

x510 Series

STACKABLE GIGABIT LAYER 3 SWITCHES

The Allied Telesis x510 Series of stackable Gigabit Layer 3 switches includes a full range of security and resiliency features, coupled with easy management, making them the ideal choice for network access applications.

Allied Telesis x510 Series switches are a high-performing and feature-rich choice for today's networks. They offer a versatile solution for enterprise applications. With a choice of 24- and 48-port models with 10Gigabit uplink ports, plus the power of Allied Telesis Virtual Chassis Stacking (VCStack™), the x510 Series can connect anything from a small workgroup to a large business.

Powerful Network Management

Meeting the increased management requirements of modern converged networks, Allied Telesis Management Framework (AMF) automates many everyday tasks including configuration management. The complete network can be managed as a single virtual device with powerful centralized management features. Growing the network can be accomplished with plug-and-play simplicity, and network node recovery is fully zero-touch.

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 and an easy solution for resiliency in access applications. The addition of Ethernet Protection Switched Ring (EPSRing™) resilient ring protocol ensures distributed network segments have high-speed, resilient access to online resources and applications.

The x510 Series can form a VCStack of up to four units for enhanced resiliency and simplified device management. Full EPSRing support and VCStack LD (Long Distance), which enables stacks to be created over long distance fiber links, make the x510 Series the perfect choice for distributed environments.

Reliable

The x510 Series was designed with reliability in mind, and guarantees continual delivery of essential services. With dual built-in power supplies and near-hitless online stack reconfiguration, reconfiguration and maintenance may be performed without affecting network uptime.

The x510DP features dual hot-swappable load-sharing power supplies for maximum uptime. With front-to-back or back-to-front cooling options, the x510DP is ideal for data center applications.

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), mitigating threats to network infrastructure. This ensures the network is accessed only by known users and devices — all users' adherence to network security policies is checked, and then either access is granted or remediation is offered. Secure access can also be provided for guests.



A secure network environment is guaranteed. The x510 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.

Future-proof

The x510 Series ensures a future-proof network, with superior flexibility coupled with the ability to stack multiple units. All x510 Series models feature 10 Gigabit uplinks ports and a comprehensive IPv6 feature set, to ensure they are ready for future network traffic demands.

Environmentally friendly

The x510 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 can significantly reduce operating costs by reducing the power requirements of the switch and any associated cooling equipment.



New Features

- » Allied Telesis Management Framework (AMF)
- » IPv6 Ready certification
- » x510DP-52GTX



Key Features

Allied Telesis Management Framework (AMF)

» Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provide a simplified approach to network management. Common tasks are automated or made so simple that the every-day running of a network can be achieved without the need for highly-trained, and expensive, network engineers. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.

VCStack (Virtual Chassis Stacking)

» Create a VCStack of up to four units with 40 Gbps of stacking bandwidth to 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.

EPSRing (Ethernet Protection Switched Ring)

» EPSRing and 10 Gigabit Ethernet allow several x510 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.

» Super-Loop Protection (SLP) 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 wire speed QoS provides flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. Boosted network performance and guaranteed delivery of business-critical Ethernet services and applications are provided. Time-critical services such as voice and video take precedence over non-essential services such as file downloads, maintaining responsiveness of Enterprise applications.

Loop Protection

» Thrash limiting, also known as rapid MAC movement, detects and resolves network loops. It is highly user-configurable — from the rate of looping traffic to the type of action the switch should take when it detects a loop.

» With thrash limiting, the switch only detects a loop when a storm has occurred, which can potentially cause disruption to the network. To avoid this, loop

detection works in conjunction with thrash limiting to send special Loop Detection Frame (LDF) packets that the switch listens for. If a port receives an LDF packet, you can choose to disable the port, disable the link, or send an SNMP trap. This feature can help to detect loops before a network storm occurs, avoiding the risk and inconvenience of traffic disruption.

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+ reduces costs and provides even greater flexibility, providing the capability to connect devices requiring more power (up to 30 Watts) such as, tilt and zoom security cameras.

High Reliability

» The x510 series switches feature front to back cooling and dual power supply units (PSUs). The x510DP features dual hot-swappable load sharing power supplies for maximum uptime, and the option of either front-to-back or back-to-front cooling. This makes it ideal for use as a top-of-rack data center switch.

