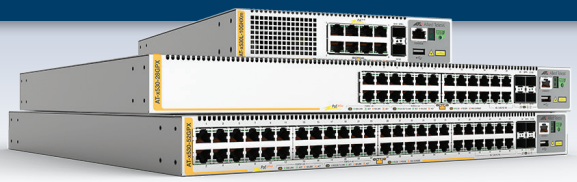
x530L Series

Stackable Intelligent Layer 3 Switches



The Allied Telesis x530L Series stackable Layer 3 switches feature high capacity, resiliency and easy management. With both Multi-Gigabit and high port density models, they are the ideal choice for network access applications.

Overview

The Allied Telesis x530L Series are a high-performing and feature-rich choice for today's networks. The x530L-10GHXm features 8 x 100M/1/2.5/5G Multi-Gigabit ports with 2 x 10 Gigabit uplinks, while 28 and 52 port models feature 24 or 48 x 10M/100M/1 Gigabit ports with 4 x 10 Gigabit uplinks. The ability to stack multiple units, enables a versatile solution for enterprise applications.

The x530L-10GHXm supports PoE++ (up to 90W per port), while 28 or 52 port GPX models support PoE+ (up to 30W per port), making them perfect for connecting and powering devices at the network edge such as wireless access points, and IP surveillance cameras.

Network Management

Vista Manager™ EX bundled with Allied Telesis Autonomous Management Framework™ (AMF) meets the increasing management requirements of modern networks. While AMF allows an entire network to be securely and easily managed as a single virtual device, Vista Manager EX provides an intuitive and powerful graphical tool for monitoring and managing AMF wired, Autonomous Wave Control (AWC) wireless, and third party (SNMP) devices.

Cybersecurity

The x530L Series acting as an AMF member is compatible with our AMF-Security solution, which enables a self-defending network. The AMF–Sec controller responds immediately to any internal malware threats by instructing the x530L to isolate the affected part of the network, and quarantine the suspect device. Vista Manager EX alerts networks administrators of threats that have been dealt with.

Resilient

Today's converging online services mean there is increasing demand for highly-available networks with minimal downtime. Allied Telesis Virtual Chassis Stacking (VCStack™), in conjunction with link aggregation, provides a network with no single point of failure and application resiliency.

x530L Series switches can form a VCStack of up to eight units for enhanced resiliency and simplified management. Mixed stacking allows the x530L Series to stack with x530 Series Switches. Stacking over Long Distance (VCStack™ LD), which enables stacks to be created over long distance fiber links, makes the x530L Series the perfect choice for distributed environments too.

Allied Telesis Ethernet Protection Switched Ring (EPSRing™), and the standards-based G.8032 Ethernet Ring Protection, ensure that distributed network segments have high-speed, resilient access to online resources and applications.

Reliable

The x530L Series was designed with reliability in mind, and guarantees continual delivery of essential services. The 28 and 52 port models feature dual built-in power supplies, and all models have near-hitless online stack reconfiguration, so maintenance does not affect network uptime.

Secure

A secure network environment is guaranteed. The x530L Series offers powerful control over network traffic types, secure management options, loop guard to protect against cabling mistakes, and tri-authentication for comprehensive access control.

High-speed wireless

The x530L-10GHXm provides support for both 2.5 and 5 Gigabit connectivity, allowing high-speed wireless to run at full capacity while avoiding the need to upgrade existing Cat5e/Cat6 cables.

Future proof

Ensure a future-proof network, with superior flexibility and the ability to stack multiple units. All x530L models feature 10 Gigabit uplink ports and a comprehensive IPv6 feature set, so are ready for future network traffic demands.

Environmentally friendly

The x530L Series supports Energy Efficient Ethernet (EEE), automatically reducing the power consumed by the switch whenever there is no traffic on a port. This sophisticated feature significantly lowers operating costs by reducing the power requirements of the switch and any associated cooling equipment.

