

x600 Series

Intelligent Gigabit Layer 3+ Switches

The Allied Telesis x600 Series is an advanced series of stackable switches providing high performance, flexibility and reliability.



Scalable

The choice of 24-port and 48-port versions, coupled with the ability to stack up to 4 units, allows the Allied Telesis x600 Series to connect anything from a small workgroup right up to a large business.

With a choice of 1 or 10 Gigabit uplink ports, bandwidth can be tailored to suit the network application. Hot-swappable XFPs provide high-speed, high-capacity fiber uplinks, with up to 40Gbps uplink capacity from each switch to the network core — so a 4-unit stack can provide a massive 160Gbps of uplink bandwidth independent from stacking bandwidth.

The flexibility of the x600 Series, coupled with the ability to stack multiple units, ensures a future-proof network.

Secure

Advanced security features protect the network from the edge to the core. Network Access Control (NAC) assures security, allowing unprecedented control over user access to the network and mitigating threats to network infrastructure. 802.1x port-based authentication, in partnership with standards-compliant dynamic VLAN assignment, assesses a user's network

security adherence and either grants authentication or offers remediation.

Authentication options on the x600 Series also include alternatives to 802.1x port-based authentication, such as web authentication to enable guest access, and MAC authentication for end points that do not have an 802.1x supplicant. All three authentication methods — 802.1x, MAC-based and Web-based, — can be enabled simultaneously on the same port. This is called tri-authentication.

Manageable

The x600 Series runs the advanced AlliedWare Plus™ fully featured operating system, delivering a rich feature set and an industry-standard CLI. The industry-standard CLI reduces training requirements and is consistent across all AlliedWare Plus devices, simplifying network management.

The built-in, web-based Graphical User Interface is an easy-to-use and powerful management tool. With comprehensive monitoring facilities and the ability to view a virtual chassis as a single entity, the GUI is an essential part of a network management toolkit.



New Features

- ▶ EPSR SuperLoop Protection
- ▶ Optical DDM
- ▶ PIM - SSM
- ▶ TACACS+ Accounting
- ▶ IPv6 Features

Key Features

Network Access Control (NAC)

- NAC allows for unprecedented control over user access to the network, in order to mitigate threats to network infrastructure. Furthermore, if multiple users share a port multi-authentication is 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.

Network in a Box

- Simplifies administration by integrating several network services into the x600 switch.
- Radius Server checks the identity of users to keep the network safe.
- Storm Control ensures a robust network by managing the amount of traffic allowed on the network, and dealing with any unexpected surges.
- DHCP server automates the distribution of network addresses to PCs.
- A centralized Timekeeper ensures the network is always working in full synchronicity.
- Loop Protection guards against accidental wiring mistakes.

VCStack™ (Virtual Chassis Stacking)

- Create a VCStack with up to four units. 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.

EPSRing™ (Ethernet Protection Switched Rings)

- EPSR and 10 Gigabit Ethernet allow several x600 Series 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.

- SuperLoop Protection enables a link between two EPSR nodes to be in separate EPSR domains, improving redundancy and network fault resiliency.

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 the AT-x600-24Ts-POE and POE+, a separate power connection to media endpoints such as IP phones and wireless access points is not required. PoE+ provides even greater flexibility, as it is capable of connecting devices that require more power (up to 30 Watts), for example tilt and zoom security cameras. Diagram 1 shows an example of PoE+ power provisioning.

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

- LLDP-MED extends LLDP's 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.

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 and Accounting

- TACACS+ provides access control and accounting 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. Accounting enables user sessions and CLI commands to be logged to create an audit trail for user activity.

Optical DDM

- Most modern optical SFP/SFP+/XFP transceivers support Digital Diagnostics Monitoring (DDM) functions according to the specification SFF-8472. This enables various parameters of the transceiver to be monitored in real-time, such as optical output power, temperature, laser bias current and transceiver supply voltage. The x600 Series provides easy access to this information simplifying diagnosing problems with optical modules and fiber connections.

