

SwitchBlade® x8112

NEXT GENERATION INTELLIGENT LAYER 3+ CHASSIS SWITCH

The Allied Telesis SwitchBlade x8112 is a 12-slot advanced Layer 3+ chassis switch designed to deliver high availability, wirespeed performance, and a high port count. Advanced features make it the ideal solution for the modern enterprise network where resiliency, reliability and high performance are the key requirements.

The Allied Telesis SwitchBlade x8112 is a high performing scalable solution, providing an extensive range of connectivity options. Dual control cards are partnered with ten line card slots. Gigabit and 10 Gigabit line card options ensure a system capable of meeting the requirements of today's networks, and the flexibility to expand when required.

High Performing

The SwitchBlade x8112 features 80Gbps non-blocking throughput to each line card slot, providing maximum performance and wirespeed delivery of critical IPv4 and IPv6 traffic.

Maximum availability of premium services and applications is effortless, with industry-leading Quality of Service (QoS) features managing network responsiveness.

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.



Resilient

The SwitchBlade x8112 operates with one AC or DC system PSU, and installing a second load-sharing PSU provides

ultimate redundancy. Two Power over Ethernet (PoE) PSUs can also be installed to maximize power available to connected devices.

Dual redundant control cards inter connect through redundant paths to the line cards over a passive backplane. Control cards, line cards, power supplies and the fan tray are all hot-swappable to minimize downtime when performing maintenance or upgrading the system.

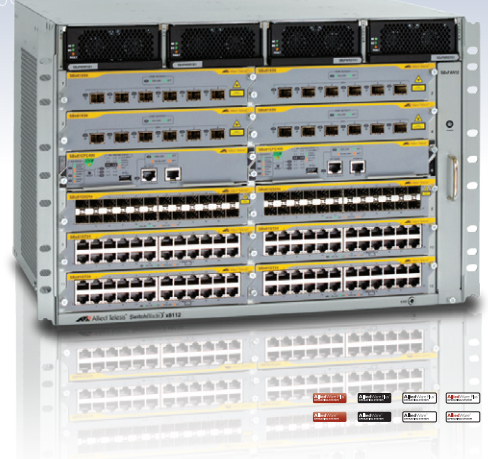
To provide a high speed solution where recovery occurs within as little as 50ms, SwitchBlade x8112 switches can be deployed in a ring-based topology, with the protected ring running at up to 10Gbps. This high performing resilient design for distributed networks is made possible with Allied Telesis EPSRing™ (Ethernet Protection Switched Ring) technology.



Scalable

A future-proof system can be deployed with the SwitchBlade x8112, as line cards can be added or changed as required to meet the demands of network growth. This flexibility and the ability to upgrade the network topology with no downtime, ensures online resources and applications are always available to meet business requirements.

There are currently three 24-port Gigabit line cards available: copper, PoE+ and fiber (SFP). The 6-port 10 Gigabit (SFP+) line card provides the SwitchBlade x8112 with high speed backbone connectivity.



The new 40-port Gigabit copper line card maximizes port density, providing up to 400 Gigabit copper ports in a single 7RU chassis.

Power over Ethernet Plus (PoE+)

The SwitchBlade x8112 supports IEEE 802.3 at PoE+ (30W) to enable customers to future-proof their network. The greater power supplied by PoE+ supports applications such as IP surveillance cameras supporting pan, tilt and zoom, IP video phones, point-of-sale units and wireless access points.



Environmentally Friendly

In keeping with our commitment to environmentally friendly processes and products, the SwitchBlade x8112 is designed to reduce power consumption and minimize hazardous waste. Features include the use of high efficiency power supplies and low power chip sets. The switches also include an ECO-Switch button on the front panel allowing conservation of additional power by turning off all diagnostic LED indicators when they are not required.



New Features

- » Allied Telesis Management Framework (AMF)
- » AMF master license for SBx8112
- » SBx81GT40 line card

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.
- » The SwitchBlade x8112 can operate as the AMF network master, storing firmware and configuration backups for all other network nodes. The AMF master enables auto-provisioning and auto-upgrade by providing appropriate files to new network members.

EPsRing™ (Ethernet Protection Switched Ring)

- » EPsRing and 10 Gigabit Ethernet allow several 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 at the core of enterprise or provider access networks.
- » Superloop Protection enables a link between two EPsR nodes to be in separate EPsR domains, improving redundancy and network fault resiliency.