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.

Multicast Support

» Multicast support ensures streaming video traffic is efficiently managed and forwarded in today's converged networks.

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.

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.

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.

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 x510 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 may be configured to provide a catch-all for users who aren't authenticated.

Tri-authentication

» Authentication options on the x510 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.

Premium Software License

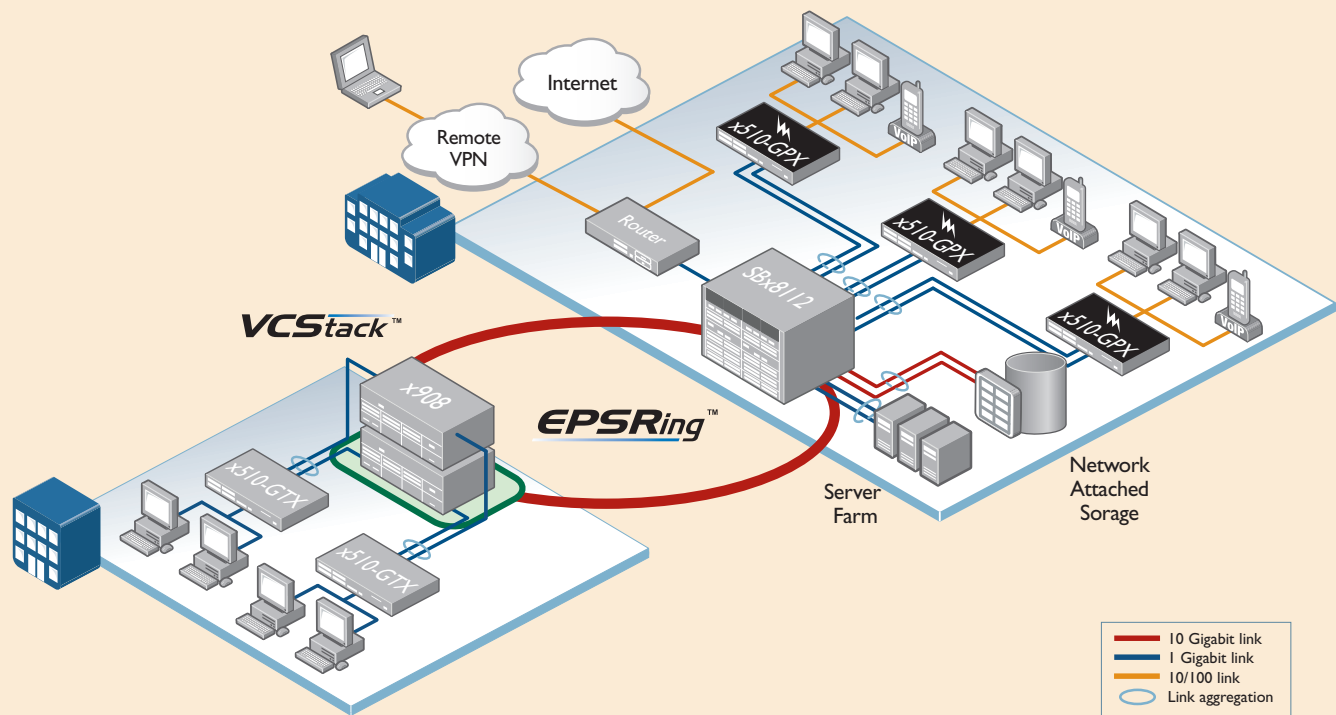
» By default, the x510 Series offers a comprehensive Layer 2 and basic Layer 3 feature set that includes static routing and IPv6 management features. The feature set can easily be elevated to full Layer 3 by applying the premium software license. This adds dynamic routing protocols and Layer 3 multicasting capabilities.

Find Me

» In busy server rooms, comprised of a large number of equipment racks, it can be quite a job finding the correct switch quickly among many similar units. The "find me" feature is a simple visual way to quickly identify the desired physical switch for maintenance or other purposes, by causing its LEDs to flash in a specified pattern.



