IE220 Series

Industrial Ethernet Layer 2+ Switches

Overview

IE220 Series Industrial Ethernet Layer 2+ switches are built for enduring performance in harsh environments, such as those found in OT networks and outdoor installations.

Allied Telesis IE220 Series switches are the perfect solution for access connectivity in unconditioned spaces and outside plant.

They feature surge immunity on the copper ports to prevent damage from electrical spikes, common in outdoor applications, and are hardened to withstand tough environmental conditions such as wide-ranging temperatures, high humidity, and vibration.

Their low latency, high availability, large PoE capacity, and ability to deliver multiple video streams, makes them the best choice for critical physical security and surveillance applications.

The IE220 Series is ideal for many vertical markets and related applications, such as:

- **Building automation**
  Facility management including security and access control, fire protection, energy management, heating/ventilation/air-conditioning, and lighting control.
- **Smart cities**
  Public space and urban infrastructure that provides safety and security, parking management, environmental metering, lighting, and information kiosks.
- **Railway transportation (traffic control)**
  Adaptive traffic control, telematics, and preventive maintenance.

IT/OT convergence

Improve productivity and decision-making by integrating your operational technology (OT) and information technology (IT). Use the intelligence of Industry 4.0 to collect, analysis, and manage all your data in real time.

Network automation and orchestration

Powerful automation options include Allied Telesis Autonomous Management Framework™ Plus (AMF Plus) and open standard-based northbound API.

For easy integration into complex networks consisting of physical, virtual, and multi-vendor devices, the IE220 Series features:

- NETCONF/RESTCONF + YANG data modelling for network automation.
- OpenFlow v1.3 for Software Defined Networking (SDN) orchestration.

Key Features

- 1/10 Gigabit uplink ports[1]
- Surge immunity for outside plants
- AlliedWare Plus™ operating system
- Allied Telesis Autonomous Management Framework™ Plus (AMF Plus)
- OpenFlow v1.3 for SDN
- NETCONF/RESTCONF + YANG data modelling
- Web-based GUI and CLI management
- QoS with traffic shaping
- Efficient forwarding of multicast streams
- Static routing capability
- Extensive features for cybersecurity and denial of service prevention
- Active Fiber Monitoring™ (AFM)
- High Availability networking (EPSRing™, ITU-T G.8032, MRP client)
- Upstream Forwarding Only (UFO)
- IEEE 802.3bt PoE++ sourcing (up to 95W)[1]
- Dynamic PoE power allocation
- Continuous PoE (CPoE)
- Extended operating temperature range: -40° C to 75° C
- Graceful thermal shutdown
- Fanless design
- Redundant power inputs
- Protection circuits
- Alarm output
- Certified for plenums

[1] Premium license is required to enable 10G on uplink ports and PoE++ sourcing.

KEY FEATURES

Network Automation

AMF Plus is a suite of tools that provide centralized control and network automation, as well as visual intent-based network management. It has the the intelligence to set-up, optimize, and maintain the network according to predefined goals and policies.

Powerful features like centralized management, auto backup, auto upgrade, auto provisioning and auto recovery enable plug-and-play networking and zero touch management.

Integration with our Vista Manager visual monitoring and management platform means AMF Plus[2] also provides intent-based features like:

- Health monitoring to easily investigate, analyze and improve overall network health.
- Smart ACLs to control and secure the resources that clients use in the network.
- Intent-based QoS to deal with network bandwidth contention.

AMF Plus is scalable and can be either deployed integrated into Allied Telesis equipment, or on multi-tenant cloud architecture.

Northbound Interfaces

Open standard-based interfaces allow for easy integration with existing management systems.

NETCONF/RESTCONF with YANG data modeling provides a standardized way to represent data and securely configure devices.

OpenFlow is a key technology for SDN orchestration.

SDN controllers and other tools support automated behavior in a network, and allow for the execution of customized applications and services.

Micro-segmentation for Network Security

Micro-segmentation enhances converged IT/OT network security by reducing the number of entry points for attackers or intruders. Isolating applications, data, and endpoints hampers the ability of intruders or malware to move within the network.

SDN network orchestration enables self-learning Artificial Intelligence to adapt and propagate security policies to mitigate evolving cyber threats.

High Availability

EPSRing™ and ITU-T G.8032 ERPS enable a protected ring capable of recovery within as little as 50ms. These features are perfect for high performance and high availability.

High-availability automation networks are supported with Media Redundancy Protocol (MRP) as defined by IEC62439-2.

MRP in ring networks allows up to 50 devices to have guaranteed and deterministic switchover behavior. The IE220 Series includes the Media Redundancy Client (MRC) functionality. It reacts on the received control frame from the MRP Master, and detect and notify the status change on its ring ports.

Spanning Tree protocols RSTP and MSTP, along with static LAGs and the dynamic Link Aggregation Control Protocol (LACP), support high availability in star network topologies.

Quality of Service (QoS)

Comprehensive low-latency wire-speed QoS provides flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. Enjoy boosted network performance and guaranteed delivery of business-critical services and applications.

sFlow

sFlow is an industry-standard technology for monitoring high-speed switched networks. It provides complete visibility into network use, enabling performance optimization, usage accounting/billing, and defense against security threats. Sampled packets sent to a collector ensure it always has a real-time view of network traffic.

