SwitchBlade® x8100 Series

With CFC960 Controller

Next generation intelligent Layer 3+ chassis switches

Allied Telesis SwitchBlade x8100 Series Layer 3+ chassis switches, with CFC960 control cards, guarantee high performance for the large enterprise network core. Available in 6 and 12 slot models, with the ability to stack two chassis into a single virtual unit, the CFC960 based system combines resilience and scalability in a superior solution.

CFC960   **Allied**Ware Plus™ OPERATING SYSTEM

High performing

The SwitchBlade x8100 Series offers an extensive range of 40, 10 and 1 Gigabit connectivity options. The CFC960 control card provides powerful processing ability ideal for the large network core, and incorporates four 10GbE ports. Dual active/active CFC960 control cards provide chassis resilience, and up to 160Gbps throughput to each line card slot for maximum performance and wirespeed data delivery.

Powerful network management

The Allied Telesis Management Framework (AMF) meets the increased management requirements of modern converged networks, automating many everyday tasks including configuration management. AMF has powerful centralized management features that manage a complete network as a single virtual device. The network can be expanded with plug-and-play simplicity, and network node recovery is fully zero-touch. AMF Guestnode allows third party devices, such as IP phones and security cameras, to be part of an AMF network.

Total reliability

For resiliency against network failures, two chassis can be stacked together into a single virtual unit using VCStack Plus™. This creates a powerful and completely resilient network core, which can even be distributed over long distance.

The SwitchBlade x8100 Series switches operate with a single AC or DC PSU. Installing a second load-sharing PSU provides complete power redundancy.

To minimize downtime when maintaining or upgrading the system, In-Service Software Upgrade can be used to upgrade software without interrupting network traffic, and control cards, line cards, power supplies and the fan tray are all hot-swappable.

Scalable

Both the 6- and 12-slot chassis options provide a powerful network solution. VCStack Plus uses the 10 Gigabit ports on the CFC960 control cards to allow two chassis to combine as a single virtual unit.

The modular SBx81XLEM line card is extremely flexible, supporting 40, 10 and 1 Gigabit Ethernet options. It also offers increased L2 and L3 table sizes for large core applications.

The 6-port and 16-port 10 Gigabit (SFP+) line cards provide high-speed downlink connectivity.

There are three 24-port Gigabit line cards available: copper, PoE+, and fiber (SFP). The 40-port Gigabit copper line card maximizes port density, providing up to 400 Gigabit copper ports in a single 7RU SwitchBlade x8112 chassis, or 200 Gigabit copper ports in a single 4RU SwitchBlade x8106 chassis.

PoE plus™

Environmentally friendly

SwitchBlade x8100 Series switches are designed to reduce power consumption and minimize hazardous waste. Features include high efficiency power supplies and low power chip sets. An ECO-Switch button allows additional power conservation, by turning off all diagnostic LED indicators when they are not required.

eco friendly

New Features

▶ SBx81XLEM 40G modular line card

▶ 4 x 10G RJ45 module for XLEM line card

▶ Large tables support with XLEM line card

▶ Active Fiber Monitoring

▶ Microsoft Network Load Balancing (MS NLB) support

▶ VLAN Mirroring (RSPAN)

VCStackPLUS™   **AMF**™   **EPSRing**™   **ACTIVE** Fiber Monitoring™

Key Features

VCStack Plus™

▶ Two SwitchBlade x8100 chassis can be stacked together into a single virtual unit using VCStack Plus. The stacking link uses the 10 Gigabit front panel ports on the CFC960 control cards, which provides a massive 160 Gigabits of stacking bandwidth. VCStack Plus provides a highly available system where network resources and distribution switches are connected across the units for ultimate resiliency. Management is simplified as the two chassis operate as a single virtual unit.

Long-distance VCStack Plus

▶ As the VCStack Plus links are fiber, the two chassis do not need to be collocated, but can be kilometres apart - perfect for a distributed network environment, or data-mirroring solution.

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. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.

▶ Any SwitchBlade x8100 Series switch 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. New network devices can be pre-provisioned making installation easy because no on-site configuration is required.

▶ AMF Guestnode allows Allied Telesis wireless access points and further switching products, as well as third party devices such as IP phones and security cameras, to be part of an AMF network.

AMF Controller

▶ The CFC960 can manage AMF networks of up to 120 nodes, which can be located locally or across WAN links. This can be dramatically increased by installing the AMF Controller, which enables multiple AMF Masters to be managed from a single point. With the AMF Controller, a network of over 7,000 devices can be managed, allowing all the time saving, cost reducing benefits of AMF to be multiplied and efficiencies to be increased.

In-Service Software Upgrade (ISSU)

▶ ISSU (also called "hitless firmware upgrade") allows firmware to be updated without causing any network disruption from a device reboot. This enables essential maintenance to be performed when it is required rather than having to schedule a network outage or tolerate any loss of service. ISSU is supported on dual controller systems and can be used in conjunction with VCStack Plus, making it ideal for high availability applications.

