x610 Series

LAYER 3+ NETWORK SWITCHES

Allied Telesis x610 Series Layer 3+ switches offer an impressive set of features in a high-value package, ideal for enterprise network applications.

The Allied Telesis x610 Series is a high performing and scalable solution for today's networks, providing an extensive range of port-density and uplink-connectivity options. With a choice of 24-port and 48-port versions and optional 10 Gigabit uplinks, plus the ability to stack up to eight units, the x610 Series can connect anything from a small workgroup to a large business.

High Performing

Flexible endpoint deployment is ensured with the ability to power devices such as IP phones, security cameras, and wireless access points directly from the switch. This convergence of voice, video and data on today's networks is enabled by Power over Ethernet Plus (PoE+), which has the added benefit of reducing costs.

Multiple customers can have their own secure virtual network within the same physical infrastructure, as the x610 Series switches are able to divide a single router into multiple independent virtual routing domains. Layer 3 network virtualization provided by Virtual Routing and Forwarding (VRF Lite) creates independent routing domains, where IP addresses can overlap without causing conflict.

Non-blocking architecture guarantees wirespeed delivery of all critical IPv4 and IPv6 traffic. Maximum availability of premium services and applications is effortless, with industry-leading Quality of Service (QoS) features managing network responsiveness.

Resilient

Uninterrupted access to online applications is provided by implementing a network with no single point of failure. Distributing resources across a stacked group of units means no network downtime. A fully resilient solution is created with Virtual Chassis Stacking (VCStack™), where up to eight units can form a single virtual chassis, with dual connections to key servers and access switches. Virtual Chassis Stacking can be implemented in the same cabinet over copper cabling, or to remote locations using fiber.

A high-speed solution where recovery occurs within as little as 50ms can be deployed in ring-based topologies. Several switches can form a protected ring, running at up to 10Gbps. This high performing resilient design for distributed networks is made possible with Allied Telesis Ethernet Protection Switching Ring (EPSRing) technology.

Scalable

The flexibility of the x610 Series, coupled with the ability to stack multiple units, ensures a future-proof network. An extensive range of port-density and uplink-connectivity options enables network connectivity for any size of business. The choice of 24-port and 48-port versions and the choice of Gigabit or 10 Gigabit uplink ports allows tailoring of the uplink bandwidth to suit network applications. Expansion modules are available for local and long-distance stacking or can be configured to provide two additional 10G ports.

Secure

Advanced security features protect the network from the edge to the core. Unprecedented control over user access is provided with Network Access Control (NAC), to mitigate threats to network infrastructure. This ensures the network is accessed only by known users and devices, as users' adherence to network security policies is checked and access granted or remediation offered. Secure access can also be provided for guests.

A secure network environment is guaranteed, with powerful control over network traffic types, secure management options, and other multi-layered security features built into the x610 Series switches.

What's New

- OSPFv3
- VRF Lite
- TACACS+ authentication
- Improved VCStack management
- Eco-friendly support
- Long-distance stacking
- Front to back cooling

Key Features

Virtual Routing and Forwarding (VRF Lite)

» VRF Lite provides Layer 3 network virtualization by dividing a single router into multiple independent virtual routing domains. With independent routing domains, IP addresses can overlap without causing conflict, allowing multiple customers to have their own secure virtual network within the same physical infrastructure.

VCStack

» Create a VCStack of up to eight units with 48Gbps of stacking bandwidth to each unit. VCStack provides a highly available system where network resources are spread out across stacked units, reducing the impact if one of the units fails. Aggregating switch ports on different units across the stack provides excellent network resiliency.

Mixed Stacking

» The x610 Series is compatible with the x600 Series in a mixed VCStack of up to four units.

Long-distance Stacking

» Long-distance stacking allows a VCStack to be created over longer distances, perfect for a distributed network environment.

Ethernet Protection Switching Rings (EPSRing)

» EPSRing and 10 Gigabit Ethernet allow several x610 switches to form a high-speed protected ring capable of recovery within as little as 50ms. This feature is perfect for high performance and high availability in enterprise networks.

Easy to Manage

» Allied Telesis x610 Layer 3+ switches run the advanced AlliedWare Plus™ Layer 3 fully featured operating system, delivering a rich feature set and an industry-standard CLI. In addition to the CLI, x610 switches feature a comprehensive GUI for easy access to monitoring and configuration.

Access Control Lists (ACLs)

» AlliedWare Plus delivers industry-standard Access Control functionality through ACLs. ACLs filter network traffic to control whether routed packets are forwarded or blocked at the port interface. This provides a powerful network security mechanism to select the types of traffic to be analyzed, forwarded, or influenced in some way.