Active Fiber Monitoring (AFM)

Active Fiber Monitoring prevents eavesdropping on fiber communications by monitoring received optical power. If the switch detects an intruder, it can automatically shut down the port or transmit an alert.

Link Layer Discovery Protocol – Media Endpoint Discovery (LLDP–MED)

LLDP-MED extends LLDP basic network endpoint discovery and management functions. LLDP-MED allows for media endpoint specific messages, providing detailed information on power equipment, network policy, location discovery (for Emergency Call Services) and inventory.

VLAN Mirroring (RSPAN)

VLAN mirroring allows traffic from a port on a remote switch to be analyzed locally. Traffic being transmitted or received on the port is duplicated and sent across the network on a special VLAN.

VLAN Translation

VLAN Translation allows traffic arriving on a VLAN to be mapped to a different VLAN on the outgoing paired interface.

VLAN Access Control List (ACLs)

ACLs simplify access and traffic control across entire segments of the network. They can be applied to a VLAN as well as a specific port.

Upstream Forwarding Only (UFO)

UFO lets you manage which ports in a VLAN can communicate with each other, and which only have upstream access to services, for secure multi-user deployment.

Dynamic Host Configuration Protocol (DHCP) Snooping

The switch keeps a record of the IP addresses of the devices on its ports, including those addresses allocated by DHCP servers. IP source guard checks against this DHCP snooping database to ensure only clients with specific IP and/or MAC addresses can access the network. DHCP snooping works with other features, like dynamic ARP inspection, to increase security in Layer 2 switched environments, and also provides a traceable history which meets the growing legal requirements placed on service providers.

Power over Ethernet (PoE)

PoE provides flexibility and reduced cost by removing the need for a separate power connection to media endpoints. PoE++ supports higher power devices such as advanced security cameras, kiosks, POS terminals, Wi-Fi 6 access points, and LED light fixtures.

The IE220 Series complies with the standard IEEE 802.3bt and maintains the backwards compatibility with previous methods. They feature the following PoE types:

- IEEE 802.3af,
- IEEE 802.3at Type 1 PoE @15.4W
- IEEE 802.3at Type 2 PoE+ @30W
- IEEE 802.3at 4PPoE Hi-PoE @60W
- IEEE 802.3bt Type 3 PoE++ @60W
- IEEE 802.3bt Type 4 PoE++ @95W

You may configure the overall PoE power budget to match the real capabilities of the external Power Supply Unit (PSU). The PoE power budget may be allocated automatically and dynamically, based on the current usage of each powered device.

If the devices connected to a switch require more power than the switch can deliver, the switch will deny power to some ports, according to the assigned priority.

Continuous PoE

Continuous PoE allows the switch to be restarted without affecting the supply of power to connected devices. Smart lighting, security cameras, and other PoE devices will continue to operate during a software upgrade on the switch.

Alarm Output

Alarm Output are useful for security integration solutions. These respond to events instantly and automatically on a pre-defined event scheme. Alarm Output controls external devices upon an event, for example sirens and strobes.

Alarm Monitoring and Trigger facility

The IE220 Series feature the alarm facility to monitor the switch's environment and respond problem as they occur.

Examples of alarm events include:

- Main power supply failure
- Over-temperature
- Port link down
- System power budget exceeded
- PoE device exceeds port power budget

Triggers based on alarm changes provide a smart/friendly mechanism for automatic and timed management of your device by activating the execution of commands in response to certain events.

Protection Circuits

The IE220 Series has optimized protection circuits to guard against the following abnormal conditions:

- Reverse input voltage polarity
- Over- and under-voltage
- Over-current, peak-current and short-circuit
- Over-temperature

Enhanced Thermal Shutdown

The Enhanced Thermal Shutdown feature acts to restrict PoE power and services when the switch exceeds the safe operating temperature.

The system restores operation when the temperature returns to acceptable levels.

Dual power inputs

The redundant power inputs provide higher system reliability and allow UPS emergency power over an extended period of time.

Sturdy connectors for PoE++ sourcing @95W

When unplugging a PoE++ powered device an arc may occur damaging the contact protection of the connector. Once the protective layer is damaged corrosion may continue to weaken the quality of

connection. This can result in increased signal attenuation or even total loss of connection.

The IE220 Series are equipped with RJ45 connectors that comply with the unmating (unplugging) under electrical load requirements standard as prescribed by IEC 60512-99-002. This compliance guarantees the level of contact resistance for connectors used for PoE++ 95W power supply.

Plenum rated

The IE220 Series is UL 2043 certified for use in plenums, ducts and other space used for environmental air.