Virtual Routing and Forwarding (VRF Lite)

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

EPSRing™ (Ethernet Protection Switched Ring)

▶ EPSRing combines with 40G or 10G Ethernet to allow several 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 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 with 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.

VLAN Mirroring (RSPAN)

▶ VLAN mirroring allows traffic from a port on a remote switch to be analysed locally. Traffic being transmitted or received on the port is duplicated and sent across the network on a special VLAN.

Optical DDM

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

Active Fiber Monitoring

▶ Active Fiber Monitoring 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.

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.

Microsoft Network Load Balancing (MS NLB) Support

▶ Support for MS NLB, which clusters identical servers together for increased performance through load-sharing.
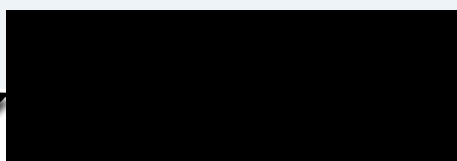
SBx81XLEM with Q2 module

SBx81XS16

SBx81CFC960

Product Specifications

AT-SBx81CFC960 (Controller Fabric Card)
▶ 2GB SDRAM
▶ 512KB NVRAM
▶ 256MB flash memory
▶ Up to 128K MAC addresses and 100K routes (with SBx81XLEM)[1]
▶ Up to 32K MAC addresses and 7K routes (with other line cards)[1]
▶ 32Mbit packet buffer memory
▶ Supports 10KB jumbo packets
▶ 4K VLANs
▶ 4 x 10GbE ports for stacking or uplinks

AT-SBx81GP24 (24 x 10/100/1000T PoE+ line card)
AT-SBx81GT24 (24 x 10/100/1000T line card)
▶ 12Mbit packet buffer memory

AT-SBx81GS24a (24 x 100/1000 SFP line card)
AT-SBx81XS6 (6 x 10Gbps SFP+ line card)
▶ 24Mbit packet buffer memory

AT-SBx81GT40 (40 x 10/100/1000T RJ.5 line card)
AT-SBx81XS16 (16 x 10GbE SFP+ line card)
AT-SBx81XLEM (12 x 100/1000 SFP, 1 module slot line card)
▶ 32Mbit packet buffer memory

> **A maximum of 6 x AT-SBx81XS16 line cards can be installed in an SBx8112 chassis, and 5 in an SBx8106 chassis**

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
▶ Over-temperature monitoring and alarms

Expandability
▶ 160Gbps of stacking bandwidth
▶ High-speed line slots support any mix of hot-swappable cards for port flexibility
▶ A line card can be installed in the second CFC slot of the SBx8106 chassis for extra port density
▶ Premium license option for additional features
▶ AMF Master license options for 40, 80 and up to 120 node networks

Flexibility and compatibility
▶ Gigabit SFP ports will support any combination of Allied Telesis SFP modules listed in this document under Ordering Information
▶ 10G SFP+ ports will support any combination of Allied Telesis SFP+ modules and direct attach cables listed in this document under Ordering Information
▶ 40G QSFP+ ports will support any combination of Allied Telesis QSFP+ modules and cables listed in this document under ordering information

Diagnostic tools
▶ Active Fiber Monitoring detects tampering on optical links
▶ Cable fault locator (TDR)
▶ UniDirectional Link Detection (UDLD)

[1] Depending on selected configuration

▶ Hardware health monitoring
▶ Automatic link flap detection and port shutdown
▶ Optical Digital Diagnostic Monitoring (DDM)
▶ Ping polling and TraceRoute for IPv4 and IPv6
▶ Port and VLAN mirroring (RSPAN)

IPv4 features
▶ Black hole routing
▶ Directed broadcast forwarding
▶ DNS relay
▶ Equal Cost Multi Path (ECMP) routing
▶ Policy-based routing
▶ Route maps and route redistribution (OSPF, BGP, RIP)
▶ IPv4 static unicast and multicast routing
▶ UDP broadcast helper (IP helper)
▶ Up to 64 Virtual Routing and Forwarding (VRF lite) domains (Premium license)

IPv6 features
▶ DHCPv6 relay, DHCPv6 client
▶ DNSv6 relay, DNSv6 client
▶ IPv4 and IPv6 dual stack
▶ IPv6 QoS and hardware ACLs
▶ Device management over IPv6 networks with SNMPv6, Telnetv6, SSHv6 and Syslogv6
▶ NTPv6 client and server
▶ IPv6 static unicast and multicast routing

Management
▶ Allied Telesis Management Framework (AMF) enables powerful centralized management and zero-touch device installation and recovery
▶ Try AMF for free with the built-in AMF Starter license
▶ Eco-friendly mode allows ports and LEDs to be disabled to save power
▶ Industry-standard CLI with context-sensitive help
▶ Out-of-band 10/100/1000T Ethernet management port on the CFC front panel for ease of access
▶ Powerful CLI scripting engine and built-in text editor
▶ Comprehensive SNMP MIB support for standards-based device management
▶ Management via Telnet or SSH to CLI
▶ 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 (QoS)
▶ 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
▶ DSCP remarking based on TCP/UDP port number