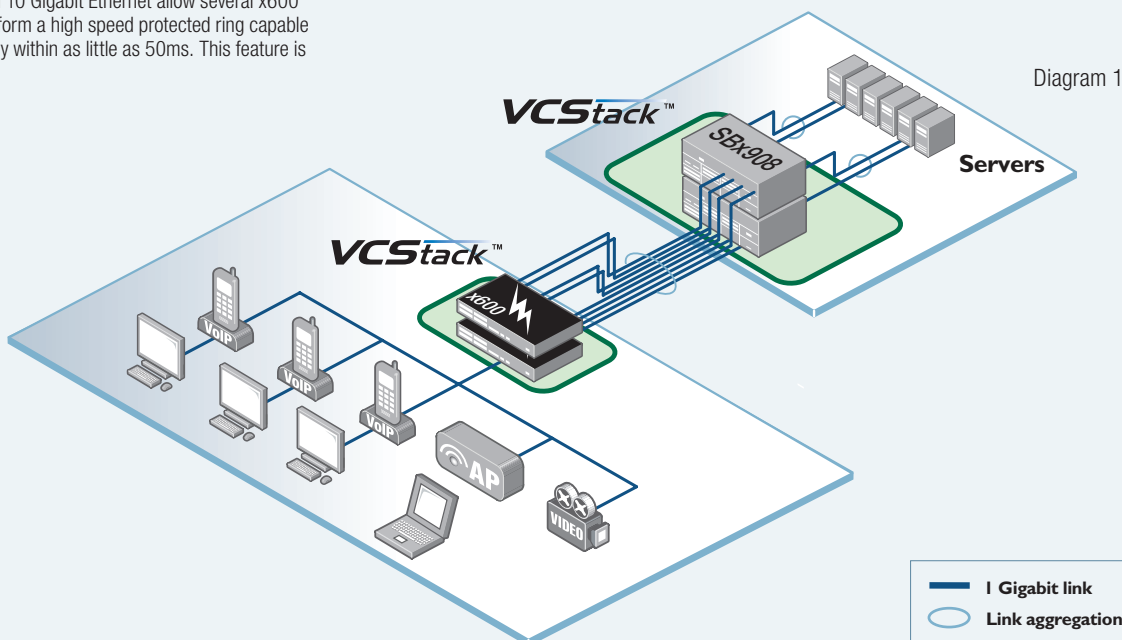


Diagram 1: PoE+ provision

Key Solutions

NAC (Network Access Control)