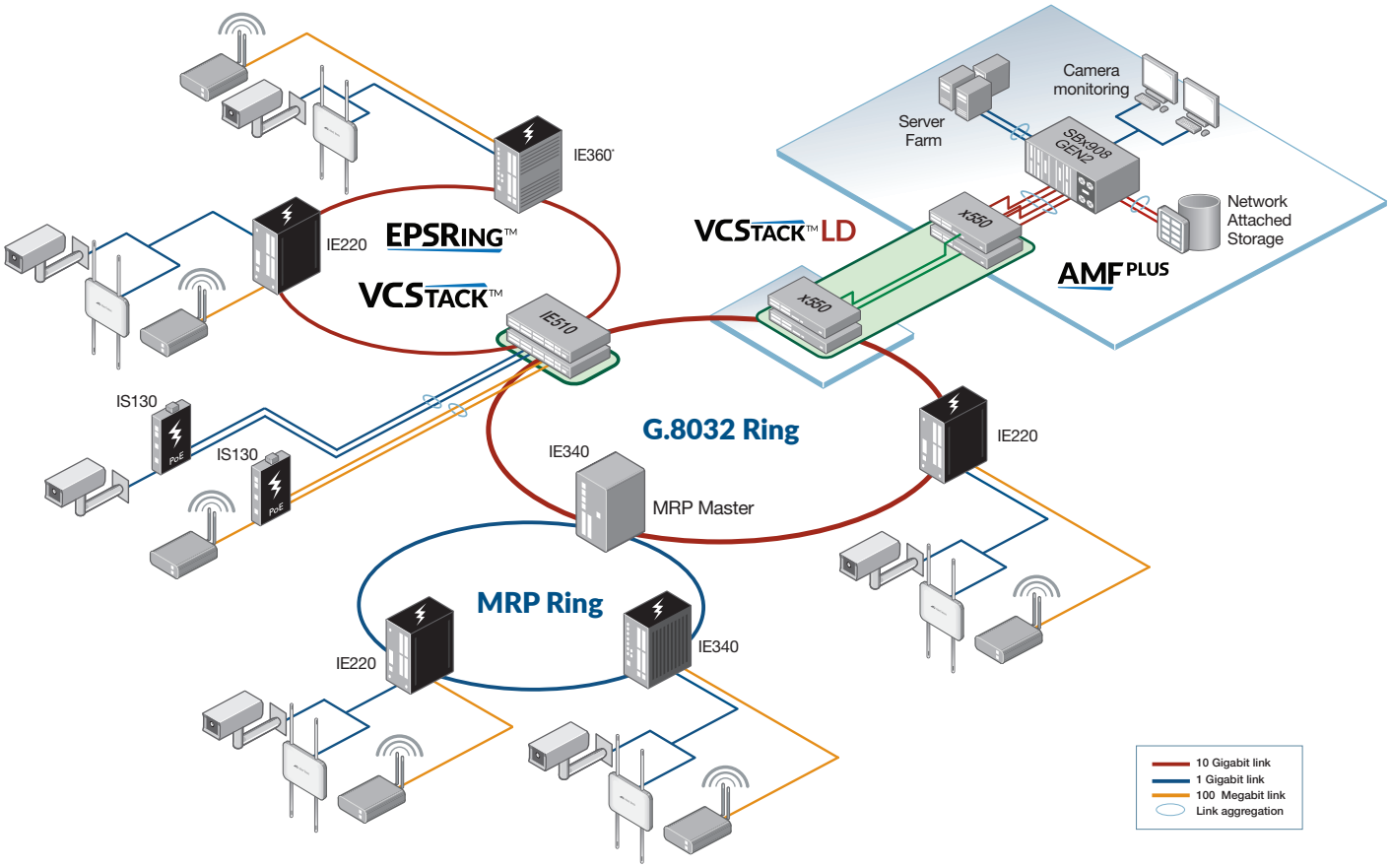
UL 2043 validates that the IE220 Series characteristics are in accordance with the provisions of the National Electric Code NFPA 70; International Mechanical Code NFPA 5000, and Standard for the Installation of Air Conditioning and Ventilating Systems NFPA 90A.

Premium Software License

By default, the IE220 Series offers a comprehensive feature set that includes 1 Gigabit uplink connectivity and PoE+ power sourcing @30W.

The feature set can easily be upgraded with premium software licenses.

KEY SOLUTIONS



Media Redundancy Protocol (MRP), EPSRing and ERPS (ITU G.8032) provide high-speed resilient ring connectivity. This diagram shows how the IE Series can support a variety of ring network topologies.

The IE Series operates at a wide temperature range, and allows deployment in outdoor and harsh industrial environments.

PoE sourcing models support remotely controlled Pan, Tilt and Zoom (PTZ) video cameras, WiFi access points and more.

Management can be automated either with the Allied Telesis Autonomous Management Framework™ Plus (AMF Plus), or by third party tools via the open standard northbound interface.

SPECIFICATIONS

Product Specifications

	10/100/1000T (RJ-45) Copper Ports	1/10G SFP+ Ports	Total Ports	PoE Enabled Ports	Switching Fabric	Forwarding Rate
IE220-6GHX	4	2	6	2 x PoE++, 4 x PoE+	48Gbps	35.7Mpps
IE220-10GHX	8	2	10	4 x PoE++, 8 x PoE+	56Gbps	41.7Mpps

Physical Specifications

	Width	Depth	Height	Weight	Enclosure	Mounting	Protection Rate
IE220-6GHX	65 mm (2.56 in)	137 mm (5.39 in)	155 mm (6.12 in)	DIN rail: 2.34 kg (5.16 lbs) Wall mount: 2.23 kg (4.91 lbs)	Aluminum/ Sheet Metal shell	DIN rail, wall mount	IP30
IE220-10GHX	65 mm (2.56 in)	137 mm (5.39 in)	155 mm (6.12 in)	DIN rail: 2.34 kg (5.16 lbs) Wall mount: 2.23 kg (4.91 lbs)	Aluminum/ Sheet Metal shell	DIN rail, wall mount	IP30