Access Control Lists (ACLs)

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

Industry-leading Quality of Service (QoS)

- » Comprehensive low-latency wirespeed QoS provides flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. Enjoy boosted network performance and guaranteed delivery of business-critical Ethernet services and applications. Time-critical services such as voice and video take precedence over non-essential services such as file downloads, maintaining responsiveness of enterprise applications.

Power over Ethernet Plus (PoE+)

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

Ease of Management

- » The AlliedWare Plus operating system incorporates an industry standard CLI, facilitating intuitive manageability.
- » Configuration tasks can be automated, as commands may be used in scripts. Triggers can also be utilized, providing a powerful mechanism for automatic and timed management by automating the execution of commands in response to specific events.
- » With three distinct modes, the CLI is very secure, and the use of encrypted remote login sessions ensures CLI access is not compromised.

AlliedWare Plus Licensing Unlocks New Features

- » With AlliedWare Plus, a single license password is all that is necessary to unlock additional feature bundles that ship with the switch. The feature bundles provide a very simple upgrade path.

Dynamic Host Configuration Protocol (DHCPv6)

- » DHCPv6 is used to dynamically assign IPv6 addresses to hosts from a central location. Acting as DHCPv6 client enables the switch to receive an IPv6 address, and acting as server enables the switch to dynamically allocate IPv6 addresses to hosts. The DHCPv6 server and client both support the Prefix Delegation feature which allocates a whole IPv6 subnet to a DHCP client. The client, in turn, can allocate addresses from this subnet to the hosts that are connected to it.

Virtual Router Redundancy Protocol (VRRPv3)

- » VRRPv3 is a protocol for providing device redundancy, by connecting redundant WAN gateway routers or server access switches in an IPv6 network. It allows a backup router or switch to automatically take over if the primary (master) router or switch fails.

sFlow

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

Network Access Control (NAC)

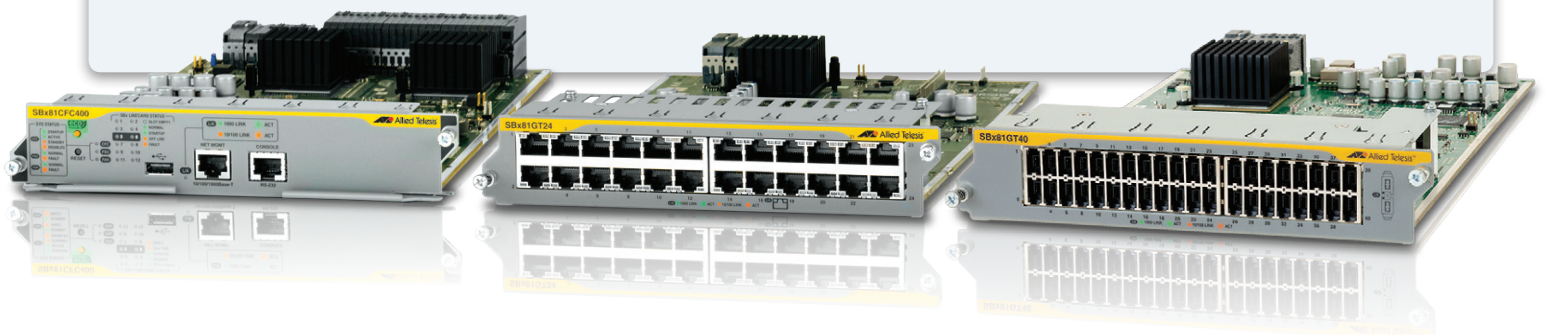
- » NAC allows for unprecedented control over user access to the network in order to mitigate threats to network infrastructure. Allied Telesis SwitchBlade x8112 switches use IEEE 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment, to assess a user's adherence to network security policies and either grant access or offer remediation.
- » If multiple users share a port, then multi-authentication can be used. Different users on the same port can be assigned into different VLANs, and so given different levels of network access. Additionally, a Guest VLAN can be configured to provide a catch-all for users who aren't authenticated.