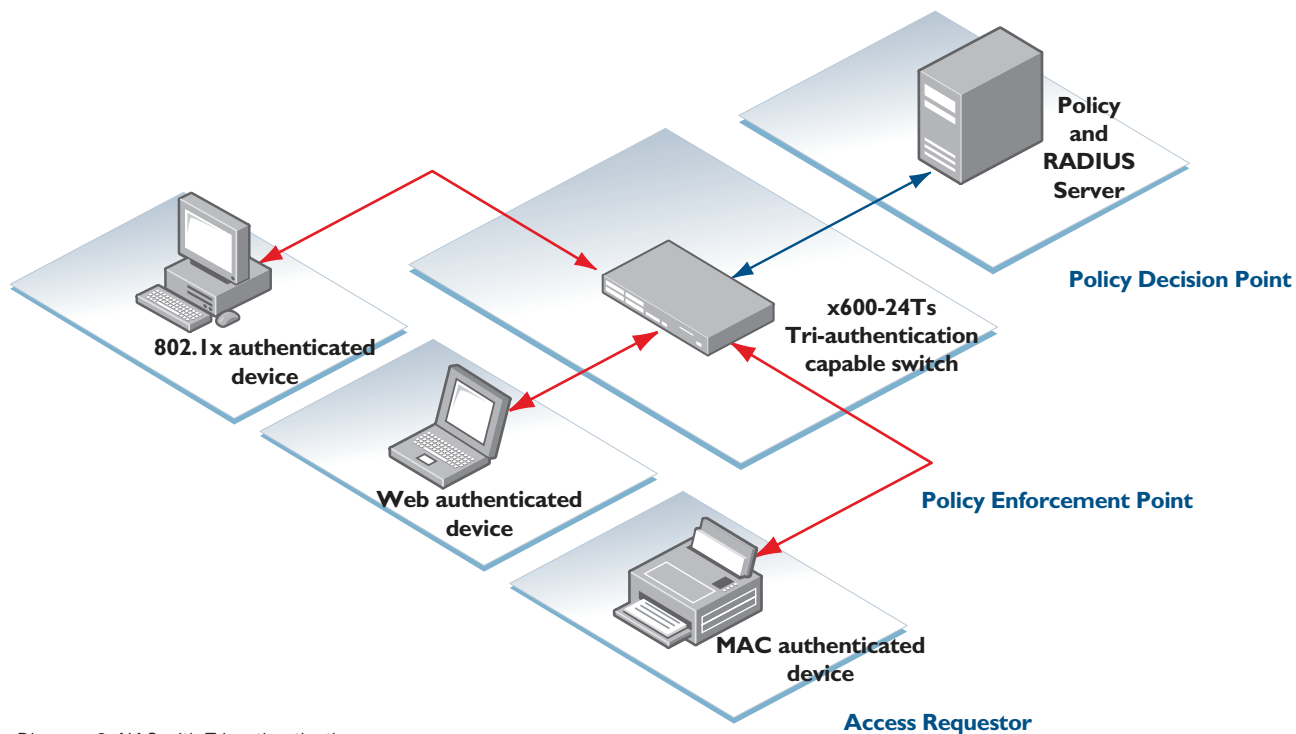


Diagram 2: NAC with Tri-authentication

One of the major security issues facing enterprise networks is prevention of internal breaches and malicious software infiltration. Internal defense requires significant involvement with individual network devices, which is costly and time consuming. NAC lowers this overhead and provides an effective solution to internal network security.

NAC automates network security policy management, allowing easy control of network access and management of network security. NAC uses 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment, to assess a user's adherence to network security policies, and then either grant authentication or offer remediation. Allied Telesis NAC also supports alternatives to 802.1x port-based authentication, such as web authentication to enable guest access, and

MAC authentication for end points that do not have an 802.1x supplicant.

Tri-Authentication provides a way for the network to successfully manage authentication of all devices.

Allied Telesis is a partner with Microsoft, supporting Microsoft Network Access Protection (NAP) technology. Allied Telesis is committed to providing secure networks, and interoperability with Microsoft's network access control solution is an important component of an already comprehensive security set. The Allied Telesis NAC solution also interoperates with many other third party NAC solutions.

Key Solutions

VCStack (Virtual Chassis Stacking)

VCStack: Resiliency and Stability

Today's modern Enterprise business relies on Information Technology resources and applications to access business-critical information, and for day-to-day work. A high-availability infrastructure is of paramount importance. The Allied Telesis x600 Series switches provide the ideal solution with VCStack.

With VCStack, multiple switches appear as a single virtual chassis. In normal operation, this virtual chassis acts as a single switch, simplifying management.

Diagram 3 shows link aggregation between the core VCStack and the edge switches. With link aggregation across ports on different virtual chassis members, there is no perceptible disruption in the case of a link failure, and the full bandwidth of the network remains available. Fast Failover ensures absolutely minimal network downtime in the event of a problem.

VCStack and link aggregation provide a solution where network resources are spread across the virtual chassis members, ensuring device and path resiliency. Virtualization of the network core ensures access to information when needed.

The x600 Series provides an extensive range of port-density and uplink-connectivity options, when used as aggregation layer switches or Gigabit to the desktop edge switches. This scalable switch family can connect anything from a small workgroup to a large business.

Diagram 4 shows four AT-x600-48Ts/XP switches connected as a virtual chassis for maximum Gigabit to the desktop or aggregation layer port density. With the stacking bandwidth provided separately from the 10 Gigabit uplink ports, this solution provides a massive 160 Gigabits of uplink bandwidth to the network core, while the stacking backplane throughput is completely unaffected for maximum performance.

Whether used to provide a virtual network core, or to maximize port density, the x600 family switches together with VCStack provide resiliency, scalability and ease of management. VCStack makes networking reliable.