Power Characteristics

	Input Voltage[2]	Cooling	No PoE Load			Full PoE+ Load[3]		
			Max Power Consumption	Max Heat Dissipation	Noise	Max Power Consumption	Max Heat Dissipation	Noise
IE220-6GHX	37~57V DC	Fanless	17.4W	59.5 BTU/h	-	240W	80.3 BTU/h	-
IE220-10GHX	37~57V D	Fanless	18.5W	63.3 BTU/h	-	266W	87.7 BTU/h	-

Power over Ethernet Sourcing Characteristics

	Enabled PoE Ports			Max PoE Power Budget[4]	Max PoE Sourcing Ports			
	PoE+	HI-PoE	PoE++		PoE+ (30W)	HI-PoE (30W)	PoE++ (60W)	PoE++ (90W)
IE220-6GHX	4	2	2	180W	4	2	2	2
IE220-10GHX	8	4	4	240W	8	4	4	2

Latency (microseconds)

	Port Speed		
	100Mbps	1Gbps	10Gbps
IE220-6GHX	12.02µs	2.81µs	2.31µs
IE220-10GHX	11.9µs	2.78µs	2.33µs

[2] PoE sourcing equipment requires:
48Vdc to enable IEEE802.3at Type 1 (PoE).
54Vdc to enable IEEE802.3at Type 2 (PoE+), IEEE802.3bt Type 3 (PoE++) and IEEE802.3bt Type 4 (PoE++).

[3] The Max Power consumption at full PoE load includes the powered device's consumption and margin. The cooling requirements of the switch are smaller than the power draw, because most of the load is dissipated at the PoE powered device and along the cabling. Use these wattage and BTU ratings for facility capacity planning.

[4] The PoE power budget is shared among all ports; we recommend configuring the dynamic PoE power allocation to optimize the power distribution

Performance

RAM memory	512MB DDR SDRAM
ROM memory	128MB flash
MAC address	16K entries
Packet Buffer	1.5 MBytes (16 Mbits)
Priority Queues	8
Simultaneous VLANs	4K
VLAN ID range	1–4094
Jumbo frames	12KB L2 jumbo frames
Multicast groups	1,023 (Layer 2)

Other Interfaces

Type	Serial console (UART)
Port no.	1
Connector	RJ-45 female
Type	USB2.0 (Host Controller Class)
Port no.	1
Connector	Type A receptacle
Type	Alarm output (1A @30Vdc)
Port no.	1
Connector	3-pin Terminal Block

Flexibility and Compatibility

- SFP ports support any combination of Allied Telesis SFP/SFP+ modules listed in this document under Ordering Information

Reliability

- Modular AlliedWare™ operating system
- Protection circuits against abnormal operations
- Redundant power input
- Full environmental monitoring of temperature and internal voltage levels. SNMP traps alert network managers in case of any failure
- Enhanced Thermal Shutdown

Diagnostic Tools

- Active Fiber Monitoring detects tampering on optical links
- Automatic link flap detection and port shutdown
- Built-In Self Test (BIST)
- Cable fault locator (TDR)
- Connectivity Fault Management (CFM) for use with G.8032 ERPS
- Event logging via Syslog over IPv4
- Find-me device locator
- Optical Digital Diagnostic Monitoring (DDM)
- Ping polling and TraceRoute for IPv4 and IPv6
- Port mirroring
  - No limit on mirrored ports
  - Up to 4 mirror (analyzer) ports for received traffic
  - 1 mirror (analyzer) port for transmitted traffic
- VLAN mirroring (RSPAN)
- sFlow
- TraceRoute for IPv4 and IPv6
- UniDirectional Link Detection (UDLD)

IPv4 Features

- Black hole routing
- Static unicast and multicast routes for IPv4

IPv6 Features

- Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- IPv4 and IPv6 dual stack
- IPv6 hardware ACLs
- Static unicast routing for IPv6

Management Features

- Allied Telesis Autonomous Management Framework™ Plus (AMF Plus) node
- NETCONF/RESTCONF northbound interface with YANG data modelling
- OpenFlow v1.3 for network orchestration
- Web-based Graphical User Interface (GUI)
- Industry-standard CLI with context-sensitive help
- Powerful CLI scripting engine
- Built-in text editor
- Event-based triggers allow user-defined scripts to be executed upon selected system events
- Link Layer Discovery Protocol (LLDP)
- Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3 support
- Comprehensive SNMP MIB support for standard based device management
- Console management port on the front panel for ease of access
- Front panel LEDs provide at-a-glance PSU status, PoE status, and fault information
- Eco-friendly mode allows ports and LEDs to be disabled to save power
- USB interface allows software release files, configurations, and other files to be stored for backup and distribution to other devices
- Recessed Reset button

Quality of Service

- 8 priority queues with a hierarchy of high priority queues for real-time traffic, and mixed scheduling, for each switch port
- Policy and traffic shaping
- Extensive remarking capabilities
- IP precedence and DiffServ marking based on Layer 2, 3 and 4 headers
- Limit bandwidth per port or per traffic class down to 64kbps
- Policy-based QoS based on VLAN, port, MAC and general packet classifiers
- Policy-based storm protection
- Strict priority, weighted round robin or mixed scheduling
- Taildrop for queue congestion control
- Wirespeed traffic classification with low latency for real-time streaming media applications