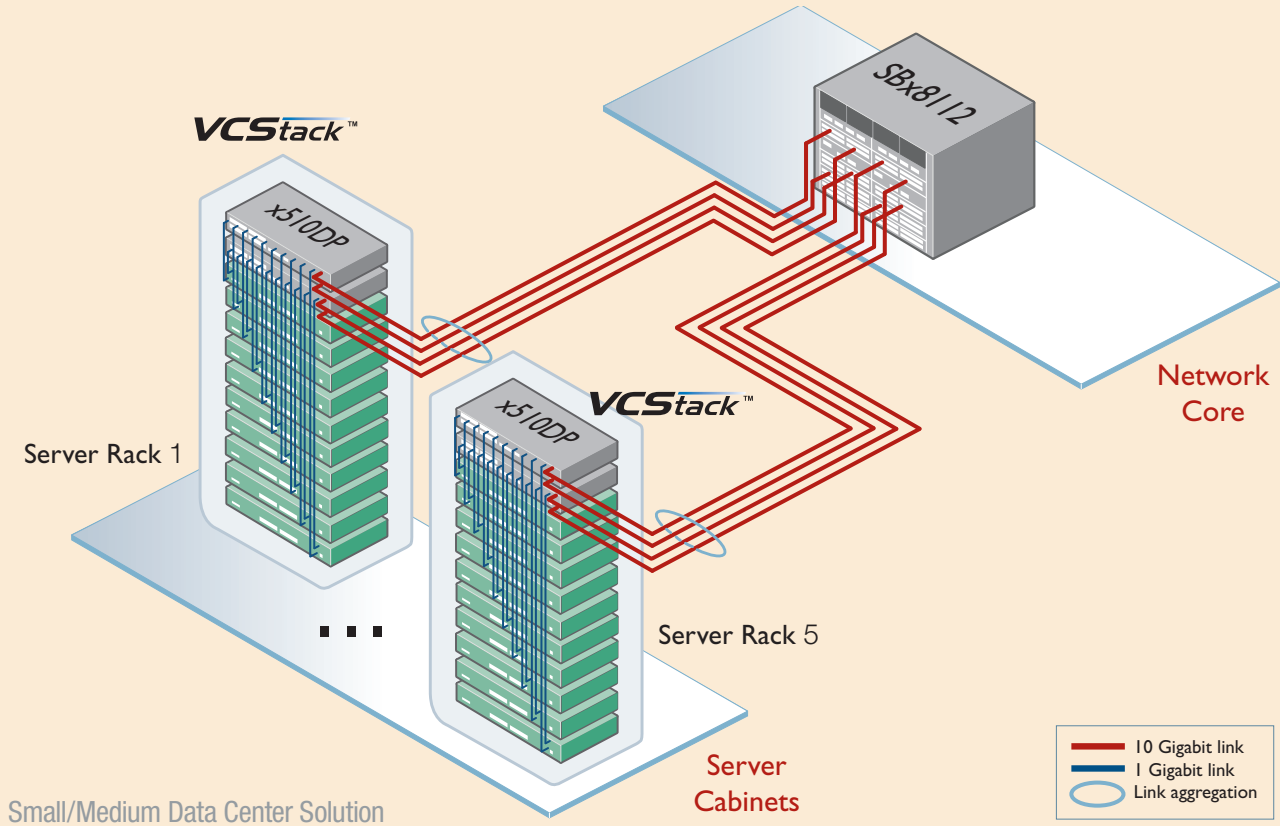
Key Solutions



Peace of mind at the network edge

Allied Telesis x510 Series switches make the ideal choice at the network edge where security, resiliency and flexibility are required. In the above diagram, security is enforced using Network Access Control (NAC) combined with tri-authentication to prevent unauthorized users and devices from connecting to the network. Link aggregations are used to provide both resiliency back to the core switches and an increase in available bandwidth over a single link. Flexibility is ensured with the range of interface types and PoE options available on the x510 Series and the ability to stack the switches if required.

Key Solutions



Small/Medium Data Center Solution

Powerful high-resiliency data center solutions

With the world-wide increase in the use of online applications and resources, data center networks have grown at an exponential rate. High resiliency and high reliability solutions are an absolute must-have in these 24/7 always-on networks. The Allied Telesis x510DP-52GTX is an ideal data center Top-of-Rack (ToR) switch, featuring dual hot-swappable load-sharing power supplies and the

option of either front-to-back or back-to-front cooling. Along with these high reliability features which maximise uptime, the x510DP switches can also be connected together in a virtual chassis stack (VCStack) which provides a ToR solution with no single point of failure, and complete resiliency. When partnered with other advanced switching products, Allied Telesis has the high demands of the data center well covered with superior solutions.