Tri-authentication

- » Authentication options on the SwitchBlade x8112 Series also include alternatives to IEEE 802.1x port-based authentication, such as Web authentication to enable guest access, and MAC authentication for end points that do not have an IEEE 802.1x supplicant. All three authentication methods—IEEE 802.1x, MAC-based and Web-based—can be enabled simultaneously on the same port. This is called tri-authentication.

Link Aggregation

- » Link aggregation allows a number of individual switch ports to be combined, forming a single logical connection of higher bandwidth. This provides a higher performance link, and also provides redundancy creating a more reliable and robust network. The SwitchBlade x8112 allows link aggregation groups to be created across line cards to maximize link resiliency.



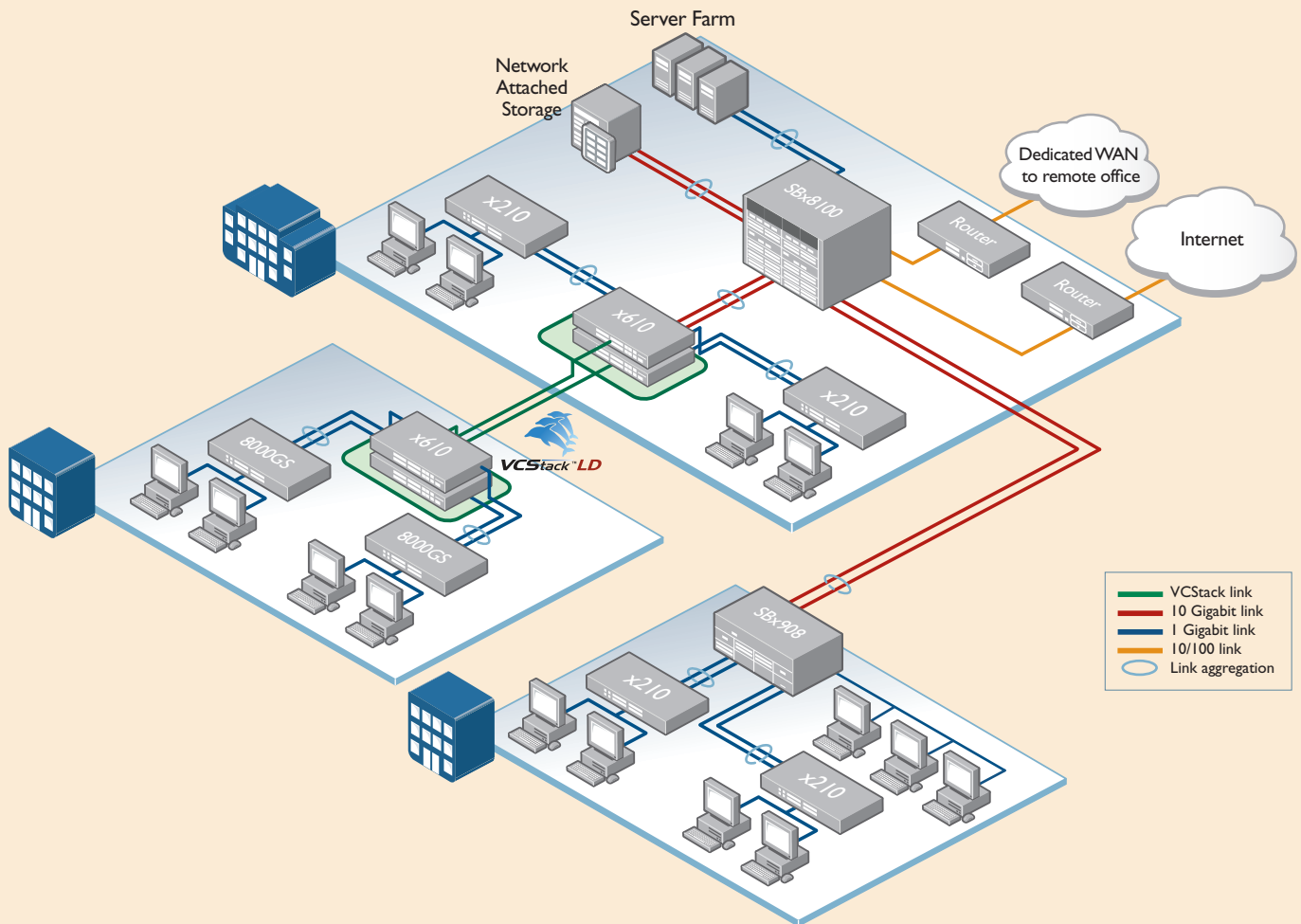
Key Solutions

Network Core Resiliency

The convergence of network services in the enterprise has led to increasing demand for high performing networks with minimal downtime. The SwitchBlade x8112 provides a powerful network core solution with extremely high reliability. PSU redundancy ensures maximum uptime, while hot-swappable PSUs, fan tray, control and line cards allow for system maintenance or re-configuration with no network interruption.