Industry-leading Quality of Service (QoS)

» Comprehensive low-latency wirespeed 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 Ethernet services and applications. Time-critical services such as voice and video take precedence over non-essential services such as file downloads, maintaining responsiveness of Enterprise applications.

Power over Ethernet Plus (PoE+)

» With PoE, a separate power connection to media endpoints such as IP phones and wireless access points is not necessary. PoE+ provides even greater flexibility, providing the capability to connect devices requiring more power (up to 30 Watts)—for example, tilt and zoom security cameras.

» A redundant PoE+ high-availability solution can be built using VCStack and additional RPS units. See the x610 PSU PoE options table on page 5 for details.

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 requirements, network policy, location discovery (for Emergency Call Services) and inventory.

Voice VLAN

» Voice VLAN automatically separates voice and data traffic into two different VLANs. This automatic separation places delay-sensitive traffic into a voice-dedicated VLAN, which simplifies QoS configurations.

Open Shortest Path First (OSPFv3)

» OSPF is a scalable and adaptive routing protocol for IP networks. The addition of OSPFv3 adds support for IPv6 and further strengthens the Allied Telesis focus on next generation networking.

Network Access Control (NAC)

» NAC allows for unprecedented control over user access to the network, in order to mitigate threats to network infrastructure. Allied Telesis x610 switches use IEEE 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment, to assess a user's adherence to network security policies and either grant access or offer remediation.

» If multiple users share a port, then multi-authentication can be used. Different users on the same port can be assigned into different VLANs, and so given different levels of network access. Additionally, a guest VLAN can be configured to provide a catch-all for users who aren't authenticated.

Tri-authentication

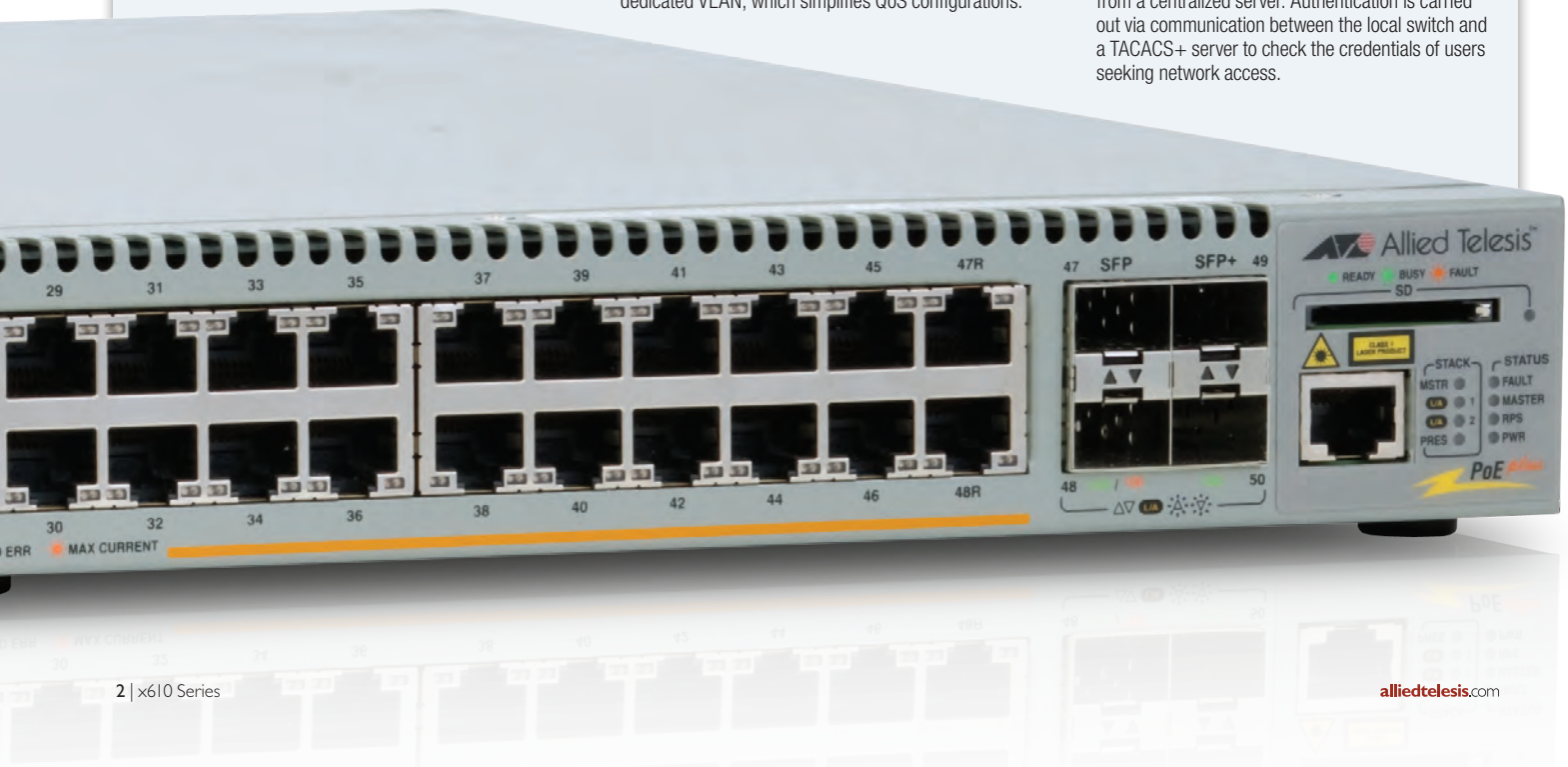
» Authentication options on the x610 Series also include alternatives to IEEE 802.1x port-based authentication, such as web authentication to enable guest access and MAC authentication for endpoints that do not have an IEEE 802.1x supplicant. All three authentication methods— IEEE 802.1x, MAC-based and Web-based—can be enabled simultaneously on the same port. This is called tri-authentication.