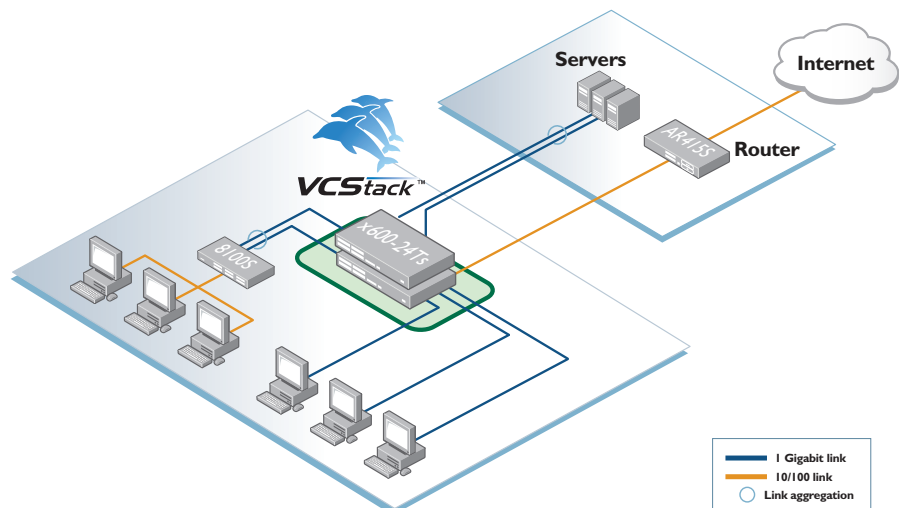


Diagram 3: VCStack - resilient network

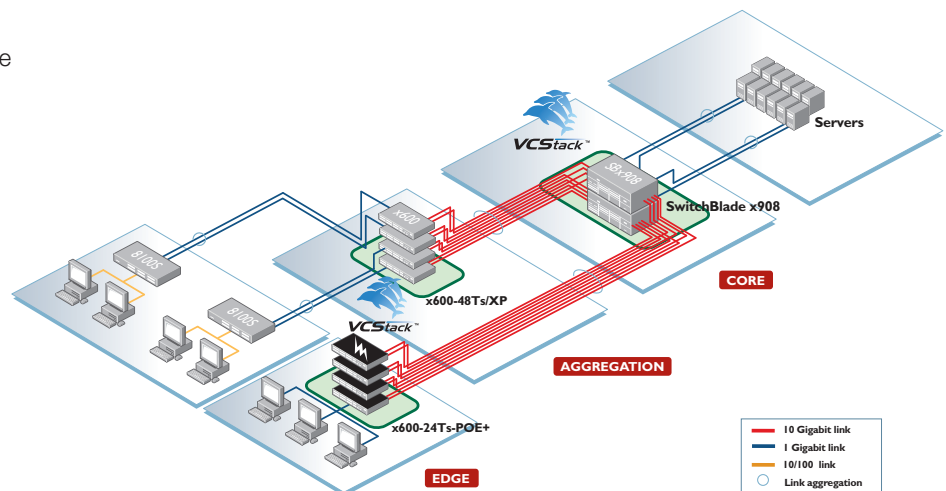


Diagram 4: VCStack - scalable port density

Specifications

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	1000X SFP PORTS	1000X SFP COMBO PORTS	10GIGABIT XFP PORTS	MAX PoE/POE+ PORTS	SWITCHING FABRIC	FORWARDING RATE
AT-x600-24Ts	24	-	4	-	-	96Gbps	71.4Mpps
AT-x600-24Ts-POE	24	-	4	-	24 PoE	96Gbps	71.4Mpps
AT-x600-24Ts-POE+	24	-	4	-	24 PoE/12 PoE+	96Gbps	71.4Mpps
AT-x600-24Ts/XP	24	-	4	2	-	136Gbps	101.2Mpps
AT-x600-48Ts	44	4	-	-	-	144Gbps	107.1Mpps
AT-x600-48Ts/XP	44	4	-	2	-	184Gbps	136.9Mpps

Performance

- ▶ 48Gbps of stacking bandwidth
- ▶ Extensive wirespeed traffic classification for ACLs and QoS
- ▶ Supports 9KB jumbo frames
- ▶ Wirespeed multicasting
- ▶ Up to 16K MAC addresses
- ▶ 4K VLANs
- ▶ 4K Layer 3 entries
- ▶ 512MB DDR SDRAM
- ▶ 64MB flash memory
- ▶ Packet buffer memory: AT-x600-24T - 2MB
AT-x600-48T - 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