Resiliency Features

- Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- Dynamic link failover (host attach)
- Ethernet Protection Switching Ring (EPSR) with SuperLoop Prevention (EPSR-SLP)
- Ethernet Ring Protection Switching (ITU-T G.8032 ERPS)
- Link Aggregation Control Protocol (LACP)
- Loop protection: loop detection and thrash limiting
- Media Redundancy Protocol (IEC62439-2 MRP)
- Multiple Spanning Tree Protocol (MSTP)
- PVST+ compatibility mode
- Rapid Spanning Tree Protocol (RSTP)
- Router Redundancy Protocol (RRP) snooping
- Spanning Tree Protocol (STP) root guard
- Continuous Power over Ethernet (CPoE)

Multicasting Features

- Internet Group Management Protocol (IGMPv1/v2/v3)
- IGMP snooping with fast leave
- IGMP query solicitation
- Multicast Listener Discovery (MLDv1/v2)
- MLDv2 for IPv6
- MLD snooping
- IGMP/MLD proxy (multicast forwarding)

Security Features

- Access Control Lists (ACLs) based on layer 3 and 4 headers
- Auth-fail and guest VLANs
- Configurable ACLs for management traffic
- Authentication, Authorization and Accounting (AAA)
- BPDU protection
- DHCP snooping, IP source guard and Dynamic ARP
- Inspection (DAI)
- DoS attack blocking and virus throttling
- Dynamic VLAN assignment
- HTTP over TLS (HTTPS)
- MAC address filtering and MAC address lockdown
- Network Access and Control (NAC) features manage endpoint security
- Password protected bootloader
- Port-based learn limits (intrusion detection)
- Private VLANs and port isolation for multiple customers using the same VLAN
- Secure Copy (SCP)
- Strong password security and encryption
- Simple Certificate Enrollment Protocol (SCEP) supports secure management
- TACACS+ authentication and accounting
- Tri-authentication: MAC-based, web-based and IEEE 802.1X

Virtual LAN Features

- Generic VLAN Registration Protocol (GVRP)
- Voice VLAN
- VLAN translation
- Upstream Forwarding Only (UFO)

Services

- Domain Name System (DNS) client
- Dynamic Host Configuration Protocol (DHCP) client
- HyperText Transfer Protocol (HTTP/1.1)
- Network Time Protocol (NTPv4) for IPv4 and IPv6
- Simple Mail Transfer Protocol (SMTP)
- Secure Shell (SSHv2/v3)
- TELNET
- Trivial File Transfer Protocol (TFTP)

Environmental Specifications

- Operating temperature range:[5]
  -40°C to 75°C (-40°F to 167°F)
- Storage temperature range:
  -40°C to 85°C (-40°F to 185°F)
- Operating humidity range:
  5% to 95% non-condensing
- Storage humidity range:
  5% to 95% non-condensing
- Operating altitude:
  up to 3,000 meters maximum (9,843 ft)

Mechanical

- EN 50021, EN 60715 Standardized mounting on rails

Warranty

- Refer to the Term & Policies page on the Allied Telesis web site.

[5] Refer to the Installation Guide for more details on the safety approved power ratings and thermal conditions.

Compliance	
Compliance Mark	CE, FCC, ICES, RCM, TEC, UKCA, UL, VCCI
Hazardous Substances Compliance	RoHS, China-RoHS, JGSSI, REACH, SCIP, TSCA, WEEE
Safety[5]	IEC 60950-22 AS/NZS 62368-1 CSA/UL 62368-1 EN/IEC/UL 62368-1
Electromagnetic Immunity	EN 55035
Harmonic current emission	EN/IEC 61000-3-2[6]
Voltage fluctuation and flicker	EN/IEC 61000-3-3[6]
Electrostatic discharge (ESD)	EN/IEC 61000-4-2
Radiated susceptibility (RS)	EN/IEC 61000-4-3
Electrical fast transient (EFT)	EN/IEC 61000-4-4
Lighting/surge immunity (Surge)	EN/IEC 61000-4-5, installation class 3 for outdoor
Conducted immunity (CS)	EN/IEC 61000-4-6
Power frequency magnetic fields	EN/IEC 61000-4-8
AC voltage dips and interruption	EN/IEC 61000-4-11[6]
DC voltage dips and Interruption	EN/IEC 61000-4-29
Electromagnetic 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
Industry	
Traffic controller assemblies	NEMA TS 2
Installation in air-handling space	UL 2043
Freefall	IEC60068-2-31
Shock	IEC60068-2-27
Vibration	IEC60068-2-6
Connector unmating endurance	IEC 60512-99-002, under PoE++ electrical load

[5] Refer to the Installation Guide for more details on the safety approved power ratings and thermal conditions.
[6] Test was applied using the power supply AT-IE048-480-20.