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.

Terminal Access Controller Access–Control System Plus (TACACS+) Authentication

» TACACS+ provides access control for network users from a centralized server. Authentication is carried out via communication between the local switch and a TACACS+ server to check the credentials of users seeking network access.



Key Solutions

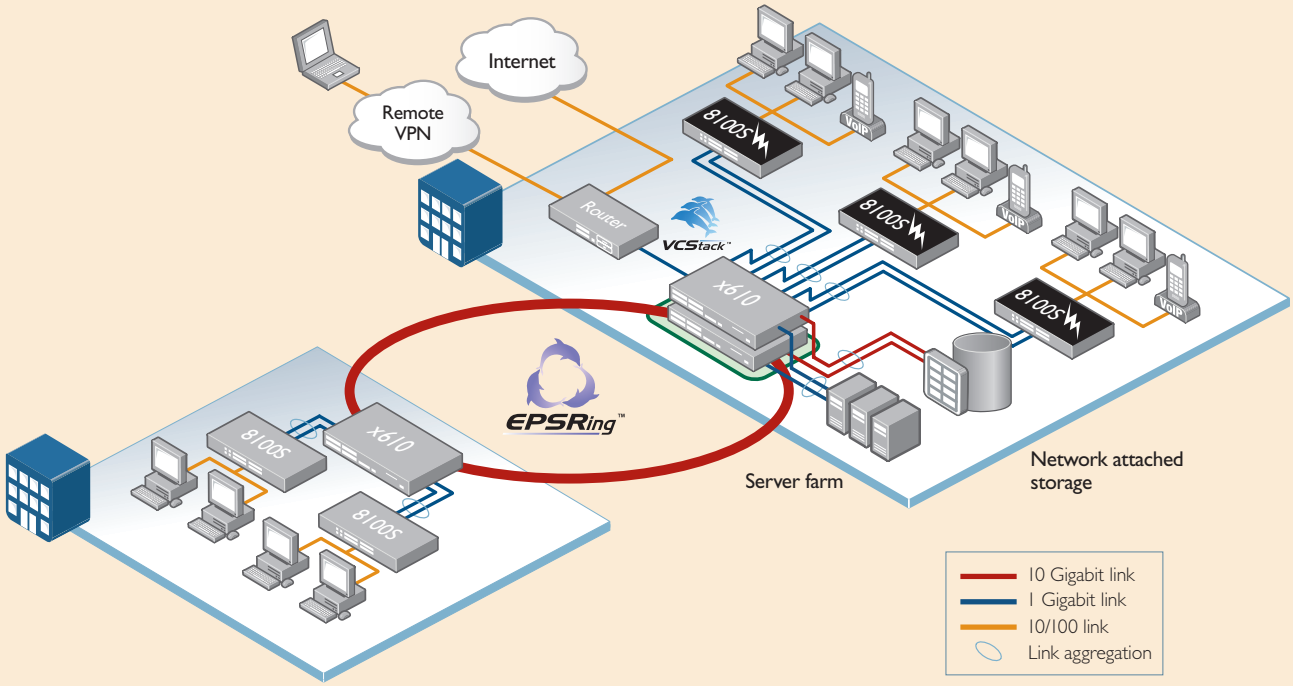


Diagram 1: VCStack and EPSR

Network Resiliency

The convergence of network services in the enterprise has led to increasing demand for highly available networks with minimal downtime. VCStack in conjunction with link aggregation provides a network with no single point of failure. The addition of EPSR ensures distributed network segments have high-speed, resilient access to online resources and applications, as shown in diagram 1.