Power Characteristics

- ▶ AC Voltage: 100 to 240V (+/-10% auto ranging)
- ▶ Frequency: 47 to 63Hz

Expandability

- ▶ One expansion bay for AT-StackXG module supporting two high speed stacking ports (on non-PoE models, stacking ports are built-in on PoE models)
- ▶ Stackable up to four units in a VCSStack
- ▶ 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
- ▶ Mix up to four x600 and x610 units in the same VCSStack

Diagnostic Tools

- ▶ Built-In Self Test (BIST)
- ▶ Ping polling
- ▶ Port mirroring
- ▶ Traceroute
- ▶ Optical Digital Diagnostic Monitoring (SFF-8472)

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)

IPv6 Features

- ▶ 6to4 tunnelling
- ▶ DHCPv6 relay, DNSv6, NTPv6
- ▶ IPv4 and IPv6 dual stack
- ▶ IPv6 management via ping, Traceroute, Telnet and SSH

Management

- ▶ Eco-friendly mode allows ports and LEDs to be disabled to save power
- ▶ Console management port on the front panel for ease of access
- ▶ 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 (QoS)

- ▶ Limit bandwidth per port or per traffic class 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

- ▶ Control plane prioritization ensures the CPU always has sufficient bandwidth to process network control traffic
- ▶ Dynamic link failover
- ▶ EPSRing (Ethernet Protection Switched Rings)
- ▶ EPSR Super Loop Protection

- ▶ Loop protection: loop detection and thrash limiting
- ▶ PVST+ compatibility-mode
- ▶ STP root guard
- ▶ VCSStack 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

- ▶ China

x600 Series | Intelligent Gigabit Layer 3+ Switches

Physical Specifications

PRODUCT	WIDTH	DEPTH	HEIGHT	MOUNTING	WEIGHT	
					UNPACKAGED	PACKAGED
AT-x600-24Ts	440 mm (17.32 in)	305 mm (12.0 in)	44 mm (1.73 in)	1 RU rack mount	4.5 kg (9.92 lb)	6.1 kg (13.44 lb)
AT-x600-24Ts-POE	440 mm (17.32 in)	408 mm (16.06 in)	44 mm (1.73 in)	1 RU rack mount	6.9 kg (15.21 lb)	8.5 kg (18.73 lb)
AT-x600-24Ts/PoE+	440 mm (17.32 in)	408 mm (16.06 in)	44 mm (1.73 in)	1 RU rack mount	6.9 kg (15.21 lb)	8.5 kg (18.73 lb)
AT-x600-24Ts/XP	440 mm (17.32 in)	305 mm (12.0 in)	44 mm (1.73 in)	1 RU rack mount	4.6 kg (10.14 lb)	6.2 kg (13.66 lb)
AT-x600-48Ts	440 mm (17.32 in)	305 mm (12.0 in)	44 mm (1.73 in)	1 RU rack mount	4.9 kg (10.80 lb)	6.5 kg (14.33 lb)
AT-x600-48Ts/XP	440 mm (17.32 in)	305 mm (12.0 in)	44 mm (1.73 in)	1 RU rack mount	4.9 kg (10.80 lb)	6.5 kg (14.33 lb)
AT-StackXG	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)

Power and Noise Characteristics

PRODUCT	NO POE LOAD			15W PER PORT POE LOAD	
	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	HEAT DISSIPATION
AT-x600-24Ts	87W	297 BTU/hr	45.8 dBA	-	-
AT-x600-24Ts-POE	78W	268 BTU/hr	48.1 dBA	462W	1,579 BTU/hr
AT-x600-24Ts-POE+	78W	268 BTU/hr	46.8 dBA	462W	1,579 BTU/hr
AT-x600-24Ts/XP	87W	297 BTU/hr	45.8 dBA	-	-
AT-x600-48Ts	112W	382 BTU/hr	46.8 dBA	-	-
AT-x600-48Ts/XP	112W	382 BTU/hr	46.8 dBA	-	-

NOISE tested to ISO7779; front bystander position

Latency (microseconds)