Specifications

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	100/1000X SFP PORTS	1/10 GIGABIT SFP+ PORTS	10 GIGABIT STACKING PORTS	POE+ ENABLED PORTS	SWITCHING FABRIC	FORWARDING RATE
AT-x510-28GTX	24	-	4 (2 if stacked)	2*	-	128Gbps	95.2Mpps
AT-x510-28GPX	24	-	4 (2 if stacked)	2*	24	128Gbps	95.2Mpps
AT-x510-28GSX	-	24	4 (2 if stacked)	2*	-	128Gbps	95.2Mpps
AT-x510-52GTX	48	-	4 (2 if stacked)	2*	-	176Gbps	130.9Mpps
AT-x510DP-52GTX	48	-	4 (2 if stacked)	2*	-	176Gbps	130.9Mpps
AT-x510-52GPX	48	-	4 (2 if stacked)	2*	48	176Gbps	130.9Mpps

* Stacking ports can be configured as additional 1G/10G Ethernet ports when unit is not stacked

Performance

- » 40Gbps of stacking bandwidth
- » Supports 13KB jumbo frames
- » Wirespeed multicasting
- » 4094 configurable VLANs
- » Up to 16K MAC addresses
- » Up to 2K IPv4 routes or up to 512 IPv6 routes
- » 512MB DDR SDRAM, 64MB flash memory
- » Packet buffer memory: AT-x510-28 - 2MB
AT-x510-52 - 4MB

Reliability

- » Modular AlliedWare Plus operating system
- » Internal redundant Power Supply Units (PSUs) load share.
- » The x510DP features dual hot-swappable PSUs, 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: 90 to 260V (auto-ranging)
- » Frequency: 47 to 63Hz

Expandability

- » Stack up to four units in a VcStack
- » Premium license option for additional features

Flexibility and Compatibility

- » SFP ports on AT-x510-28GSX switch support any combination of 10/100/1000T, 100FX, 100BX, 1000SX, 1000LX, 1000ZX or 1000ZX CWDM SFPs
- » SFP+ ports will support any combination of 1000X, 1000SX, 1000LX, 1000ZX, 1000ZX CWDM SFPs or 10G-SR, 10G-LR SFP+ modules
- » Stacking ports can be configured as 10G Ethernet ports
- » Port speed and duplex configuration can be set manually or by auto-negotiation

Diagnostic Tools

- » Built-In Self Test (BIST)
- » Find-me device locator
- » Automatic link flap detection and port shutdown
- » Optical Digital Diagnostic Monitoring (DDM)
- » Ping polling and TraceRoute for IPv4 and IPv6
- » Port mirroring

IPv4 Features

- » Black hole routing
- » Directed broadcast forwarding

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

IPv6 Features

- » DHCPv6 relay, DHCPv6 client
- » DNSv6 relay, DNSv6 client
- » IPv4 and IPv6 dual stack
- » IPv6 hardware ACLs
- » Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- » NTPv6 client and server
- » Static unicast and multicast routes for IPv6

Management

- » Front panel 7-segment LED provides at-a-glance status and fault information
- » Allied Telesis Management Framework (AMF) enables powerful centralized management and zero-touch device installation and recovery
- » Console management port on the front panel for ease of access
- » Eco-friendly 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 engine
- » Comprehensive SNMP MIB support for standards-based device management
- » Built-in text editor
- » Event-based triggers allow user-defined scripts to be executed upon selected system events
- » USB interface allows software release files, configurations and other files to be stored for backup and distribution to other devices

Quality of Service

- » 8 priority queues with a hierarchy of high priority queues for real time traffic, and mixed scheduling, for each switch port
- » 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
- » Taildrop for queue congestion control
- » Strict priority, weighted round robin or mixed scheduling
- » IP precedence and DiffServ marking based on layer 2, 3 and 4 headers