Network Virtualization

Virtual Routing and Forwarding (VRF Lite) allows multiple customers to share a common infrastructure, while maintaining their own independent virtual routing domains. While security for the individual customers is assured, they can still take advantage of shared resources such as printers and Internet access via filtered inter-VRF communication, as shown in diagram 2.

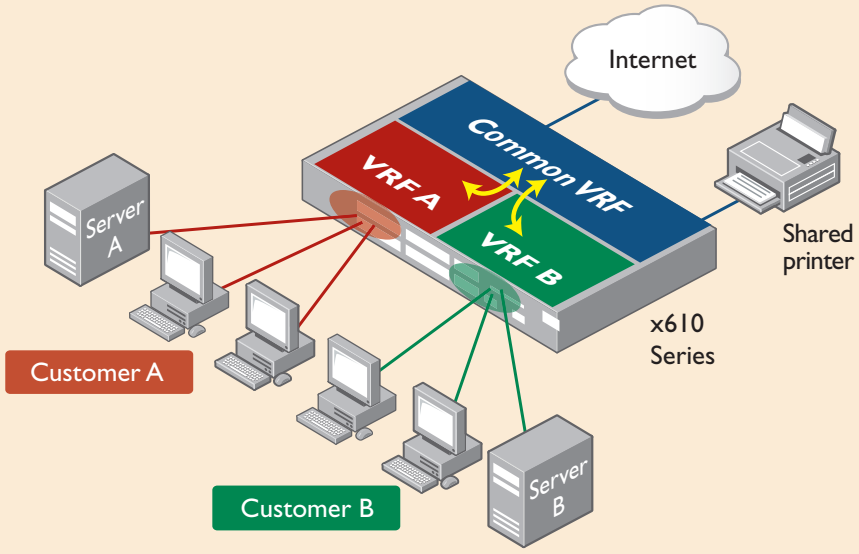


Diagram 2: VRF Lite

Specifications

Performance

» 48Gbps of stacking bandwidth
» Supports 9KB jumbo frames
» Wirespeed multicasting
» Up to 32K MAC addresses
» 8K Layer 3 entries
» 512MB DDR SDRAM
» 64MB flash memory
» Packet buffer memory: AT-x610-24Ts - 2MB
AT-x610-48Ts - 4MB

Reliability

» Modular AlliedWare Plus operating system
» Redundant Power Supply available to load share with internal power supply, providing uninterrupted power and extra reliability
» Full environmental monitoring of PSUs, fans, temperature and internal voltages. SNMP traps alert network managers in case of any failure

Expandability

» One expansion bay
» IPv6 routing license option
» Advanced Layer 3 license option

Flexibility and Compatibility

» Gigabit SFP ports will support any combination of 1000T, 1000X SFPs, 1000SX, 1000LX, or 1000ZX SFPs

Diagnostic Tools

» Built-In Self Test (BIST)
» Ping polling
» Port mirroring
» Trace route

General Routing

» Black hole routing
» Directed broadcast forwarding
» DNS relay
» Equal Cost Multi-Path (ECMP) routing
» Policy-based routing
» Route maps
» Route redistribution (OSPF, BGP, RIP)
» UDP broadcast helper (IP helper)
» Up to eight Virtual Routing and Forwarding (VRF Lite) domains (with license)

IPv6 Features

» 6to4 tunnelling
» DHCPv6 relay, DNSv6, NTPv6
» IPv4 and IPv6 dual stack
» IPv6 management via Ping, TraceRoute, Telnet and SSH
» RA guard

Management

» Eco-mode allows ports and LEDs to be disabled to save power
» Web-based Graphical User Interface (GUI)
» Industry-standard CLI with context-sensitive help
» Powerful CLI scripting tool
» SD/SDHC memory card socket allowing software release files, configurations and other files to be stored for backup and distribution to other devices.
» Configurable logs and triggers provide an audit trail of SD card insertion and removal
» Secure Copy (SCP)
» Built-in text editor
» Event-based triggers allow user-defined scripts to be run upon selected system events

Quality of Service

» Limit bandwidth per port or per traffic class down to 64kbps
» Wirespeed traffic classification with low latency essential for VoIP and real-time streaming media applications
» Policy-based QoS based on VLAN, port, MAC and general packet classifiers
» Policy-based storm protection
» Extensive remarking capabilities
» Strict priority scheduling, weighted round robin or mixed
» RED and WRED curves for drop precedence

Resiliency

» Stacking ports can be configured as 10G Ethernet ports
» Control plane prioritization ensures the CPU always has sufficient bandwidth to process network control traffic
» Dynamic link failover
» Ethernet Protection Switched Rings (EPSR)
» Long-distance stacking
» Loop protection - loop detection
» Loop protection - thrash limiting
» Mix up to four x600 and x610 units in the same VCStack
» PVST+ compatibility-mode
» STP root guard
» Stackable up to eight units in a VCStack
» VCStack fast failover minimizes network disruption