Key Features

- Autonomous Management Framework™ (AMF)
- Vista Manager EX compatible
- AMF-Security compatible
- VCStack™ up to 8 units locally, or over long distance
- EPSR™ and G.8032 Ethernet Ring Protection for resilient rings
- EPSR Master
- Up to 740W PoE+ power (28 and 52 port models)
- Up to 90W PoE++ per port (x530L-10GHXm)
- Continuous PoE
- Multi-Gigabit (100M/1G/2.5G/5G) (x530L-10GHXm)
- Active Fiber Monitoring (AFM)
- OpenFlow for SDN
- VLAN Translation
- Multicast Source Discovery Protocol (MSDP)
- Link Monitoring
- FIPS 140-2 certified

Key Features

Autonomous Management Framework™ (AMF)

- AMF is a sophisticated suite of management tools that provide a simplified approach to network management. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.
- Any x530L Series switch can operate as the AMF network master, storing firmware and configuration backups for other network nodes. The AMF master enables auto-provisioning and auto-upgrade by providing appropriate files to new network members. New network devices can be pre-provisioned, making installation easy because no onsite configuration is required.
- AMF Guestnode allows Allied Telesis wireless APs and other switching products, as well as third-party devices such as IP phones and security cameras, to be part of an AMF network.

Virtual Chassis Stacking (VCStack™)

- Create a VCStack of up to 8 units with 40Gbps of stacking bandwidth for each unit. Stacking links are connected in a ring so each device has dual connections to further improve resiliency. 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 allows the x530L Series to stack with x530 Series switches, providing flexible deployment options.

Long-Distance Stacking (VCStack™ LD)

- VCStack LD allows a VCStack to be created over longer distances, perfect for distributed network environments.

Ethernet Protection Switched Ring (EPSRing™)

- EPSRing and 10 Gigabit Ethernet allow several x530L Series switches to form high-speed protected rings capable of recovery within as little as 50ms. This feature is perfect for high performance and high availability in enterprise networks.
- Super-Loop Protection (SLP) enables a link between two EPSR nodes to be in separate EPSR domains, improving redundancy and network fault resiliency.
- The x530L Series switches can act as the ESPR Master, or be deployed as EPSR transit nodes, in a high-speed ring.

G.8032 Ethernet Ring Protection

- G.8032 provides standards-based high-speed ring protection, that can be deployed as stand-alone, or interoperate with Allied Telesis EPSR.
- Ethernet Connectivity Fault Monitoring (CFM) proactively monitors links and VLANs, and provides alerts when a fault is detected.

Power over Ethernet (PoE+ and PoE++)

- With PoE, a separate power connection to media endpoints such as IP phones and wireless access points is not necessary. PoE reduces costs and provides flexibility, with the x530L 28 and 52 port models supplying up to 30W per port (PoE+) to endpoints.
- The x530L 10 port model supports up to 90W per port (PoE++) to connect high power devices such as high resolution PTZ cameras, enhanced infrared lighting and lighting controllers, remote Point of Sale (POS) kiosks, and more.

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.

Active Fiber Monitoring (AFM)

- AFM prevents eavesdropping on fiber communications by monitoring received optical power. If an intrusion is detected, the link can be automatically shut down, or an operator alert can be sent.

Multi-Gigabit Ethernet

- The IEEE 802.3bz standard (also known as "NBASE-T") allows traffic speeds of greater than 1 Gigabit on legacy Cat5e/Cat6 cable. The x530L 10 port model supports both 2.5 and 5 Gigabit connectivity, allowing high-speed wireless APs to run at full capacity, and building uplinks to be upgraded, without re-cabling.

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 a real-time view of network traffic.

VLAN Translation

- VLAN Translation allows traffic arriving on a VLAN to be mapped to a different VLAN on the outgoing paired interface.
- It is common for a network Service Provider (SP) to give each customer their own unique VLAN, yet at the customer location give all customers the same VLAN-ID for tagged packets to use on the wire. SPs can use VLAN Translation to change the tagged packet's VLAN-ID at the customer location to the VLAN-ID for tagged packets to use within the SP's network.
- This feature is also useful in Enterprise environments where it can be used to merge two networks together, without manually reconfiguring the VLAN numbering scheme.

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.

Tri-authentication

- Authentication options on the x530L 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 for tri-authentication.

TACACS+ Command Authorization

- TACACS+ Command Authorization offers centralized control over which commands may be issued by each specific AlliedWare Plus device user. It complements authentication and accounting services for a complete AAA solution.