STANDARDS & PROTOCOLS

AlliedWare Plus Operating System

Version 5.5.6

Authentication

RFC 1321 MD5 Message-Digest algorithm
RFC 1828 IP authentication using keyed MD5

Encryption (Management Traffic Only)

FIPS 180-1 Secure Hash standard (SHA-1)
FIPS 186 Digital signature standard (RSA)
FIPS 46-3 Data Encryption Standard (DES and 3DES)

Ethernet

IEEE 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab 1000BASE-T
IEEE 802.3ae 10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3an 10GBASE-T
IEEE 802.3at Power over Ethernet up to 30W (PoE+)
IEEE 802.3az Energy Efficient Ethernet (EEE)
IEEE 802.3bt Power over Ethernet (PoE++)
IEEE 802.3u 100BASE-X
IEEE 802.3x Flow control - full-duplex operation
IEEE 802.3z 1000BASE-X

IPv4 Features

RFC 768 User Datagram Protocol (UDP)
RFC 791 Internet Protocol (IP)
RFC 792 Internet Control Message Protocol (ICMP)
RFC 793 Transmission Control Protocol (TCP)
RFC 826 Address Resolution Protocol (ARP)
RFC 894 Standard for the transmission of IP datagrams over Ethernet networks
RFC 919 Broadcasting Internet datagrams
RFC 922 Broadcasting Internet datagrams in the presence of subnets
RFC 932 Subnetwork addressing scheme
RFC 950 Internet standard subnetting procedure
RFC 951 Bootstrap Protocol (BootP)
RFC 1027 Proxy ARP
RFC 1035 DNS client
RFC 1042 Standard for the transmission of IP datagrams over IEEE 802 networks
RFC 1071 Computing the Internet checksum
RFC 1122 Internet host requirements
RFC 1191 Path MTU discovery
RFC 1256 ICMP router discovery messages
RFC 1518 An architecture for IP address allocation with CIDR
RFC 1519 Classless Inter-Domain Routing (CIDR)
RFC 1542 Clarifications and extensions for BootP
RFC 1591 Domain Name System (DNS)
RFC 1812 Requirements for IPv4 routers
RFC 1918 IP addressing
RFC 2581 TCP congestion control

IPv6 Features

RFC 1981 Path MTU discovery for IPv6
RFC 2460 IPv6 specification
RFC 2464 Transmission of IPv6 packets over Ethernet networks
RFC 3484 Default address selection for IPv6
RFC 3587 IPv6 global unicast address format
RFC 3596 DNS extensions to support IPv6
RFC 4007 IPv6 scoped address architecture
RFC 4193 Unique local IPv6 unicast addresses
RFC 4213 Transition mechanisms for IPv6 hosts and routers
RFC 4291 IPv6 addressing architecture
RFC 4443 Internet Control Message Protocol (ICMPv6)
RFC 4861 Neighbor discovery for IPv6
RFC 4862 IPv6 Stateless Address Auto-Configuration (SLAAC)
RFC 5014 IPv6 socket API for source address selection
RFC 5095 Deprecation of type 0 routing headers in IPv6
RFC 5175 IPv6 Router Advertisement (RA) flags option
RFC 6105 IPv6 Router Advertisement (RA) guard

Management

AT Enterprise MIB including AMF Plus MIB and traps
Optical DDM MIB
SNMPv1, v2c and v3
ANSI/TIA-1057 Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED)
IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 1155 Structure and identification of management information for TCP/IP-based Internets
RFC 1157 Simple Network Management Protocol (SNMP)
RFC 1212 Concise MIB definitions
RFC 1213 MIB for network management of TCP/IP-based Internets: MIB-II
RFC 1215 Convention for defining traps for use with the SNMP
RFC 1227 SNMP MUX protocol and MIB
RFC 1239 Standard MIB
RFC 2011 SNMPv2 MIB for IP using SMIv2
RFC 2012 SNMPv2 MIB for TCP using SMIv2
RFC 2013 SNMPv2 MIB for UDP using SMIv2
RFC 2578 Structure of Management Information v2 (SMIv2)
RFC 2579 Textual conventions for SMIv2
RFC 2580 Conformance statements for SMIv2
RFC 2674 Definitions of managed objects for bridges with traffic classes, multicast filtering and VLAN extensions
RFC 2741 Agent extensibility (AgentX) protocol
RFC 2819 RMON MIB (groups 1,2,3 and 9)
RFC 2863 Interfaces group MIB
RFC 3176 sFlow: a method for monitoring traffic in switched and routed networks
RFC 3411 An architecture for describing SNMP management frameworks
RFC 3412 Message processing and dispatching for the SNMP
RFC 3413 SNMP applications
RFC 3414 User-based Security Model (USM) for SNMPv3
RFC 3415 View-based Access Control Model (VACM) for SNMP
RFC 3416 Version 2 of the protocol operations for the SNMP
RFC 3417 Transport mappings for the SNMP
RFC 3418 MIB for SNMP
RFC 3621 Power over Ethernet (PoE) MIB
RFC 3635 Definitions of managed objects for the Ethernet-like interface types
RFC 3636 IEEE 802.3 MAU MIB
RFC 4022 MIB for the Transmission Control Protocol (TCP)
RFC 4113 MIB for the User Datagram Protocol (UDP)
RFC 4188 Definitions of managed objects for bridges
RFC 4292 IP forwarding table MIB
RFC 4293 MIB for the Internet Protocol (IP)
RFC 4318 Definitions of managed objects for bridges with RSTP
RFC 4560 Definitions of managed objects for remote ping, traceroute and lookup operations
RFC 5424 The Syslog protocol

Multicast Support

IGMP query solicitation
IGMP snooping (IGMPv1, v2 and v3)
IGMP snooping fast-leave
IGMP/MLD multicast forwarding (IGMP/MLD proxy)
MLD snooping (MLDv1 and v2)
RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2715 Interoperability rules for multicast routing protocols
RFC 3306 Unicast-prefix-based IPv6 multicast addresses
RFC 3376 IGMPv3
RFC 3590 Source Address Selection for the Multicast Listener Discovery (MLD) Protocol
RFC 3810 Multicast Listener Discovery v2 (MLDv2) for IPv6
RFC 4541 IGMP and MLD snooping switches
RFC 4604 Using IGMPv3 and MLDv2 for source-specific multicast