Resiliency Features

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

Security Features

- » Access Control Lists (ACLs) based on layer 3 and 4 headers
- » Configurable auth-fail and guest VLANs
- » Authentication, Authorisation and Accounting (AAA)
- » Bootloader can be password protected for device security
- » BPDU protection
- » DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- » DoS attack blocking and virus throttling
- » Dynamic VLAN assignment
- » MAC address filtering and MAC address lock-down
- » Network Access and Control (NAC) features manage endpoint security
- » Port-based learn limits (intrusion detection)
- » Private VLANs provide security and port isolation for multiple customers using the same VLAN
- » Secure Copy (SCP)
- » Strong password security and encryption
- » Tri-authentication: MAC-based, web-based and IEEE 802.1x

Environmental Specifications

- » Operating temperature range:
0°C to 45°C (32°F to 113°F)
Derated by 1°C per 305 meters (1,000 ft)
- » Storage temperature range:
-25°C to 70°C (-13°F to 158°F)

x510 Series | Stackable Gigabit Layer 3 Switches

- » 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)

Electrical Approvals and Compliances

- » EMC: EN55022 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, TUV (TUV is on all models except the AT-x510DP-52GTX)

Restrictions on Hazardous Substances (RoHS) Compliance

- » EU RoHS compliant
- » China RoHS compliant

Country of Origin

- » Singapore

Physical Specifications

PRODUCT	WIDTH	DEPTH	HEIGHT	MOUNTING	WEIGHT	
					UNPACKAGED	PACKAGED
AT-x510-28GTX	440 mm (17.32 in)	325 mm (12.80 in)	44 mm (1.73 in)	Rack-mount	4.3 kg (9.48 lb)	6.3 kg (13.89 lb)
AT-x510-28GPX	440 mm (17.32 in)	400 mm (15.75 in)	44 mm (1.73 in)	Rack-mount	5.8 kg (12.79 lb)	7.8 kg (17.20 lb)
AT-x510-28GSX	440 mm (17.32 in)	325 mm (12.80 in)	44 mm (1.73 in)	Rack-mount	4.8 kg (10.58 lb)	6.8 kg (14.99 lb)
AT-x510-52GTX	440 mm (17.32 in)	325 mm (12.80 in)	44 mm (1.73 in)	Rack-mount	5.2 kg (11.47 lb)	7.2 kg (15.88 lb)
AT-x510DP-52GTX	440 mm (17.32 in)	480 mm (18.89 in)	44 mm (1.73 in)	Rack-mount	5.7 kg (12.57 lb)	7.7 kg (16.98 lb)
AT-x510-52GPX	440 mm (17.32 in)	400 mm (15.75 in)	44 mm (1.73 in)	Rack-mount	6.2 kg (13.67 lb)	8.2 kg (18.08 lb)

Power and Noise Characteristics

PRODUCT	NO POE LOAD			FULL POE+ LOAD			MAX POE POWER	MAX 15.4W POE PORTS	MAX 30W POE+ PORTS
	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE			
AT-x510-28GTX	52W	177 BTU/h	45 dBA	-	-	-	-	-	-
AT-x510-28GPX	67W	229 BTU/h	45 dBA	530W	605 BTU/h	55 dBA	370W	24	12
AT-x510-28GSX	74W	252 BTU/h	45 dBA	-	-	-	-	-	-
AT-x510-52GTX	86W	293 BTU/h	45 dBA	-	-	-	-	-	-
AT-x510DP-52GTX	95W	324 BTU/h	44 dBA	-	-	-	-	-	-
AT-x510-52GPX	93W	317 BTU/h	45 dBA	550W	620 BTU/h	55 dBA	370W	24	12

Noise: tested to IS07779; front bystander position

Latency (microseconds)

PRODUCT	PORT SPEED			
	10MBPS	100MBPS	1GBPS	10GBPS
AT-x510-28GTX	117µs	14.4µs	4.4µs	3.1µs
AT-x510-52GTX	119µs	16.8µs	6.7µs	4.9µs
AT-x510DP-52GTX	119µs	16.8µs	6.7µs	4.9µs
AT-x510-28GSX	116µs	14.5µs	4.4µs	3.1µs
AT-x510-28GPX	117µs	14.4µs	4.4µs	3.1µs
AT-x510-52GPX	119µs	16.8µs	6.7µs	4.9µs