Premium Software License

- By default, the x530L Series offers a comprehensive Layer 2 and basic Layer 3 feature set that includes static routing and IPv6 management features. The feature set can easily be elevated to full Layer 3 by applying the premium software license. This adds dynamic routing protocols and Layer 3 multicasting capabilities.

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.

Dynamic Host Configuration Protocol (DHCP) Snooping

- DHCP servers allocate IP addresses to clients, and the switch keeps a record of addresses issued on each port. IP source guard checks against this DHCP snooping database to ensure only clients with specific IP and/or MAC address can access the network. DHCP snooping can be combined 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.

Software Defined Networking (SDN)

- OpenFlow is a key technology that enables the use of SDN to build smart applications that unlock value and reduce cost.

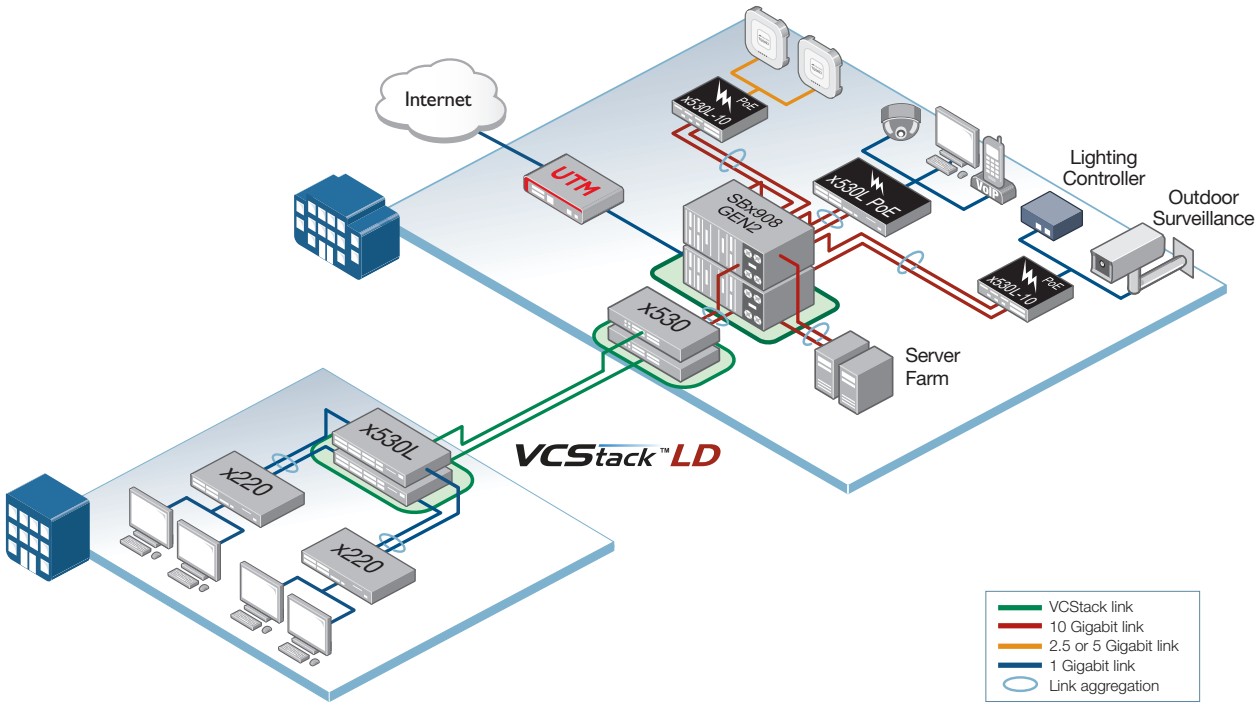
Multicast Source Discovery Protocol (MSDP)

- MSDP enables two or more PIM-SM (Sparse Mode) domains to share information on active multicast sources, for more efficient forwarding of multicast traffic.

Link Monitoring (Linkmon)

- Linkmon enables network health monitoring by regularly sending probes over key links to gather metrics comprising latency, jitter, and probe loss. This supports pro-active network management, and can also be used with triggers to automate a change to device or network configuration in response to the declining health of a monitored link.