Security Features

» Access Control Lists (ACLs)
» Auth fail VLAN
» BPDU protection
» DHCP snooping, IP source guard and dynamic ARP inspection
» DoS attack blocking and virus throttling
» Dynamic VLAN assignment
» Guest VLAN
» MAC-based authentication
» Port-based learn limits (intrusion detection)
» Private VLANs, providing security and port isolation of multiple customers using the same VLAN
» Strong password security
» Web-based authentication

Environmental Specifications

» Operating temperature range:
0°C to 40°C (32°F to 104°F)
Derated by 1°C per 305 meters (1,000 ft)
» Storage temperature range:
-25°C to 70°C (-13°F to 158°F)
» Operating relative humidity range:
5% to 90% non-condensing
» Storage relative humidity range:
5% to 95% non-condensing
» Operating altitude:
3,048 meters maximum (10,000 ft)
» Front to back forced air cooling

Electrical Approvals and Compliances

» EMC: EN55022 class A, FCC class A, VCCI class A
» Immunity: EN55024, EN61000-3-levels 2 (Harmonics), and 3 (Flicker) – AC models only

Safety

» Standards: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950.1
» Certification: UL, cUL, TUV

Restrictions on Hazardous Substances (RoHS) Compliance

» EU RoHS compliant
» China RoHS compliant

Country of Origin

» Singapore

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	100/1000X SFP PORTS	1000X SFP COMBO PORTS	10GIGABIT SFP+ PORTS		MAX POE+ PORTS	SWITCHING FABRIC	FORWARDING RATE
AT-x610-24Ts	24	-	4	-	2*	-	96Gbps	71.4Mpps
AT-x610-24Ts-POE+	24	-	4	-	2*	24	96Gbps	71.4Mpps
AT-x610-24Ts/X	24	-	4	2	4*	-	136Gbps	101.2Mpps
AT-x610-24Ts/X-POE+	24	-	4	2	4*	24	136Gbps	101.2Mpps
AT-x610-24SPs/X	-	24	4†	2	4*	-	136Gbps	101.2Mpps
AT-x610-48Ts	48	-	4	-	2*	-	144Gbps	107.1Mpps
AT-x610-48Ts-POE+	48	-	4	-	2*	48	144Gbps	107.1Mpps
AT-x610-48Ts/X	48	-	2	2	4*	-	184Gbps	136.9Mpps
AT-x610-48Ts/X-POE+	48	-	2	2	4*	48	184Gbps	136.9Mpps

† 10/100/1000T RJ-45 copper ports * with AT-x6EM/XS2 module in standalone switch

Physical Specifications and MTBF Figures

PRODUCT	WIDTH	DEPTH	HEIGHT	MOUNTING	WEIGHT		MTBF (HOURS)
					UNPACKAGED	PACKAGED	
AT-x610-24Ts	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.3 kg (13.89 lb)	8.8 kg (19.4 lb)	80,000
AT-x610-24Ts-POE+	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	5.6 kg (12.35 lb)	7.6 kg (16.76 lb)	160,000*
AT-x610-24Ts/X	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.3 kg (13.89 lb)	9.7 kg (21.38 lb)	80,000
AT-x610-24Ts/X-POE+	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	5.6 kg (12.35 lb)	7.6 kg (16.76 lb)	150,000*
AT-x610-24SPs/X	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.6 kg (14.55 lb)	9.2 kg (20.3 lb)	70,000
AT-x610-48Ts	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.7 kg (14.77 lb)	9.0 kg (19.84 lb)	70,000
AT-x610-48Ts-POE+	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.0 kg (13.23 lb)	7.8 kg (17.2 lb)	120,000*
AT-x610-48Ts/X	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.8 kg (14.99 lb)	9.8 kg (21.61 lb)	60,000
AT-x610-48Ts/X-POE+	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack mount	6.0 kg (13.23 lb)	8.5 kg (18.74 lb)	120,000*
AT-RPS3000	440 mm (17.32 in)	360 mm (14.17 in)	44 mm (1.73 in)	Rack mount	4.3 kg (9.48 lb)	6.1 kg (13.45 lb)	440,000*
AT-PWR250 AC	150 mm (5.9 in)	27.5 mm (10.83 in)	42 mm (1.65 in)	Internal	1.5 kg (3.31 lb)	2.7 kg (5.95 lb)	170,000
AT-PWR250 DC	150 mm (5.9 in)	27.5 mm (10.83 in)	42 mm (1.65 in)	Internal	1.5 kg (3.31 lb)	2.7 kg (5.95 lb)	180,000
AT-PWR800	150 mm (5.9 in)	27.5 mm (10.83 in)	42 mm (1.65 in)	Internal	1.8 kg (3.97 lb)	2.9 kg (6.39 lb)	150,000
AT-PWR1200	150 mm (5.9 in)	330 mm (13 in)	42 mm (1.65 in)	Internal	2.2 kg (4.85 lb)	4.5 kg (9.92 lb)	100,000
AT-x6EM/XS2	150 mm (5.9 in)	95 mm (3.74 in)	30 mm (1.18 in)	Internal	0.2 kg (0.44 lb)	0.5 kg (1.1 lb)	2,130,000
AT-StackXG	147 mm (5.8 in)	86 mm (3.4 in)	31 mm (1.2 in)	Internal	0.131 kg (0.35 lb)	0.75 kg (1.65 lb)	6,850,000