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.4

Authentication

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

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 Link aggregation (static and LACP)
- IEEE 802.2 Logical Link Control (LLC)

- IEEE 802.3 Ethernet
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ad Static and dynamic link aggregation
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3af Power over Ethernet (PoE)
- IEEE 802.3at Power over Ethernet plus (PoE+)
- IEEE 802.3az Energy Efficient Ethernet (EEE)
- 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

x510 Series | Stackable Gigabit Layer 3 Switches

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 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 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	
SNMPv1, v2c and v3	
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 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 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 3164	Syslog protocol
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 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
RFC 6527	Definitions of managed objects for VRRPv3

Multicast Support

Bootstrap Router (BSR) mechanism for PIM-SM	
IGMP query solicitation	
IGMP snooping (v1, v2 and v3)	
IGMP/MLD multicast forwarding (IGMP/MLD proxy)	
MLD snooping (v1 and v2)	
PIM for IPv6	
RFC 2236	Internet Group Management Protocol v2 (IGMPv2)
RFC 2710	Multicast Listener Discovery (MLD) for IPv6
RFC 3376	IGMPv3
RFC 3810	Multicast Listener Discovery v2 (MLDv2) for IPv6
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	
OSPF restart signaling	
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

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	MAC bridges
IEEE 802.1s	Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w	Rapid Spanning Tree Protocol (RSTP)
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 and 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	DHCPv4 (server, relay and client)
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 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 802.3ac	VLAN tagging

Voice over IP (VoIP)

LLDP-MED	ANSI/TIA-1057
Voice VLAN	

x510 Series | Stackable Gigabit Layer 3 Switches

Ordering Information

Feature Licenses

NAME	DESCRIPTION	INCLUDES
AT-FL-x510-01	x510 premium license	<ul style="list-style-type: none"> » RIP » OSPF » PIMv4-SM, DM and SSM » ESR master » VLAN double tagging (Q-in-Q) » RIPng » OSPFv3 » MLDv1 and v2 » PIMv6-SM

Switches



AT-x510-28GTX-xx

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

AT-x510-28GPX-xx

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

AT-x510-28GSX-xx

24-port 100/1000X SFP stackable switch with 4 SFP+ ports and 2 fixed power supplies



AT-x510-52GTX-xx

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

AT-x510DP-52GTX-00

48-port 10/100/1000T stackable switch with 4 SFP+ ports and 2 hot-swappable power supplies**

AT-x510-52GPX-xx

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

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 supplies ordered separately

Power Supplies (for the x510DP-52GTX)

AT-PWR100R-xx

100W AC system power supply (reverse airflow)

AT-PWR250-xx

250W AC system power supply

AT-PWR250R-80

250W DC system power supply (reverse airflow)

100Mbps SFP Modules

AT-SPTX*

1000T 100 m copper

*AT-SPTX is supported only on Gigabit Fiber ports of AT-x510-28GSX, and it is not supported on the 10G Ports of any x510 model.

AT-SPSX

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

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-I3

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

AT-SPBD10-I4

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

100Mbps 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-I3

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

AT-SPFXBD-LC-I5

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

100Mbps SFP modules are only compatible with the SFP ports on the AT-x510-28GSX switch.

10GbE SFP+ Modules

AT-SPIO3R

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

AT-SPIO1R

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

AT-SPIO1R/I

10GLR 1310 nm medium-haul, 10 km with SMF industrial temperature

AT-SPIO1LRM

10GLR 1310 nm medium-haul, 10 km with MMF

AT-SPIOER40/I

10GER 1310nm long-haul, 40km with SMF industrial temperature

AT-SPIOZR80/I

10GER 1550nm long-haul, 80 km with SMF industrial temperature

AT-SPIOTW1

1 meter SFP+ direct attach cable

AT-SPIOTW3

3 meter SFP+ direct attach cable

AT-SPIOTW7

7 meter SFP+ direct attach cable

Stacking Modules

AT-StackXS/1.0

1 meter stacking cable (includes 2 stacking modules)

AT-StackOP/0.3

Optical stacking module 850 nm short-haul, 300 m with MMF (two modules required per switch)

AT-StackOP/9.0

Optical stacking module 1310 nm medium-haul, 9 km with SMF (two modules required per switch)



the solution : the network

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