Key Solutions



Resilient distribution switching

The x530L Series are ideal for distribution solutions, where resiliency and flexibility are required. In the above diagram, distribution switches utilize long-distance Virtual Chassis Stacking (VCStack LD) to create a single virtual unit out of multiple devices. By using fiber stacking connectivity, units can be kilometers apart—perfect for a distributed environment. Mixed stacking allows the x530L Series and x530 Series switches to be stacked together for even more deployment flexibility.

When combined with link aggregation, VCStack provides a solution with no single point of failure, which fully utilizes all network bandwidth.

The x530L Series supports Enterprises and their use of business-critical online resources and applications, with a resilient and reliable distribution solution.

Power at the network edge

The 28 and 52 port PoE+ models can provide 30 Watts of power to endpoints such as wireless access points, security cameras, and IP phones – with dual internal PSUs providing a resilient solution.

The 10 port PoE++ model can provide up to 90 Watts per port, to connect and power today's most advanced devices, such as outdoor PTZ security cameras with heaters and blowers, enhanced lighting management, and more. Multi-Gigabit enables 2.5 or 5 Gigabit connectivity over existing Cat5e/Cat6 cables, to maximize throughout, as well as support low-cost network performance upgrades.

Continuous PoE ensures power delivery to endpoints even during a switch firmware upgrade, while advanced security and access control features make the x530L Series the ideal choice for connecting and powering devices at the network edge.

Specifications

Performance

- 40Gbps of stacking bandwidth using front panel 10G SFP+ ports
- 10KB L2 and 9KB L3 Jumbo frames
- Wirespeed multicasting
- 4094 configurable VLANs
- 16K MAC addresses
- Up to 1250 OpenFlow v1.3 entries
- 1GB DDR3 SDRAM, 256MB NAND flash memory
- Packet buffer memory: 3MB

Reliability

- Modular AlliedWare Plus operating system
- Full environmental monitoring of PSUs, fans, temperature and internal voltages. SNMP traps alert network managers in case of any failure

Expandability

- Stack up to eight units in a VCStack
- Versatile licensing options for additional features

Flexibility and Compatibility

- 10G SFP+ ports will support any combination of Allied Telesis 1000Mbps SFP and 10GbE SFP+ modules and direct attach cables listed in this document under Ordering Information
- Port speed and duplex configuration can be set manually or by auto-negotiation
- Front-panel SFP+ stacking ports can be configured as 1G/10G Ethernet ports

Diagnostic Tools

- Connectivity Fault Management (CFM) - Continuity Check Protocol (CCP) for use with G.8032 ERPS
- Built-In Self Test (BIST)
- Ping polling and TraceRoute for IPv4 and IPv6
- Optical Digital Diagnostic Monitoring (DDM)
- Find-me device locator
- Automatic link flap detection and port shutdown
- Cable fault locator (TDR)
- Uni-Directional Link Detection (UDLD)
- Active Fiber Monitoring detects tampering on optical links
- Port and VLAN mirroring (RSPAN)

IPv4 Features

- Equal Cost Multi Path (ECMP) routing
- Static unicast and multicast routing for IPv4
- UDP broadcast helper (IP helper)
- Directed broadcast forwarding
- Black hole routing
- DNS relay
- Policy-based routing
- Route redistribution (OSPF, RIP, and BGP)

IPv6 Features

- Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- IPv4 and IPv6 dual stack
- IPv6 over IPv4 tunneling (manual configuration only)
- Log to IPv6 hosts with Syslog v6
- NTPv6 client and server
- DNSv6 client, DNSv6 relay
- DHCPv6 server, relay, and client
- Static IPv6 unicast and multicast routing
- IPv6 aware storm protection and QoS
- IPv6 hardware ACLs
- IPv6 Ready certified

Management

- Industry-standard CLI with context-sensitive help
- Built-in text editor and powerful CLI scripting engine
- Comprehensive SNMP MIB support for standards-based device management
- Console management port on the front panel for ease of access
- Event-based triggers allow user-defined scripts to be executed upon selected system events
- 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
- Front panel 7-segment LED provides at-a-glance status and fault information
- Autonomous Management Framework (AMF) enables powerful centralized management and zero-touch device installation and recovery. Try AMF for free with the built-in Starter license
- Web-based Graphical User Interface (GUI)