*Excluding PSU

Power and Noise Characteristics

PRODUCT	INTERNAL PSU OR AT-PWR250 (NO POE LOAD)			AT-PWR800 (FULL POE+ LOAD)			AT-PWR1200 (FULL POE+ LOAD)		
	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE
AT-x610-24Ts	81W	299 BTU/hr	51.2 dBA	-	-	-	-	-	-
AT-x610-24Ts-POE+	87W	299 BTU/hr	51.2 dBA	632W	708 BTU/hr	51.8 dBA	930W	913 BTU/hr	
AT-x610-24Ts/X	89W	320 BTU/hr	51.2 dBA	-	-	-	-	-	-
AT-x610-24Ts/X-POE+	92W	320 BTU/hr	51.2 dBA	636W	729 BTU/hr	51.8 dBA	935W	934 BTU/hr	
AT-x610-24SPs/X	88W	375 BTU/hr	51.2 dBA	-	-	-	-	-	-
AT-x610-48Ts	112W	405 BTU/hr	51.2 dBA	-	-	-	-	-	-
AT-x610-48Ts-POE+	119W	405 BTU/hr	51.2 dBA	673W	815 BTU/hr	51.8 dBA	1,027W	1071 BTU/hr	
AT-x610-48Ts/X	120W	427 BTU/hr	51.2 dBA	-	-	-	-	-	-
AT-x610-48Ts/X-POE+	125W	427 BTU/hr	51.2 dBA	681W	836 BTU/hr	51.8 dBA	1,034W	1092 BTU/hr	

*NOISE: tested to ISO7779; front bystander position

PSU PoE Options

POWER SUPPLY UNIT	POE POWER AVAILABLE	MAXIMUM POE PORTS SUPPORTED			
		CLASS 1 (4.0 W)	CLASS 2 (7.0 W)	CLASS 3 (15.4 W)	CLASS 4 (30 W)
AT-PWR250	-	-	-	-	-
AT-PWR800	480W	48	48	31	16
AT-PWR1200	780W	48	48	48	26

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.1 or higher

Authentication

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

Border Gateway Protocol (BGP)

BGP dynamic capability
BGP graceful restart
BGP outbound route riltering
Extended communities attribute
RFC 1771 Border Gateway Protocol 4 (BGP-4)
RFC 1772 Application of the Border Gateway Protocol in the Internet
RFC 1997 BGP communities attribute
RFC 2385 Protection of BGP sessions via the TCP MD5 signature option
RFC 2439 BGP route flap damping
RFC 2796 BGP route reflection - an alternative to full mesh IBGP
RFC 2858 Multiprotocol extensions for BGP-4
RFC 2918 Route refresh capability for BGP-4
RFC 3065 Autonomous system confederations for BGP
RFC 3107 Carrying label information in BGP-4
RFC 3392 Capabilities advertisement with BGP-4
RFC 4893 BGP support for four-octet AS number space

Encryption

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 802.1AX-2008 link aggregation (static and dynamic)
IEEE 802.2 Logical Link Control
IEEE 802.3 Ethernet CSMA/CD
IEEE 802.3ab 1000T
IEEE 802.3ae 10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3at Power over Ethernet Plus (PoE+)
IEEE 802.3u 100TX
IEEE 802.3x Flow control - full-duplex operation
IEEE 802.3z Gigabit Ethernet

General Routing

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 903 Reverse ARP
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) relay and server
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 the bootstrap protocol
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 3056 Connection of IPv6 domains via IPv4 clouds
RFC 3484 Default address selection for IPv6
RFC 3596 DNS extensions to support IPv6
RFC 4007 IPv6 scoped address architecture
RFC 4193 Unique local IPv6 unicast addresses
RFC 4291 IPv6 addressing architecture
RFC 4443 Internet Control Message Protocol (ICMPv6)
RFC 4861 Neighbor discovery for IPv6
RFC 4862 IPv6 stateless address autoconfiguration
RFC 5014 IPv6 socket API for source address selection
RFC 5095 Deprecation of type 0 routing headers in IPv6
RFC 5175 IPv6 router advertisement flags option