PRODUCT	SPEED			
	10 MBPS	100 MBPS	1 GBPS	10 GBPS
AT-x600-24Ts	32.3µs	6.0µs	3.7µs	
AT-x600-24Ts/X	32.3µs	6.0µs	3.7µs	6.1µs
AT-x600-48Ts	32.3µs	6.0µs	3.7µs	
AT-x600-48Ts/X	32.3µs	6.0µs	3.7µs	7.7µs

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.2 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 filtering
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 1000BASE-T
IEEE 802.3ae 10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3at Power over Ethernet Plus (PoE+)
IEEE 802.3u 100BASE-X
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 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

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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
RFC 6105	IPv6 router advertisement guard

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
RFC 4604	Using IGMPv3 and MLDv2 for Source Specific Multicast
RFC 4607	Source-Specific Multicast for IP

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 (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

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-suplicant 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 3580	IEEE 802.1x RADIUS usage guidelines

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 (NTPv4)

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	

Voice over IP (VoIP) Support

LLDP-MED ANSI/TIA-1057	
Voice VLAN	

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Ordering Information

Feature Licenses

NAME	DESCRIPTION	INCLUDES
AT-FL-x600-01	x600 advanced Layer 3 license	<ul style="list-style-type: none"> ▶ OSPF1 ▶ PIM-SM ▶ PIM-DM ▶ BGP4 ▶ VLAN double tagging (Q-in-Q)
AT-FL-x600-02	x600 IPv6 pack	<ul style="list-style-type: none"> ▶ IPv6 management ▶ IPv6 static routes ▶ IPv6 unicast forwarding ▶ RIPng ▶ OSPFv3 ▶ MLD snooping
AT-FL-RADIUS-FULL	Increase local RADIUS server support limits ²	<ul style="list-style-type: none"> ▶ 5000 users ▶ 1000 NAS

¹ The standard switch software supports 64 OSPF routes. The advanced Layer 3 license supports 8K OSPF routes.

² 100 users and 24 NAS can be stored in local RADIUS database with base software.

x600 Series

AT-x600-24Ts-xx

24 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP combo ports, 1 x expansion bay for AT-Stack-XG module

AT-x600-24Ts-POE-xx

24 x 10/100/1000T (RJ-45) Power over Ethernet (IEEE 802.3af) copper ports, 4 x 1000X SFP combo ports, 2 x 24 Gbps on-board stacking ports

AT-x600-24Ts-POE+-xx

24 x 10/100/1000T (RJ-45) Power over Ethernet plus (IEEE 802.3at) copper ports, 4 x 1000X SFP combo ports, 2 x 24 Gbps on-board stacking ports

AT-x600-24Ts/XP-xx

24 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP combo ports, 2 x XFP ports, 1 expansion bay for AT-Stack-XG module

AT-x600-48Ts-xx

44 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP ports, 1 expansion bay for AT-Stack-XG module

AT-x600-48Ts/XP-xx

44 x 10/100/1000T (RJ-45) copper ports, 4 x 1000X SFP ports, 2 x XFP ports, 1 expansion bay for AT-Stack-XG module

10 GbE XFP Modules

AT-XPSR

10GbE-SR 850 nm short-haul, 300 m with MMF

AT-XPLR

10GbE-LR 1310 nm medium-haul, 10 km with SMF

AT-XPER40

10GbE-ER 1550 nm long-haul, 40 km with SMF

SFP Modules

AT-SPTX

1000T 100 m copper

AT-SPSX

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

AT-SPSX/I

1000SX GbE multi-mode 850 nm fiber up to 550 m industrial temperature

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 temperature

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



Redundant Power Supplies for non PoE models

AT-RPS3204-xx

Chassis for up to 4 redundant power supplies (Chassis includes one power supply and one cable)

AT-PWR3202

Additional 200W redundant power supply with RPS cable



Redundant Power Supplies for PoE model

AT-RPS3104-xx

Chassis for up to 4 redundant power supplies (Chassis includes one power supply and one cable)

AT-PWR3101

Additional 450W redundant power supply with RPS cable



Stacking Accessories

AT-StackXG-00

Stacking module with one AT-StackXG/0.5-00 cable included. (Not required for x600-24Ts-PoE or PoE+)

AT-StackXG/0.5-00

0.5 meter cable for stacking

AT-StackXG/1-00

1 meter cable for stacking



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



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