Real-time applications like VoIP and streaming video are assured premium service on the network, as near hitless failover between the dual control cards on the SwitchBlade x8112 means there is no perceptible disruption in the case of a problem.

Link aggregation across line-cards to servers, network storage, and distribution switches leaves no single point of failure in this high performing network core.

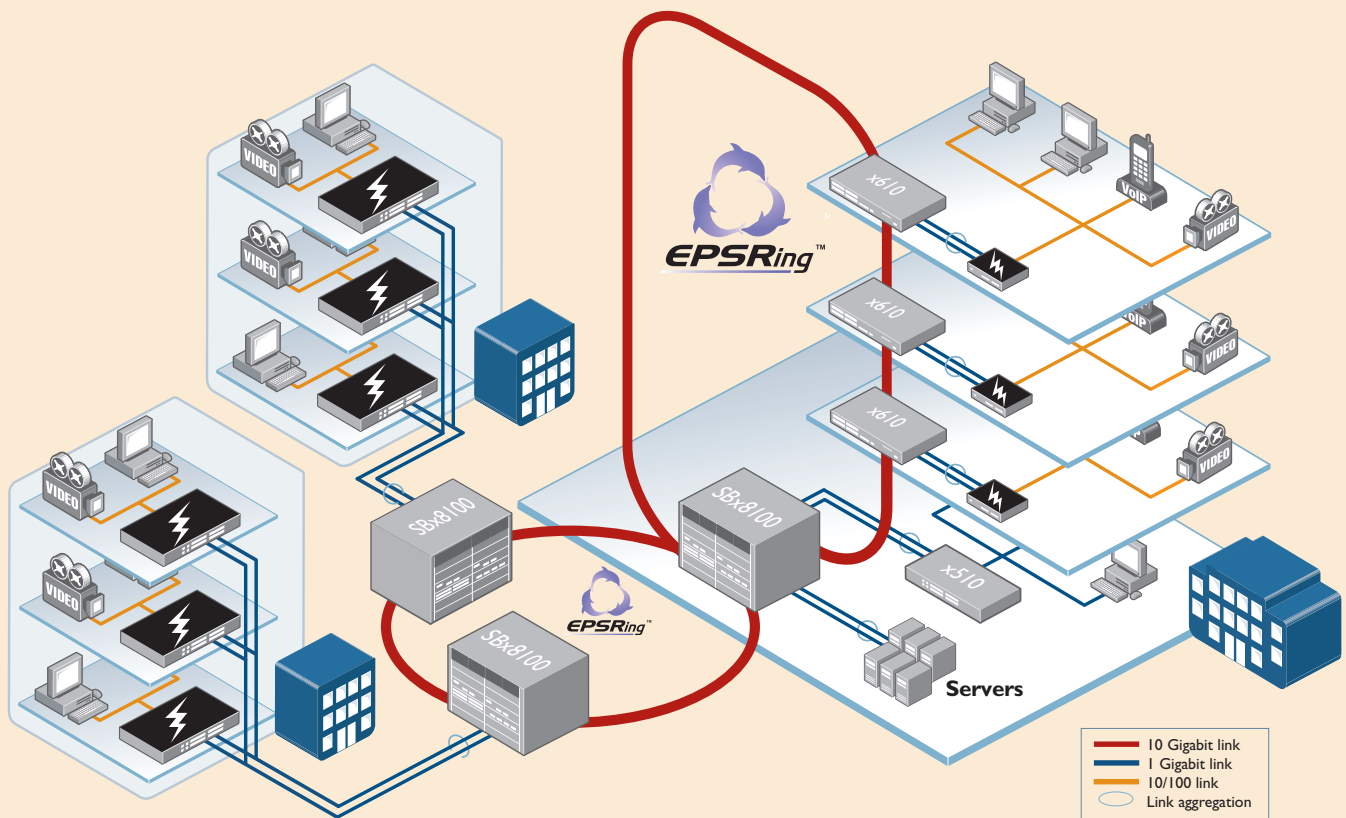


Key Solutions

Distributed Network with EPSR

Where a distributed network design is required, Allied Telesis EPSRing (Ethernet Protection Switched Ring) with the SwitchBlade x8112 provides an ideal solution, with high speed 10GbE connectivity. Failover in a little as 50ms, prevents a node or link failure from affecting customer experience, even with demanding applications such as IP telephony and video monitoring.

This is an ideal solution for ensuring continual access to online resources and applications in a multi-building campus. Now that technology has made high-availability and high-bandwidth so accessible, corporate business, education providers and other enterprise network users can enjoy the many benefits that EPSRing provides. This advanced self-healing network technology meets the constant demand for information.



Product Specifications

AT-SBx81CFC400 (Controller Fabric Card)

- » 512MB SDRAM
- » 512KB NVRAM
- » 128MB flash memory
- » Up to 32K MAC addresses*
- » Up to 16K IP routes maximum*
- » 24Mbit packet buffer memory
- » Supports 10KB jumbo packets
- » 4K VLANs

AT-SBx81GP24 (24 x 10/100/1000T PoE+ line card)

- » 12Mbit packet buffer memory

AT-SBx81GT24 (24 x 10/100/1000T line card)

- » 12Mbit packet buffer memory

AT-SBx81GT40 (40 x 10/100/1000T RJ.5 line card)

- » 32Mbit packet buffer memory

AT-SBx81GS24a (24 x 100/1000 SFP line card)

- » 24Mbit packet buffer memory

AT-SBx81XS6 (6 x 10Gbps SFP+ line card)

- » 24Mbit packet buffer memory

Performance

- » Non-blocking for all packet sizes, with 2 CFCs installed
- » Wirespeed multicasting
- » Forwarding rate: 595Mpps
- » Switch fabric: 800Gbps (400Gbps per CFC)

Reliability

- » Modular AlliedWare Plus operating system
- » Redundant controller fabric cards
- » Redundant 1200W AC or DC system power supplies
- » Load-sharing 1200W PoE+ power supplies
- » Full environmental monitoring of PSUs, fans, temperature and internal voltages. SNMP traps alert network managers in case of failure