Quality of Service (QoS)

IEEE 802.1p Priority tagging
RFC 2211 Specification of the controlled-load network element service
RFC 2474 DiffServ precedence for eight queues/port
RFC 2475 DiffServ architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2697 A single-rate three-color marker
RFC 2698 A two-rate three-color marker
RFC 3246 DiffServ Expedited Forwarding (EF)

Resiliency Features

IEC 62439-2 Media Redundancy Protocol (MRP)
IEEE 802.3ad Static and dynamic link aggregation
EEE 802.1ag CFM Continuity Check Protocol (CCP)
IEEE 802.1AX Link aggregation (static and LACP)
IEEE 802.1D MAC bridges
IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
ITU-T G.8032 / Y.1344 Ethernet Ring Protection Switching (ERPS)
RFC 5798 Virtual Router Redundancy Protocol version 3 (VRRPv3) for IPv4 and IPv6

Security Features

SSH remote login
SSLv2 and SSLv3
TACACS+ Accounting, Authentication, Authorization (AAA)
IEEE 802.1X Authentication protocols (TLS, TTLS, PEAP and MD5)
IEEE 802.1X Multi-supplicant authentication
IEEE 802.1X Port-based network access control
RFC 2818 HTTP over TLS ("HTTPS")
RFC 2865 RADIUS authentication
RFC 2866 RADIUS accounting
RFC 2868 RADIUS attributes for tunnel protocol support
RFC 2986 PKCS #10: certification request syntax specification v1.7
RFC 3579 RADIUS support for Extensible Authentication Protocol (EAP)
RFC 3580 IEEE 802.1x RADIUS usage guidelines
RFC 3748 Extensible Authentication Protocol (EAP)
RFC 4251 Secure Shell (SSHv2) protocol architecture
RFC 4252 Secure Shell (SSHv2) authentication protocol
RFC 4253 Secure Shell (SSHv2) transport layer protocol
RFC 4254 Secure Shell (SSHv2) connection protocol
RFC 5176 RADIUS CoA (Change of Authorization)
RFC 5280 X.509 certificate and Certificate Revocation List (CRL) profile
RFC 5425 Transport Layer Security (TLS) transport mapping for Syslog
RFC 5656 Elliptic curve algorithm integration for SSH
RFC 6125 Domain-based application service identity within PKI using X.509 certificates with TLS
RFC 6614 Transport Layer Security (TLS) encryption for RADIUS
RFC 6668 SHA-2 data integrity verification for SSH
RFC 8446 Transport Layer Security (TLS) v1.3
RFC 8894 Simple Certificate Enrollment Protocol (SCEP)

Services

RFC 854 Telnet protocol specification
RFC 855 Telnet option specifications
RFC 857 Telnet echo option
RFC 858 Telnet suppress go ahead option
RFC 1091 Telnet terminal-type option
RFC 1350 The TFTP protocol (revision 2)
RFC 1985 SMTP service extension
RFC 2049 MIME
RFC 2131 DHCPv4 (server, relay and client)
RFC 2132 DHCP options and BootP vendor extensions
RFC 2616 Hypertext Transfer Protocol - HTTP/1.1
RFC 2821 Simple Mail Transfer Protocol (SMTP)
RFC 2822 Internet message format
RFC 3046 DHCP relay agent information option (DHCP option 82)
RFC 3315 Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
RFC 3396 Encoding Long Options in the Dynamic Host Configuration Protocol (DHCPv4)
RFC 4330 Simple Network Time Protocol (SNTP) version 4
RFC 4954 SMTP Service Extension for Authentication
RFC 5905 Network Time Protocol (NTP) version 4

VLAN LAN Features

IEEE 802.1ad Provider bridges (VLAN stacking, Q-in-Q)
IEEE 802.1Q Virtual LAN (VLAN) bridges
IEEE 802.1v VLAN classification by protocol and port
IEEE 802.3ac VLAN tagging

Premium Licenses

From AW+ 5.5.4-0 onward, the equipment provides all baseline capabilities, except those features enabled by the Premium License.

	Description	Includes
AT-IE220-FL01	IE220 Series Premium license	■ 10G uplink ports ■ Hi-PoE sourcing ■ PoE++ sourcing

ORDERING INFORMATION

The DIN rail and wall mount kits are included. The management serial console cable is NOT included

AT-IE220-6GHX-xx[7]	4x 10/100/1000T, 2x 1G/10G SFP+, Industrial Ethernet, Layer 2+ Switch PoE++ Support
AT-IE220-10GHX-xx[7]	8x 10/100/1000T, 2x 1G/10G SFP+, Industrial Ethernet, Layer 2+ Switch PoE++ Support
Power Supplies	
AT-DRB50-48-1	50W @48Vdc, Industrial AC/DC power supply, DIN rail mount
AT-IE048-120-20	120W @48Vdc, Industrial AC/DC power supply, DIN rail mount (5 years warranty)
AT-IE048-240-20	240W @48Vdc, Industrial AC/DC power supply, DIN rail mount (5 years warranty)
AT-IE048-480-20	480W @48Vdc, Industrial AC/DC power supply, DIN rail mount (5 years warranty)
AT-SDR120-48	120W @48Vdc, Industrial AC/DC power supply DIN rail mount
AT-SDR240-48	240W @48Vdc, Industrial AC/DC power supply DIN rail mount)
AT-SDR480-48	480W @48Vdc, Industrial AC/DC power supply DIN rail mount

Where xx = 80 standard Country of Origin
980 TAA compliant Country of Origin

[7] Trade Act Agreement compliant (TAA)

Accessories

Refer to the installation guide for the recommended Maximum Operating Temperature according to the selected SFP module.