Quality of Service

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

Resiliency Features

- EPSRing (Ethernet Protection Switched Rings) with SuperLoop Protection (SLP) and enhanced recovery
- EPSR Master or transit node deployment
- STP root guard
- Loop protection: thrash limiting and loop detection
- Dynamic link failover (host attach)
- Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- PVST+ compatibility mode
- VCStack fast failover minimizes network disruption
- SFP+ stacking ports can be configured as 10G Ethernet ports
- Long-Distance VCStack with 10G SFP+ modules (VCStack LD)
- BPDU forwarding

Security Features

- Federal Information Processing Standard Publication 140-2 (FIPS 140-2) certified
- MAC address filtering and MAC address lock-down
- Learn limits (intrusion detection) for single ports or LAGs
- Access Control Lists (ACLs) based on layer 3 and 4 headers
- Dynamic ACLs assigned via port authentication
- ACL Groups enable multiple hosts/ports to be included in a single ACL, reducing configuration
- Private VLANs provide security and port isolation for multiple customers using the same VLAN
- Secure Copy (SCP)
- BPDU protection
- Network Access and Control (NAC) features manage endpoint security
- Dynamic VLAN assignment
- Tri-authentication: MAC-based, web-based and IEEE 802.1x
- DoS attack blocking and virus throttling
- DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- Strong password security and encryption
- Auth fail and guest VLANs
- Secure File Transfer Protocol (SFTP) client
- Authentication, Authorisation and Accounting (AAA)
- Bootloader can be password protected for device security
- Configurable ACLs for management traffic
- RADIUS group selection per VLAN or port

Software Defined Networking (SDN)

- OpenFlow v1.3 with support for encryption, connection interruption and inactivity probe

Environmental Specifications

- Operating temperature range: 0°C to 50°C (32°F to 122°F)
- 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)

Power Supply Specifications

- AC voltage: 90-264V (auto-ranging)
- Frequency: 50-60Hz

Electrical Approvals and Compliances

- EMC: EN55032 class A, FCC class A, VCCI class A, ICES-003 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, FIPS 140-2

Restrictions on Hazardous Substances (RoHS) Compliance

- EU RoHS compliant
- China RoHS compliant

Product Specifications

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	100M/1/2.5/5 GIGABIT PORTS	1/10 GIGABIT SFP+ PORTS	STACKING PORTS	POE+ ENABLED PORTS	POE++ ENABLED PORTS	SWITCHING FABRIC	FORWARDING RATE
x530L-10GHXm	-	8	2	2[1]	-	8	120Gbps	89.2Mpps
x530L-28GTX	24	-	4	2[2]	-	-	128Gbps	95.2Mpps
x530L-28GPX	24	-	4	2[2]	24	-	128Gbps	95.2Mpps
x530L-52GTX	48	-	4	2[2]	-	-	176Gbps	130.9Mpps
x530L-52GPX	48	-	4	2[2]	48	-	176Gbps	130.9Mpps

[1] Any ports on the 10-port model can be used for stacking (up to a maximum of 8)
[2] Any of the SFP+ ports on the 28 and 52-port models can be used for stacking (up to a maximum of 4)

Physical Specifications

PRODUCT	WIDTH X DEPTH X HEIGHT	MOUNTING	WEIGHT		PACKAGED DIMENSIONS
			UNPACKAGED	PACKAGED	
x530L-10GHXm	210 x 362 x 42.5 mm (8.27 x 14.25 x 1.67 in)	Rack-mount	3.5 kg (7.72 lbs)	4.8 kg (10.58 lbs)	461 x 371 x 153 mm (18.15 x 14.60 x 6.02 in)
x530L-28GTX	441 x 323 x 44 mm (17.36 x 12.72 x 1.73 in)	Rack-mount	4.4 kg (9.07 lbs)	6.3 kg (13.89 lbs)	577 x 440 x 153 mm (22.72 x 17.32 x 6.02 in)
x530L-28GPX	441 x 421 x 44 mm (17.36 x 16.57 x 1.73 in)	Rack-mount	6.2 kg (13.67 lbs)	8.4 kg (18.52 lbs)	577 x 548 x 153 mm (22.72 x 21.57 x 6.02 in)
x530L-52GTX	441 x 323 x 44 mm (17.36 x 12.72 x 1.73 in)	Rack-mount	5.2 kg (11.46 lbs)	7.1 kg (15.65 lbs)	577 x 440 x 128 mm (22.72 x 17.32 x 6.02 in)
x530L-52GPX	441 x 421 x 44 mm (17.36 x 16.57 x 1.73 in)	Rack-mount	6.7 kg (14.77 lbs)	8.9 kg (19.62 lbs)	577 x 548 x 153 mm (22.72 x 21.57 x 6.02 in)