Expandability

- » 10 high speed chassis slots support any mix of hot-swappable line cards for port flexibility and application versatility
- » Premium license option for additional features
- » AMF Master license option

Flexibility and compatibility

- » Gigabit SFP ports will support any combination of 1000T, 100FX, 100BX, 1000SX, 1000LX, 1000ZX or 1000ZX CWDM SFPs
- » 10G SFP+ ports will support any combination of 10GSR or 10GLR SFP+ modules and SFP+ direct attach cables

Diagnostic Tools

- » Optical Digital Diagnostic Monitoring (DDM)
- » Ping polling for IPv4 and IPv6
- » Port mirroring
- » TraceRoute for IPv4 and IPv6

* Depending on selected configuration

IPv4 Features

- » Black hole routing
- » Directed broadcast forwarding
- » DNS relay
- » Equal Cost Multi Path (ECMP) routing
- » Route maps
- » Route redistribution (OSPF, BGP, RIP)
- » UDP broadcast helper (IP helper)

IPv6 Features

- » DHCPv6 relay
- » DNSv6
- » Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- » NTPv6

Management

- » 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
- » Out-of-band 10/100/1000T Ethernet management port
- » 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

- » 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
- » Taildrop for queue congestion control
- » Strict priority, weighted round robin or mixed scheduling

Resiliency Features

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

Security Features

- » Access Control Lists (ACLs)
- » Configurable auth-fail and guest VLANs
- » Authentication, Authorisation and Accounting (AAA)
- » BPDU protection
- » DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- » 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 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)

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, TÜV

Restrictions on Hazardous Substances (RoHS) Compliance

- » EU RoHS compliant
- » China RoHS compliant

Country of Origin

- » Singapore

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.3

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 2545 Use of BGP-4 multiprotocol extensions for IPv6 inter-domain routing
- RFC 2858 Multiprotocol extensions for BGP-4
- RFC 2918 Route refresh capability for BGP-4
- RFC 3392 Capabilities advertisement with BGP-4
- 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