AT-VT-Kit3	Management cable (USB to serial console)
10Gbps SFP+ Modules	
AT-SP10BD10/I-12	10 km, 10G BiDi SFP, LC, SMF, (1270 Tx/1330 Rx)
AT-SP10BD10/I-13	10 km, 10G BiDi SFP, LC, SMF, (1330 Tx/1270 Rx)
AT-SP10BD20-12	20 km, 10G SFP, LC, SMF, TAA[8] (1270 Tx/1330 Rx)
AT-SP10BD20-13	20 km, 10G SFP, LC, SMF, TAA[8] (1330 Tx/1270 Rx)
AT-SP10BD40/I-12	40 km, 10G SFP, LC, SMF, I-Temp, TAA[8] (1270 Tx/1330 Rx)
AT-SP10BD40/I-13	40 km, 10G SFP, LC, SMF, I-Temp, TAA[8] (1330 Tx/1270 Rx)
AT-SP10BD80/I-14	80 km, 10G SFP, LC, SMF, I-Temp, TAA[8] (1490 Tx/1550 Rx)
AT-SP10BD80/I-15	80 km, 10G SFP, LC, SMF, I-Temp, TAA[8] (1550 Tx/1490 Rx)
AT-SP10ER40a/I	40 km, 10G SFP, LC, SMF, 1550 nm, I-Temp, TAA[8]
AT-SP10LRa/I	10 km, 10G SFP, LC, SMF,1310 nm, I-Temp, TAA[8]
AT-SP10SR	300 m, 10G SFP, LC, MMF,850 nm, TAA[8]
AT-SP10SR/I-90	300 m, 10G SFP, LC, MMF,850 nm, I-Temp, TAA[8]
AT-SP10TM	20 m, 1/10G SFP, RJ-45, I-Temp, TAA[8]
AT-SP10ZR80/I	80 km, 10G SFP, LC, SMF,1550 nm, I-Temp
1000Mbps SFP Modules	
AT-SPBD10-13	10 km, 1G BiDi SFP, LC, SMF, I-Temp (1310 Tx/1490 Rx)
AT-SPBD10-14	10 km, 1G BiDi SFP, LC, SMF, I-Temp (1490 Tx/1310 Rx)
AT-SPBD20-13/I	20 km, 1G BiDi SFP, SC, SMF, I-Temp, (1310 Tx/1490 Rx)
AT-SPBD20-14/I	20 km, 1G BiDi SFP, SC, SMF, I-Temp, (1490 Tx/1310 Rx)
AT-SPBD20LC/I-13	20 km, 1G BiDi SFP, LC, SMF, I-Temp, TAA[8] (1310 Tx/1490 Rx)
AT-SPBD20LC/I-14	20 km, 1G BiDi SFP, LC, SMF, I-Temp, TAA[8] (1490 Tx/1310 Rx)
AT-SPBD40-13/I	40 km, 1G BiDi SFP, LC, SMF, I-Temp, (1310 Tx/1490 Rx)
AT-SPBD40-14/I	40 km, 1G BiDi SFP, LC, SMF, I-Temp, (1490 Tx/ 1310 Rx)
AT-SPEX/E-90	2 km, 1000EX SFP, LC, MMF, 1310 nm, Ext. Temp, TAA[8]
AT-SPLX10a	10 km, 1000LX SFP, LC, SMF, 1310 nm, TAA[8]
AT-SPLX10a/I	10 km, 1000LX SFP, LC, SMF, 1310 nm, I-Temp
AT-SPLX10/E-90	10 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp, TAA[8]
AT-SPLX40	40 km, 1000LX SFP, LC, SMF, 1310 nm
AT-SPLX40/E-90	40 km, 1000LX SFP, LC, SMF, 1310 nm, Ext. Temp, TAA[8]
AT-SPSX-90	550 m, 1000SX SFP, LC, MMF, 850 nm, TAA[8]
AT-SPSX/I-90	550 m, 1000SX SFP, LC, MMF, 850 nm, I-Temp, TAA[8]
AT-SPSX/E-90	550 m, 1000SX SFP, LC, MMF, 850 nm, Ext. Temp, TAA[8]
AT-SPTX-90	100 m, 10/100/1000T SFP, RJ-45, TAA[8]
AT-SPTX/I	100 m, 10/100/1000T SFP, RJ-45, I-Temp
AT-SPZX120/I	120 km, 1000LX SFP, LC, SMF, 1550 nm, I-Temp, TAA[8]
Direct Attach Cables (DAC)	
AT-SP10TW1	Twinax direct attach cable (1 meter)
AT-SP10TW3	Twinax direct attach cable (3 meters)
AT-SP10TW7	Twinax direct attach cable (7 meters)

[8] Trade Act Agreement compliant (TAA)