Power and Noise Characteristics

PRODUCT	NO POE LOAD			FULL POE+ LOAD			MAX POE POWER (W)	POE SOURCING PORTS				
	MAX POWER CONSUMPTION (W)	MAX HEAT DISSIPATION (BTU/H)	NOISE (DBA)	MAX POWER CONSUMPTION (W)	MAX HEAT DISSIPATION (BTU/H)	NOISE (DBA)		POE (7.5W)	POE (15.4W)	POE+ (30W)	POE++ (60W)	POE++ (90W)
x530L-10GHXm	60	204	64	605	2065	64	500	8	8	8	8	5
x530L-28GTX	39	133	42*	-	-	-	-	-	-	-	-	-
x530L-28GPX	70	239	42*	890	3037	42*	740	24	24	24	-	-
x530L-52GTX	60	205	42*	-	-	-	-	-	-	-	-	-
x530L-52GPX	95	324	42*	950	3242	42*	740	48	48	24	-	-

* This figure is under 30 degree C ambient temperature

Noise: tested to ISO7779; front bystander position

Latency (microseconds)

PRODUCT	PORT SPEED					
	10MBPS	100MBPS	1GBPS	2.5GBPS	5GBPS	10GBPS
x530L-10GHXm	30.53µs	8.24µs	7.89µs	5.63µs	3.49µs	2.12µs
x530L-28GTX	29.91µs	6.06µs	3.98µs	-	-	1.63µs
x530L-28GPX	29.91µs	6.06µs	3.98µs	-	-	1.63µs
x530L-52GTX	30.98µs	8.34µs	5.27µs	-	-	1.67µs
x530L-52GPX	30.98µs	8.34µs	5.27µs	-	-	1.67µs

Standards and Protocols

AlliedWare Plus Operating System

Version 5.5.1

Authentication

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

Border Gateway Protocol (BGP)

BGP dynamic capability
BGP outbound route filtering
RFC 1772 Application of the Border Gateway Protocol (BGP) 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 2858 Multiprotocol extensions for BGP-4
RFC 2918 Route refresh capability for BGP-4
RFC 3392 Capabilities advertisement with BGP-4
RFC 3882 Configuring BGP to block Denial-of-Service (DoS) attacks
RFC 4271 Border Gateway Protocol 4 (BGP-4)
RFC 4360 BGP extended communities
RFC 4456 BGP route reflection - an alternative to full mesh iBGP
RFC 4724 BGP graceful restart
RFC 4893 BGP support for four-octet AS number space
RFC 5065 Autonomous system confederations for BGP

Cryptographic Algorithms

FIPS Approved Algorithms

Encryption (Block Ciphers):

- AES (ECB, CBC, CFB and OFB Modes)
- 3DES (ECB, CBC, CFB and OFB Modes)

Block Cipher Modes:

- CCM
- CMAC
- GCM
- XTS

Digital Signatures & Asymmetric Key Generation:

- DSA
- ECDSA
- RSA

Secure Hashing:

- SHA-1
- SHA-2 (SHA-224, SHA-256, SHA-384. SHA-512)

Message Authentication:

- HMAC (SHA-1, SHA-2(224, 256, 384, 512)

Random Number Generation:

- DRBG (Hash, HMAC and Counter)

Non FIPS Approved Algorithms

RNG (AES128/192/256)
DES
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 Standards