Management

AT Enterprise MIB
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 1493 Bridge MIB
RFC 1724 RIPv2 MIB extension
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 2096 IP forwarding table MIB
RFC 2574 User-based Security Model (USM) for SNMPv3
RFC 2575 View-based Access Control Model (VACM) for SNMP
RFC 2674 Definitions of managed objects for bridges with traffic classes, multicast filtering and VLAN extensions
RFC 2741 Agent Extensibility (AgentX) protocol
RFC 2787 Definitions of managed objects for VRRP
RFC 2819 RMON MIB (groups 1,2,3 and 9)
RFC 2863 Interfaces group MIB
RFC 3164 Syslog protocol
RFC 3176 sFlow: A method for monitoring traffic in switched and routed networks
RFC 3412 Message processing and dispatching for the SNMP
RFC 3413 SNMP applications
RFC 3418 MIB for SNMP
RFC 3621 PoE MIB
RFC 3635 Definitions of managed objects for the Ethernet-like interface types
RFC 3636 IEEE 802.3 MAU MIB
RFC 4188 Definitions of managed objects for bridges
RFC 4318 Definitions of managed objects for bridges with RSTP
RFC 4560 Definitions of managed objects for Remote Ping, Traceroute, and Lookup Operations

Multicast Support

Bootstrap router for PIM-SM
IGMP proxy
IGMP query solicitation
IGMP snooping
RFC 1112 Host extensions for IP multicasting
RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
RFC 2362 PIM-SM
RFC 2715 Interoperability rules for multicast routing protocols
RFC 3376 IGMPv3
RFC 3973 PIM-DM
RFC 4541 IGMP and MLD snooping switches

Open Shortest Path First (OSPF)

Graceful OSPF restart
OSPF link-local signaling
OSPF MD5 authentication
OSPF restart signaling
OSPF TE extensions
OSPFv3 TE extensions
Out-of-band LSDB resync
RFC 1245 OSPF protocol analysis
RFC 1246 Experience with the OSPF protocol
RFC 1370 Applicability statement for OSPF
RFC 1765 OSPF database overflow
RFC 2328 OSPFv2
RFC 2370 OSPF opaque LSA option
RFC 2740 OSPFv3 for IPv6
RFC 3101 OSPF Not-So-Stubby Area (NSSA) option
RFC 3509 Alternative implementations of OSPF area border routers

Quality of Service

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

IEEE 802.1D-2004 MAC bridges
IEEE 802.1D-2004 Rapid Spanning-Tree Protocol (RSTP)
IEEE 802.1Q-2005 Multiple Spanning-Tree Protocol (MSTP)
RFC 3768 Virtual Router Redundancy Protocol (VRRP)

Routing Information Protocol (RIP)

RFC 1058 Routing Information Protocol (RIP)
RFC 2080 RIPng for IPv6
RFC 2081 RIPng protocol applicability statement
RFC 2082 RIP-2 MD5 authentication
RFC 2453 RIPv2

Security Features

SSH remote login
SSLv2 and SSLv3
TACACS+ accounting
TACACS+ authentication
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 2246	TLS protocol v1.0
RFC 2865	RADIUS
RFC 2866	RADIUS accounting
RFC 2868	RADIUS attributes for tunnel protocol support
RFC 3546	Transport Layer Security (TLS) extensions
RFC 3579	RADIUS support for Extensible Authentication Protocol (EAP)
RFC 3748	PPP 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

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	Trivial File Transfer Protocol (TFTP)
RFC 1985	SMTP service extension
RFC 2049	MIME
RFC 2131	DHCP for IPv4
RFC 2132	DHCP options and BOOTP vendor extensions
RFC 2554	SMTP service extension for authentication
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 3993	Subscriber-ID suboption for DHCP relay agent option
RFC 5905	Network time protocol version 4

VLAN Support

Generic VLAN Registration Protocol (GVRP)
IEEE 802.1ad Provider bridges (VLAN stacking, Q-in-Q)
IEEE 802.1Q-2005 Virtual LAN (VLAN) bridges
IEEE 802.1v VLAN classification by protocol and port
IEEE 802.3ac VLAN tagging

VoIP Support

LLDP-MED ANSI/TIA-1057
Voice VLAN

Ordering Information

Feature Licenses

NAME	DESCRIPTION	INCLUDES
AT-FL-x610-01	x610 advanced Layer 3 license	» OSPF[1] » PIM-SM » PIM-DM » BGP4 » VLAN double tagging (Q-in-Q) » VRF Lite
AT-FL-x610-02	x610 IPv6 pack	» IPv6 management » IPv6 static routes » IPv6 unicast forwarding » RIPng » OSPFv3 » MLD snooping
AT-FL-RADIUS-FULL	Increase local RADIUS server support limits[2]	» 5000 users » 1000 NAS

