

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-GS970M/18PS
	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-GS970M/18PS
			1. EQUIPMENT
				1. Manufacturer: Allied Telesis Incorporated
				2. Model AT-GS970M/18PS
				3. Alternates: None
			2. GENERAL SPECIFICATIONS
				1. The Power over Ethernet managed switch shall be an AT-GS970M/18PS model.
				2. The switch features 16 fixed 10/100/1000 Base-T electrical ports.
				3. The switch features 2 shared 100/1000 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 Power over Ethernet.

The AT-GS970M/18PS shall support IEEE 802.3at Power over Ethernet detection and 54 VDC power injection at port1 to port16.

The AT-GS970M/18PS shall transmit DC Voltage to the Cat5/5e/6 cable and transfer data and power simultaneously to remote PD (Powered Device) equipments.

The AT-GS970M/18PS shall Auto-detect of PoE IEEE802.3at / 802.3af equipment; protect devices from being damaged by incorrect installation.

The AT-GS970M/18PS shall support total distance up to 100 meters on PoE ports.

The AT-GS970M/18PS shall support 30 watts PoE power outputting maximum for compatible PoE device.

* + - * 1. The switch shall provide Power, FAULT, SD, Link / Act status, at/af 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 Port16: 10/100/1000 Mbps

Port17 to Port18 SFP: 100/1000 Mbps

* + - * 1. Data Inputs: 18
				2. Operation Mode: Simplex or Duplex
			1. STATUS INDICATORS
				1. System

Power: Off; Steady green - Switch is receiving AC input power and is operating normally.

Fault: Off; Red flashing once - Indicates fan failure; Red flashing six times - Indicates the switch’s temperature has exceeded threshold.

* + - * 1. 10/1000BASE-T/100BASE-TX Interface (port1 to port16)

Link/Activity/Speed: Off – Port has not established a link, or ecofriendly feature is enabled; 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, no power output, or ecofriendly feature is enabled; Steady green - PD is on; Flashing amber - PD maximum current; Steady amber - PD error.

* + - * 1. SFP Interface (port17 to port18)

SFP: Off - Port has not established a link, or the ecofriendly feature is enabled; Flashing green - Rx or Tx activities; Steady green - SFP transceiver has established a link.

* + - 1. CONNECTORS
				1. Ethernet Port: RJ45
				2. PoE Port: RJ45
				3. Optical: SFP slot
				4. Console: RJ45
				5. SD Card Reader
				6. Power: C13 socket
			2. ELECTRICAL SPECIFICATIONS
				1. Power characteristics:

Voltage Input:100 to 240 VAC, 50/60 Hz

Current: 2.5A max.

Power Consumption: Maximum 296 watts with PoE full load

* + - * 1. PoE Output Power:

PoE output budget: 247 watts

IEEE 802.3af class 3 (15.4 W): Max. 16 ports

IEEE 802.3at class 4 (30.8 W): Max. 8 ports

* + - 1. MECHANICAL SPECIFICATIONS
				1. Surface Mount Dimensions: 13.42” x 9.10” x 1.73” (341 mm x 231 mm x 44 mm)
				2. Finish: Module shall be constructed of a metal enclosure.
				3. Weight < 6.61 lbs. / 3000 g
			2. ENVIRONMENTAL SPECIFICATIONS
				1. MTBF: > 230,000 Hrs @30˚ C
				2. Operating Temp: 0 to +50˚ C
				3. Storage Temp: –25 to +70˚ C
				4. Relative Humidity: 5 to 90% (non-condensing).
			3. REGULATORY AGENCIES/APPROVALS AND LISTINGS
				1. EMI (Emissions):

FCC Class A

EN55022 Class A,

EN61000-3-2

EN61000-3-3,

VCCI Class A

CISPR Class A

* + - * 1. EMC (Immunity):

EN55024

* + - * 1. Electrical and Laser Safety:

EN60950-1 (TUV)

UL 60950-1(cULus)

EN60825-1

* + - * 1. Compliance Marks:

UL

cUL

UL-EU

CE

* + - * 1. Restrictions on Hazardous Substances (RoHS) Compliance

EU RoHS compliant

China RoHS compliant

* + - 1. ACCESSORIES
				1. Console cable x 1
				2. Power cable x 1
				3. Power cable hook x 1
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.