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
- 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
- IGMP/MLD multicast forwarding (IGMP/MLD proxy)
- MLD snooping (v1 and v2)
- PIM 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 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)

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 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 857	Telnet echo option	RFC 3993	Subscriber-ID suboption for DHCP relay agent option
RFC 2865	RADIUS	RFC 858	Telnet suppress go ahead option	RFC 4330	Simple Network Time Protocol (SNTP) version 4
RFC 2866	RADIUS accounting	RFC 1091	Telnet terminal-type option	RFC 5905	Network Time Protocol (NTP) version 4
RFC 2868	RADIUS attributes for tunnel protocol support	RFC 1350	Trivial File Transfer Protocol (TFTP)		
RFC 3546	Transport Layer Security (TLS) extensions	RFC 1985	SMTP service extension		
RFC 3579	RADIUS support for Extensible Authentication Protocol (EAP)	RFC 2049	MIME		
RFC 3580	IEEE 802.1x RADIUS usage guidelines	RFC 2131	DHCPv4 (server, relay and client)		
RFC 3748	PPP Extensible Authentication Protocol (EAP)	RFC 2132	DHCP options and BootP vendor extensions		
RFC 4251	Secure Shell (SSHv2) protocol architecture	RFC 2554	SMTP service extension for authentication		
RFC 4252	Secure Shell (SSHv2) authentication protocol	RFC 2616	Hypertext Transfer Protocol - HTTP/1.1		
RFC 4253	Secure Shell (SSHv2) transport layer protocol	RFC 2821	Simple Mail Transfer Protocol (SMTP)		
RFC 4254	Secure Shell (SSHv2) connection protocol	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		

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)

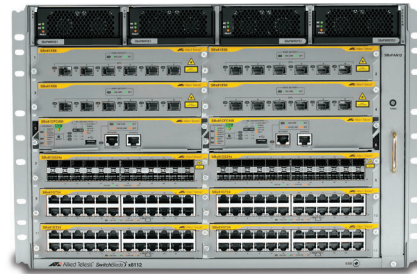
LLDP-MED ANSI/TIA-1057
 Voice VLAN

Services

RFC 854	Telnet protocol specification
RFC 855	Telnet option specifications

Physical Specifications

Product	Dimensions (WxDxH)	Weight (kg/lbs)
AT-SBx8112 chassis	48.0 x 38.8 x 31.0 cm	17.8 kg (39.1 lb)
AT-SBx81CFC400 controller fabric card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.4 lb)
AT-SBx81GP24 PoE+ line card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 lb)
AT-SBx81GT24 line card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 lb)
AT-SBx81GT40 line card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 lb)
AT-SBx81GS24a SFP line card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 lb)
AT-SBx81XS6 SFP+ line card	20.7 x 31.3 x 4.1 cm	0.8 kg (1.8 lb)
AT-SBxPWRSYS1 AC sys power supply	10.2 x 32.2 x 4.3 cm	2.8 kg (6.1 lb)
AT-SBxPWRSYS1-80 DC sys power supply	10.2 x 32.2 x 4.3 cm	2.8 kg (6.1 lb)
AT-SBxPWRPOE1 PoE power supply	10.2 x 32.2 x 4.3 cm	2.7 kg (6.0 lb)
AT-SBxFAN12 fan tray	2.7 x 33.4 x 26.0 cm	1.8 kg (4.0 lb)



PoE Power Provisioning

Maximum number of ports that can be powered (with 2 x AT-SBxPWRPOE1 installed)

	PoE Power	Class 3 (15.4W)	Class 4 (30W)
PSUs in redundant mode	1200W	77	40
PSUs in boost mode	2400W	155	80



Power Consumption

	Maximum	Heat dissipation
AT-SBx81CFC400	48.3W	164.8 BTU/hr
AT-SBx81GP24	34.4W	117.4 BTU/hr
AT-SBx81GT24	34.4W	117.4 BTU/hr
AT-SBx81GT40	53.9W	183.7 BTU/hr
AT-SBx81GS24a	56.3W	192.1 BTU/hr
AT-SBx81XS6	48.3W	164.8 BTU/hr