IEEE 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3at Power over Ethernet up to 30W (PoE+)
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3bt Power over Ethernet up to 90W (PoE++)
IEEE 802.3bz 2.5GBASE-T and 5GBASE-T ("multi-gigabit")
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 2711 IPv6 router alert option
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 MIB and SNMP traps
Optical DDM MIB
SNMPv1, v2c and v3
IEEE 802.1ABLink 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 1724 RIPv2 MIB extension
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 2787 Definitions of managed objects for VRRP
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 4502 RMON 2
RFC 4560 Definitions of managed objects for remote ping, traceroute and lookup operations
RFC 5424 The Syslog protocol
RFC 6527 Definitions of managed objects for VRRPv3

Multicast Support

Bootstrap Router (BSR) mechanism for PIM-SM
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)
PIM and PIM SSM for IPv6
RFC 1112 Host extensions for IP multicasting (IGMPv1)
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 3618 Multicast Source Discovery Protocol (MSDP)
RFC 3810 Multicast Listener Discovery v2 (MLDv2) for IPv6
RFC 3956 Embedding the Rendezvous Point (RP) address in an IPv6 multicast address
RFC 3973 PIM Dense Mode (DM)
RFC 4541 IGMP and MLD snooping switches
RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM): protocol specification (revised)
RFC 4604 Using IGMPv3 and MLDv2 for source-specific multicast
RFC 4607 Source-specific multicast for IP

Open Shortest Path First (OSPF)

OSPF link-local signaling
OSPF MD5 authentication
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
RFC 3623 Graceful OSPF restart
RFC 3630 Traffic engineering extensions to OSPF
RFC 4552 Authentication/confidentiality for OSPFv3
RFC 5329 Traffic engineering extensions to OSPFv3
RFC 5340 OSPFv3 for IPv6 (partial support)

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

ITU-T G.8023 / Y.1344 Ethernet Ring Protection Switching (ERPS)
IEEE 802.1ag CFM Continuity Check Protocol (CCP)
IEEE 802.1AXLink 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)
IEEE 802.3adStatic and dynamic link aggregation
RFC 5798 Virtual Router Redundancy Protocol version 3 (VRRPv3) for IPv4 and IPv6

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, Authentication and 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 2560 X.509 Online Certificate Status Protocol (OCSP)
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 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
RFC 5246 Transport Layer Security (TLS) v1.2
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

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 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 DHCPv6 (server, relay and client)
RFC 3633 IPv6 prefix options for DHCPv6
RFC 3646 DNS configuration options for DHCPv6
RFC 3993 Subscriber-ID suboption for DHCP relay agent option
RFC 4330 Simple Network Time Protocol (SNTP) version 4
RFC 5905 Network Time Protocol (NTP) version 4

VLAN Support

Generic VLAN Registration Protocol (GVRP)
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 802.3acVLAN tagging

Voice over IP (VoIP)