Resiliency features
▶ Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
▶ 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
▶ VCStack Plus enables two SBx8100 chassis with CFC960 to form a stack for ultimate resiliency and simplified management
▶ In-Service Software Upgrade provides hitless firmware update to prevent outages during essential maintenance

Security features
▶ Access Control Lists (ACLs) based on layer 3 and 4 headers
▶ Configurable ACLs for management traffic
▶ Auth-fail and guest VLANs
▶ Bootloader can be password protected for device security
▶ 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
▶ RADIUS group selection per VLAN or port

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, TUV

Restrictions on Hazardous Substances (RoHS) Compliance
▶ EU and China RoHS compliant

Country of origin
▶ Indonesia

Standards and Protocols

AlliedWare Plus Operating System
Version 5.4.6-1

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

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

Ethernet
IEEE 802.1AXLink aggregation (static and LACP)
IEEE 802.2   Logical Link Control (LLC)
IEEE 802.3   Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3adStatic and dynamic link aggregation
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3an 10GBASE-T
IEEE 802.3at Power over Ethernet plus (PoE+)
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3ba40 Gigabit Ethernet
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
AMF MIB and traps
VCS+ MIB and 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 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 4022	SNMPv2 MIB for TCP using SMIv2
RFC 4113	SNMPv2 MIB for UDP using SMIv2
RFC 4293	SNMPv2 MIB for IP using SMIv2
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-SM and 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 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

CFC960

_t20-29.E
g Information Protocol (RIP)
Routing Information Protocol (RIP)
RIPng foP   otocol (RIP)

RFC 2080

RFC 2080
RIPv (/PP)
RFC 20817.57   (72.4 (V i)-6.4 (n)-13.1h (i)-13.4 (i)-13.1 (c-12.7t)l)-15 (y e)-19.4 (i)92 (c)-1rmaot (o4-2.4.4.82o35.6 -10.43(S)-50-32.8 (P)-29.7 ())TJ-5.028 -1.28)-72

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-SBx8106 chassis	48.0 x 38.8 x 17.6 cm	14.4 kg (31.8 lb)
AT-SBx81CFC960 controller fabric card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 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 RJ.5 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-SBx81XS16 SFP+ line card	20.7 x 31.3 x 4.1 cm	1.0 kg (2.2 lb)
81XLEM 40G modular line card	20.7 x 31.3 x 4.1 cm	1.1 kg (2.3 lb)
PWRSYS2 AC system PSU	10.2 x 32.2 x 4.3 cm	2.8 kg (6.1 lb)
PWRSYS1-80 DC system PSU	10.2 x 32.2 x 4.3 cm	2.8 kg (6.1 lb)
PWRPOE1 PoE+ power supply	10.2 x 32.2 x 4.3 cm	2.7 kg (6.0 lb)

AT-SBx8112
Rack mount 12-slot chassis with fan tray

AT-SBx8106
Rack mount 6-slot chassis with fan tray

AT-SBxFAN12
Contains four fans, temperature sensors and
controller board for SBx8112 chassis

AT-SBxFAN06
Contains two fans, temperature sensors and
controller board for SBx8106 chassis

AT-SBx81CFC960
960Gbps Controller fabric card with 4 x 10GbE
ports

CFC960

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Accessories

40G QSFP+ Modules

AT-QSFPLR4
40GLR4 1310 nm medium-haul, 10 km with SMF

AT-QSFPSR4
40GSR4 850 nm short-haul up to 150 m with MMF

AT-QSFPSR
40GSR 850nm short-haul up to 150 m with MMF

AT-MTP12-1
MTP optical cable for AT-QSFPSR, 1 m

AT-MTP12-5
MTP optical cable for AT-QSFPSR, 5 m

AT-QSFP1CU
QSFP+ direct attach cable 1 m

AT-QSFP3CU
QSFP+ direct attach cable 3 m

10GbE SFP+ modules
(Note that any Allied Telesis 10G SFP+ module can be used for stacking with the 10G ports on the CFC960)

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-SP10LRM
10GLRM 1310 nm short-haul, 220 m with MMF

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 1310nm long-haul, 20 km with SMF
industrial temperature

AT-SP10ER40/I
10GER 1310nm long-haul, 40 km with SMF
industrial temperature

AT-SP10 R80/I
10GER 1550nm long-haul, 80 km with SMF
industrial temperature

10GbE cables

AT-SP10TW1
1 meter SFP+ direct attach cable

AT-SP10TW3
3 meter SFP+ direct attach cable

AT-SP10TW7
7 meter SFP+ direct attach cable

RJ.5 to RJ-45 cables
For use with AT-SBx81GT40

AT-UTP/RJ.5-100-A-008
RJ.5 to RJ-45 1 m Ethernet cables
(pack of 8)

AT-UTP/RJ.5-300-A-008
RJ.5 to RJ-45 3 m Ethernet cables
(pack of 8)

SFP modules

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

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

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

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

AT-SPTX
1000T 100 m copper

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

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

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

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

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

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

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

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

AT-SP X80
1000ZX GbE single-mode 1550 nm fiber up to 80 km

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