[1] The standard switch software supports 64 OSPF routes. The advanced Layer 3 license supports 12K OSPF routes.
[2] 100 users and 24 NAS can be stored in local RADIUS database with base software.

x610 Series

AT-x610-24Ts-60
24 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP combo ports, internal PSU

AT-x610-24Ts-POE+-00
24 x 10/100/1000T (RJ-45) copper ports Power over Ethernet (IEEE 802.3at), 4 x 1000X SFP combo ports, removable PSU (PSU not included)

AT-x610-24Ts/X-60
24 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP combo ports, 2 x SFP+ ports, internal PSU

AT-x610-24Ts/X-POE+-00
24 x 10/100/1000T (RJ-45) copper ports, Power over Ethernet (IEEE 802.3at), 4 x 1000X SFP combo ports, 2 x SFP+ ports, removable PSU (PSU not included)

AT-x610-24SPs/X-60
24 x 100/1000X SFP ports, 4 x 10/100/1000T combo ports, 2 x SFP+ ports, internal PSU

AT-x610-48Ts-60
48 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP combo ports, internal PSU

AT-x610-48Ts-POE+-00
48 x 10/100/1000T (RJ-45) copper ports, Power over Ethernet (IEEE 802.3at), 4 x 1000X SFP combo ports, removable PSU (PSU not included)

AT-x610-48Ts/X-60
48 x 10/100/1000T (RJ-45) copper ports, 2 x 1000X SFP combo ports, 2 x SFP+ ports, internal PSU

AT-x610-48Ts/X-POE+-00
48 x 10/100/1000T (RJ-45) copper ports, Power over Ethernet (IEEE 802.3at), 2 x 1000X SFP combo ports, 2 x SFP+ ports, removable PSU (PSU not included)

Expansion Modules

AT-x6EM/XS2-00
Expansion module (2 x SFP+) for long-distance stacking or two additional 10GbE ports

AT-StackXG-00
Expansion module with one AT-StackXG/0.5-00 cable included

Cables

AT-StackXG/0.5-00
0.5 meter cable for stacking

AT-StackXG/1-00
1 meter cable for stacking

AT-SP10TW1
1 meter SFP+ direct attach cable

AT-SP10TW3
3 meter SFP+ direct attach cable

AT-SP10TW7
7 meter SFP+ direct attach cable

10GbE SFP+ Modules

AT-SP10SR
10GSR 850 nm short-haul, 300 m with MMF

AT-SP10LR
10GLR 1310 nm medium-haul, 10 km with SMF

SFP Modules

AT-SPFX/2
100FX multi-mode 1310 nm fiber up to 2 km

AT-SPFX/15
100FX single-mode 1310 nm fiber up to 15 km

AT-SPFXBD-LC-13
100BX Bi-Di (1310 nm Tx, 1550 nm Rx) fiber up to 10 km

AT-SPFXBD-LC-15
100BX Bi-Di (1550 nm Tx, 1310nm Rx) fiber up to 10 km

AT-SPTX
1000T 100 m copper

AT-SPSX
1000SX GbE multi-mode 850 nm fiber up to 550 m

100Mbps SFP modules are only compatible with the AT-x610-24SPs/X switch

AT-SPSX/I
1000SX GbE multi-mode 850 nm fiber up to 550 m industrial

AT-SPEX
1000X GbE multi-mode 1310 nm fiber up to 2 km

AT-SPLX10
1000LX GbE single-mode 1310 nm fiber up to 10 km

AT-SPLX10/I
1000LX GbE single-mode 1310 nm fiber up to 10 km Industrial

AT-SPBD10-13
1000LX GbE Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 10 km

AT-SPBD10-14
1000LX GbE Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 10 km

AT-SPLX40
1000LX GbE single-mode 1310 nm fiber up to 40 km

AT-SPZX80
1000ZX GbE single-mode 1550 nm fiber up to 80 km

PoE Power Supplies

AT-PWR800-xx
Additional 800W AC system and PoE+ power supply

AT-PWR1200-xx
Additional 1200W AC system and PoE+ power supply

Where xx = 10 for US power cord
20 for no power cord
30 for UK power cord
40 for Australian power cord
50 for European power cord

Power Supply Accessories

AT-RPS3000-00
Chassis for up to two redundant power supplies (PSUs not included)

AT-PWR250-xx
Additional 250W AC system power supply

AT-PWR250-80
Additional 250W DC system power supply

AT-RPS-CBL1.0
1 meter RPS cable

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617-000177 Rev A