is on; Flashing amber - PD exceeds available power; Steady amber - PD error.

* + - * 1. SFP+ Interface (port5 to port6)

SFP: Off – Port has not established a link; Flashing green - Rx or Tx activities at 10Gbps; Steady green - SFP transceiver has established a link and is active (10Gbps); Flashing amber - Rx or Tx activities at 1000Mbps; Steady amber- SFP transceiver has established a link and is active (1000Mbps).

* + - 1. CONNECTORS
         1. Ethernet Port: RJ45
         2. PoE Port: RJ45
         3. Optical: SFP+ slot
         4. Console: RJ45
         5. USB Port
         6. Power: DC input
      2. ELECTRICAL SPECIFICATIONS
         1. Power characteristics:

Voltage Input:

Non-PoE: 37-57 Vdc

PoE: 46-57 Vdc

PoE+: 52-57 Vdc

Hi-PoE: 52-57 Vdc

PoE++: 54-57 Vdc

Current: DC Voltage dependent

Power Consumption:

Full PoE Load: Maximum 204 watts

No PoE Load: Maximum 17.4 watts

* + - * 1. PoE Output Power:

PoE output budget: 180 watts

IEEE 802.3af class 3 (15.4 W): Max. 4 ports

IEEE 802.3at class 4 (30.8 W): Max. 4 ports

IEEE 802.3bt class 4 (60.0 W): Max. 2 ports

IEEE 802.3bt class 4 (90.0 W): Max. 2 ports

* + - 1. MECHANICAL SPECIFICATIONS
         1. Enclosure Dimensions: 2.56” x 5.39” x 6.12” (65 mm x 137 mm x 155.4 mm)
         2. Finish: Module shall be constructed of a metal enclosure.
         3. Weight:

With DIN rail brackets < 3.46 lbs. / 1570 g

With wall brackets < 3.20 lbs. / 1450 g

* + - 1. ENVIRONMENTAL SPECIFICATIONS
         1. MTBF: > 560,000 Hrs @25˚ C, 530,000 Hrs @30˚ C
         2. Operating Temp:

Vertical Wall Installations:

Sealed enclosure (0 LFM): -40˚ C to 55˚ C

Ventilated enclosure (40 LFM): -40˚ C to 65˚ C

Fan-based enclosure (150 LFM): -40˚ C to 75˚ C

Horizontal Wall Installations:

Sealed enclosure (0 LFM): -40˚ C to 45˚ C

Ventilated enclosure (40 LFM): -40˚ C to 55˚ C

Fan-based enclosure (150 LFM): -40˚ C to 65˚ C

Floor and Ceiling Installations:

Sealed enclosure (0 LFM): -40˚ C to 50˚ C

Ventilated enclosure (40 LFM): -40˚ C to 60˚ C

Fan-based enclosure (150 LFM): -40˚ C to 70˚ C

* + - * 1. Storage Temp: –40˚ C to 85˚ C
        2. Relative Humidity: 5 to 95% (non-condensing)
        3. Ingress Protection: IP30
      1. REGULATORY AGENCIES/APPROVALS AND LISTINGS
         1. EMI (Emissions):

AS/NZS CISPR 32, class A

CISPR 32, class A

EN 55032, class A

FCC 47 CFR Part 15, subpart B, class A

ICES 003 class A

VCCI class A

* + - * 1. EMC (Immunity):

EN55035

EN/IEC 61000-3-2

EN/IEC 61000-3-3

EN/IEC 61000-4-2

EN/IEC 61000-4-3

EN/IEC 61000-4-4

EN/IEC 61000-4-5, installation class 3 for outdoor

EN/IEC 61000-4-6

EN/IEC 61000-4-8

EN/IEC 61000-4-11

EN/IEC 61000-4-29

* + - * 1. Safety:

IEC 60950-22

AS/NZS 62368-1

CSA/UL 62368-1

EN/IEC/UL 62368-1

* + - * 1. Compliance Marks:

CE

FCC

ICES

RCM

UL

UL-EU

VCCI

UKCA

* + - * 1. Environmental Compliance

RoHS

China-RoHS

JGSSI

REACH

SCIP

TSCA

WEEE

* + - * 1. Industry:

NMEA TS 2

UL 2043

* + - * 1. Physical:

IEC60068-2-31

IEC60068-2-27

IEC60068-2-6

IEC 60512-99-002, under PoE++ electrical load

* + - 1. PRE-INSTALLED COMPONENTS
         1. USB port dust cover x 1
         2. Copper and console port dust cover x 5
         3. SFP+ port dust cover x 2
         4. 3-pin alarm out connector x 1
         5. 4-pin DC power connector x 1
         6. DIN rail bracket x 1
      2. ACCESSORIES
         1. Wall bracket x 2
         2. M4x8 Phillips-head screw x 5

1. EXECUTION
   1. PREPARATION
      1. System Integrator: Confirm the solution proposal planning and design with the installing contractor.
      2. The network design and configuration to be verified for compatibility and performance with the input/output devices.

3.2 NETWORK SYSTEM INSTALLATION, NECESSARY MOUNTING ACCESSORIES, AND PROGRAMMING

* + 1. PREPARATION
       1. Installation of equipment in standalone, wall, or equipment rack configurations shall comply with equipment Installation guide, freely available on the manufacturer’s website.
       2. Accessories for installation of equipment in wall or equipment rack configurations shall be installed according to the equipment installation guide.
       3. Contractor personnel must comply with all applicable state and local licensing requirements.
    2. CONFIGURATION
       1. Configuration of equipment shall be conducted through
          1. Serial management port (as applicable)
          2. IP Terminal management session (SSH/Telnet)
          3. Web GUI (as applicable)
          4. Allied Telesis management software (as applicable)
       2. Initial configuration shall include at minimum
          1. Creation of individual administrator accounts with secure passwords per industry best practices.
          2. Removal of default password.
          3. Application of latest firmware updates.
          4. Assign IP address and hostname.
          5. Creation and assignment of backup configuration file
    3. POST CONFIGURATION
       1. As applicable, equipment shall be monitored for appropriate POE power budget utilization as client/edge equipment is connected.
       2. Testing shall be conducted to ensure cabling meets performance standards outlined in equipment specifications
          1. Testing can be performed internally by select network switches supporting the Cable Fault Locator (TDR) feature. Further information shall be referenced in the equipment configuration guide, available from the manufacturer.

3.3 CYBER SECURITY PROTECTION

* + 1. All equipment requiring users to log on using a password to be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed. Contractor shall implement all network manufacturer’s cyber security recommendations and configurations, following industry best practices per the equipment manufacturer configuration guide.
    2. Document that all network switches do not have a default password.
    3. Document that all network switches have the latest firmware (cyber security patches) installed.
       1. Latest firmware updates shall be provided to contractor through the manufacturer software download portal.
       2. Latest firmware updates shall be applied biannually or as recommended by the equipment manufacturer.
    4. Evaluation of security best practices shall be conducted at minimum, concurrent to firmware updates. Evaluations shall include at minimum:
       1. Review of admin access list to any equipment or management software.
       2. Removal of any default passwords
       3. Confirmation of appropriate equipment environmental state including history of temperature events.