Power Efficiency

Maximum power supply efficiency (based on 100V input voltage)

AT-SBxPWRSYS1	78.4% (100% load)
	81.8% (50% load)
AT-SBxPWRPOE1	81.3% (100% load)
	83.6% (50% load)



Latency

Measured in microseconds (µs) at 64byte framesize

	10Mbit	100Mbit	1000Mbit
AT-SBx81GP24	36.0 µs	5.6 µs	2.6 µs
AT-SBx81GT24	36.0 µs	5.6 µs	2.6 µs
AT-SBx81GT40	165.0 µs	20.0 µs	6.0 µs
AT-SBx81GS24a	38.5 µs	7.0 µs	2.8 µs
AT-SBx81XS6	3.1 µs (10Gbit)		



Power Characteristics

Voltage: 100-240V AC (10% auto-ranging)
 Frequency: 50/60 Hz
 Maximum current: 16A @ 100V

Ordering Information

AT-SBx8112-96POE+

96-port PoE+ starter bundle
 1 x AT-SBx8112 chassis
 1 x AT-SBx81CFC400 controller fabric card
 4 x AT-SBx81GP24 PoE+ line card
 1 x AT-SBxPWRSYS1 system power supply
 1 x AT-SBxPWRPOE1 PoE power supply

AT-SBx8112-I2XR

12-port 10G resiliency starter bundle
 1 x AT-SBx8112 chassis
 2 x AT-SBx81CFC400 controller fabric card
 2 x AT-SBx81XS6 SFP+ Ethernet line card
 2 x AT-SBxPWRSYS1 system power supply

AT-SBx8112

Rack mount 12-slot chassis with fan tray

AT-SBx81FAN12

Contains four fans, temperature sensors and controller board

AT-SBx81CFC400

400Gbps Controller fabric card

AT-SBx81GP24

24-port 10/100/1000T PoE+ Ethernet line card

AT-SBx81GP24

24-port 10/100/1000T PoE+ Ethernet line card

AT-SBx81GT24

24-port 10/100/1000T Ethernet line card

AT-SBx81GT40

40-port 10/100/1000T RJ.5 Ethernet line card

AT-SBx81GS24a

24-port 100/1000X SFP Ethernet line card

AT-SBx81XS6

6-port 10GbE SFP+ Ethernet line card

AT-SBxPWRSYS1-xx

1200W AC system power supply

AT-SBxPWRSYS1-80

1200W DC system power supply

AT-SBxPWRPOE1-xx

1200W AC PoE power supply

Where xx =

- 10 for US power cord
- 20 for no power cord
- 30 for UK power cord
- 40 for Australian power cord
- 50 for European power cord



10GbE SFP+ Modules

AT-SPI0SR

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

AT-SPI0LR

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



10GbE Cables

AT-SPI0TW1

1 meter SFP+ direct attach cable

AT-SPI0TW3

3 meter SFP+ direct attach cable

AT-SPI0TW7

7 meter SFP+ direct attach cable

SFP Modules

AT-SPFX/2

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

AT-SPFX/15

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

AT-SPFXBD-LC-13

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

AT-SPFXBD-LC-15

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

AT-SPTX

1000T 100 m copper

AT-SPSX

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

AT-SPSX/I

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

Power cords are only shipped with AT-SBxPWRSYS1 or AT-SBxPWRPOE1 power supplies.

Note: Power entry connector is IEC 60320 C19 (High capacity)

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

RJ.5 to RJ45 Cables

For use with SBx81GT40

AT-UTP/RJ.5-100-A-008

RJ.5 to RJ45 1m Ethernet cables (pack of 8)

AT-UTP/RJ.5-300-A-008

RJ.5 to RJ45 3m Ethernet cables (pack of 8)

Feature Licenses

NAME	DESCRIPTION	INCLUDES
AT-FL-SBx81-01	AT-SBx8112 Premium License	<ul style="list-style-type: none"> » OSPF* » PIMv4-SM, DM, SSM » VLAN double tagging (Q-in-Q) » RIPng » OSPFv3 » MLDv1 & v2 » PIMv6-SM » RADIUS-Full
AT-FL-CF4-AM40	AMF Master License for up to 40 nodes	<ul style="list-style-type: none"> » AMF Master role

*64 OSPF routes included in base license