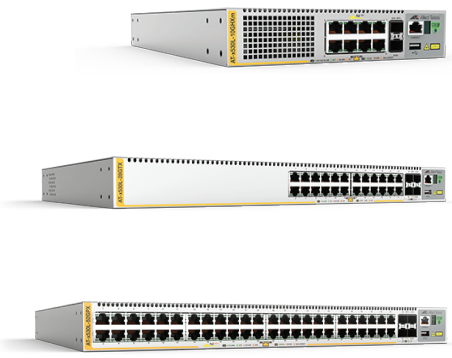
LLDP-MED ANSI/TIA-1057
Voice VLAN

Feature Licenses

NAME	DESCRIPTION	INCLUDES	STACK LICENSING
AT-FL-x530L-01	x530L premium license	▶ OSPFv2 (256 routes) ▶ BGP4 (256 routes) ▶ PIMv4-SM, DM and SSM v4 ▶ VLAN double tagging (Q-in-Q) ▶ RIPng (256 routes) ▶ OSPFv3 (256 routes) ▶ MLDv1/v2 ▶ PIM-SMv6/SSMv6 ▶ RADIUS-Full ▶ UDLD ▶ VLAN Translation	▶ One license per stack member
AT-SW-AM10-1YR[3]	Cumulative AMF Master license	▶ AMF Master license for up to 10 nodes for 1 year	▶ One license per stack
AT-SW-AM10-5YR[3]	Cumulative AMF Master license	▶ AMF Master license for up to 10 nodes for 5 years	▶ One license per stack
AT-FL-x53L-8032	ITU-T G.8032 license	▶ G.8032 ring protection ▶ Ethernet CFM	▶ One license per stack member
AT-FL-x53L-CPOE	Continuous PoE license	▶ Continuous PoE power	▶ One license per stack member
AT-FL-x53L-MSTK	Mixed Stacking license	▶ Stack x530L with x530 Series switches	▶ One license per stack member
AT-FL-x530L-OF13-1YR	OpenFlow license	▶ OpenFlow v1.3 (1250 entries) for 1 year	▶ Not supported on a stack
AT-FL-x530L-OF13-5YR	OpenFlow license	▶ OpenFlow v1.3 (1250 entries) for 5 years	▶ Not supported on a stack

[3] Purchase one license per 10 nodes (up to 20 nodes maximum)

Ordering Information



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

Switches

19 inch rack-mount brackets included

AT-x530L-10GHXm-xx
8-port 100M/1/2.5/5G PoE++ stackable switch with 2 SFP+ ports and a single fixed power supply

AT-x530L-28GTX-xx
24-port 10/100/1000T stackable switch with 4 SFP+ ports and 2 fixed power supplies

AT-x530L-28GPX-xx
24-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and 2 fixed power supplies

AT-x530L-52GTX-xx
48-port 10/100/1000T stackable switch with 4 SFP+ ports and 2 fixed power supplies

AT-x530L-52GPX-xx
48-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and 2 fixed power supplies

AT-RKMT-J15[4]
Rack mount shelf kit for x530L-10GHXm

AT-BRKT-J24
Wall mount kit for x530L-10GHXm

AT-BRKT-J22
Wall-mount kit for x530L-28GTX & 52GTX

AT-VT-Kit3
Management Cable (USB to Serial Console)

10G SFP+ Modules

Any 10G SFP+ module or cable can be used for stacking with the front panel 10G ports

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

AT-SP10SR/I
10GSR 850 nm short-haul, 300 m with MMF industrial temperature

AT-SP10LRa/I
10GBASE-LR, 1310 nm, 10 km with SMF, I-Temp, TAA[4]

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

AT-SP10LR/I
10GLR 1310 nm medium-haul, 10 km with SMF industrial temperature

AT-SP10LR20/I
10GER 1310 nm long-haul, 20 km with SMF industrial temperature

AT-SP10ER40/I
10GER 1550 nm long-haul, 40 km with SMF industrial temperature

AT-SP10ZR80/I
10GER 1550 nm long-haul, 80 km with SMF industrial temperature

AT-SP10TM
1G/2.5G/5G/10G, 100m copper, TAA[5]

AT-SP10BD10/I-12
10G Bi-Di, 1270 nm TX/1330 nm RX, 10km, industrial temperature, TAA[5]

AT-SP10BD10/I-13
10G Bi-Di, 1330 nm TX/1270 nm RX, 10km, industrial temperature, TAA[5]

AT-SP10BD20-12
10G Bi-Di, 1270 nm TX/1330 nm RX, 20km, TAA[5]

AT-SP10BD20-13
10G Bi-Di, 1330 nm TX/1270 nm RX, 20km, TAA[5]

AT-SP10BD40/I-12
10G Bi-Di, 1270 nm TX/1330 nm RX, 40km, industrial temperature, TAA[5]

AT-SP10BD40/I-13
10G Bi-Di, 1330 nm TX/1270 nm RX, 40km, industrial temperature, TAA[5]

AT-SP10TW1
1 meter SFP+ direct attach cable

AT-SP10TW3
3 meter SFP+ direct attach cable

1000Mbps SFP Modules

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-SPLX10a
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 (LC) GbE Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 10 km

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

AT-SPBD40-13/I
1000LX (LC) GbE single-mode Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 40 km, industrial temperature

AT-SPBD40-14/I
1000LX (LC) GbE single-mode Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 40 km, industrial temperature

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

[4] See the installation guide
[5] Trade Act Agreement compliant

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