

# x930 Series

## Advanced Gigabit Layer 3 Stackable Switches with 10G and 40G Uplinks

The Allied Telesis x930 Series of stackable Gigabit Layer 3 switches provide resiliency, reliability and high performance, making them ideal for distribution and network core solutions.



Allied Telesis x930 Series switches are a high-performing and feature-rich choice for today's networks. With a choice of 24- and 48-port models with 10 Gigabit and 40 Gigabit uplink ports, plus the power of Allied Telesis Virtual Chassis Stacking (VCStack™) with up to 160Gbps of stacking bandwidth per switch, the x930 Series have the flexibility and performance for key network connectivity.

### Powerful network management

The Allied Telesis Autonomous 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 secure mode increases network security with management traffic encryption, authorization, and monitoring. AMF Guestnode allows third party devices, such as IP phones and security cameras, to be part of an AMF network.

### 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, resilient solution for high availability applications.

The x930 Series can form a VCStack of up to eight units for enhanced resiliency and simplified device management. Stacks can be created over long distance fiber links with VCStack LD (Long Distance), making the x930 Series the perfect choice for distributed environments.

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

### Reliable

The x930 Series was designed with reliability in mind, and guarantees continual delivery of essential services. With dual hot-swappable load-sharing power supplies and near-hitless online stack reconfiguration, maintenance may be performed without affecting network uptime.

### Secure

Advanced security features protect the network from the edge to the core. The x930 Series offers powerful control over network traffic types, protection against network attacks, secure management options, loop guard to detect cabling mistakes, and tri-authentication for comprehensive end-point access control.

### Future-proof

The x930 Series ensures a futureproof network, with superior flexibility coupled with the ability to stack multiple units. All x930 Series models

feature 10 Gigabit and the option of 40 Gigabit uplinks ports and a comprehensive IPv6 feature set, so are fully ready for future network traffic demands. All x930 Series switches are Software Defined Networking (SDN) ready and are able to support OpenFlow v1.3.



### Environmentally friendly

The x930 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 / Key Features

- ▶ AMF secure mode
- ▶ G.8032 Ethernet Ring Protection
- ▶ Ethernet CFM
- ▶ Continuous PoE
- ▶ Precision Time Protocol (PTP) Transparent Mode
- ▶ 40G Ethernet uplinks and stacking ports
- ▶ 10G copper Ethernet expansion module
- ▶ Active Fiber Monitoring
- ▶ OpenFlow for SDN

## Key Features

### Allied Telesis Autonomous 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 x930 Series switch can operate as the AMF network master, storing firmware and configuration backups for other network nodes. The AMF master enables auto-provisioning and auto-upgrade by providing appropriate files to new network members. New network devices can be pre-provisioned making installation easy because no on-site configuration is required.
- ▶ AMF secure mode encrypts all AMF traffic, provides unit and user authorization, and monitors network access to greatly enhance network security.
- ▶ 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.

### Virtual Chassis Stacking (VCStack)

- ▶ Create a VCStack of up to eight units with 40Gbps (or 160Gbps with the StackQS model) of stacking bandwidth on 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.

### Long-Distance Stacking

- ▶ Long-distance stacking allows a VCStack to be created over longer distances, perfect for a distributed network environment.

### Ethernet Protection Switched Ring (EPSRing)

- ▶ EPSRing and 10 Gigabit Ethernet 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.

### G.8032 Ethernet Ring Protection

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

### 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.

### 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.

### UniDirectional link Detection

- ▶ UniDirectional Link Detection (UDLD) is useful for monitoring fiber-optic links between two switches that use two single-direction fibers to transmit and receive packets. UDLD prevents traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails.

### 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.

### Continuous PoE

- ▶ Continuous PoE allows the switch to be restarted without affecting the supply of power to connected devices. Smart lighting, security cameras, and other PoE devices will continue to operate during a software upgrade on the switch.

### High Reliability

- ▶ The x930 series switches feature front to back cooling and dual power supply units (PSUs). The x930 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.

### 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.

### 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.

### Premium Software License

- ▶ By default, the x930 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.

### Precision Time Protocol (PTP)

- ▶ PTP (IEEE 1588) synchronizes clocks throughout the network with micro-second accuracy, supporting industrial automation and control systems.

### Software Defined Networking (SDN)

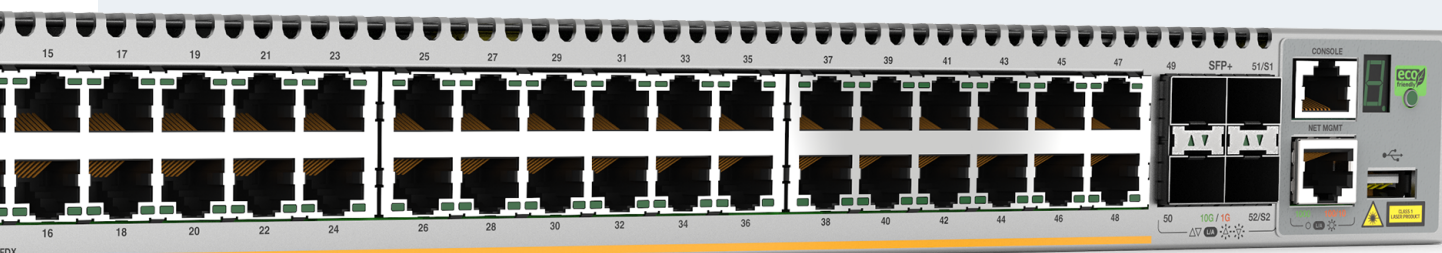
- ▶ OpenFlow is a key technology that enables the use of SDN to build smart applications that unlock value and reduce cost.

### VLAN ACLs

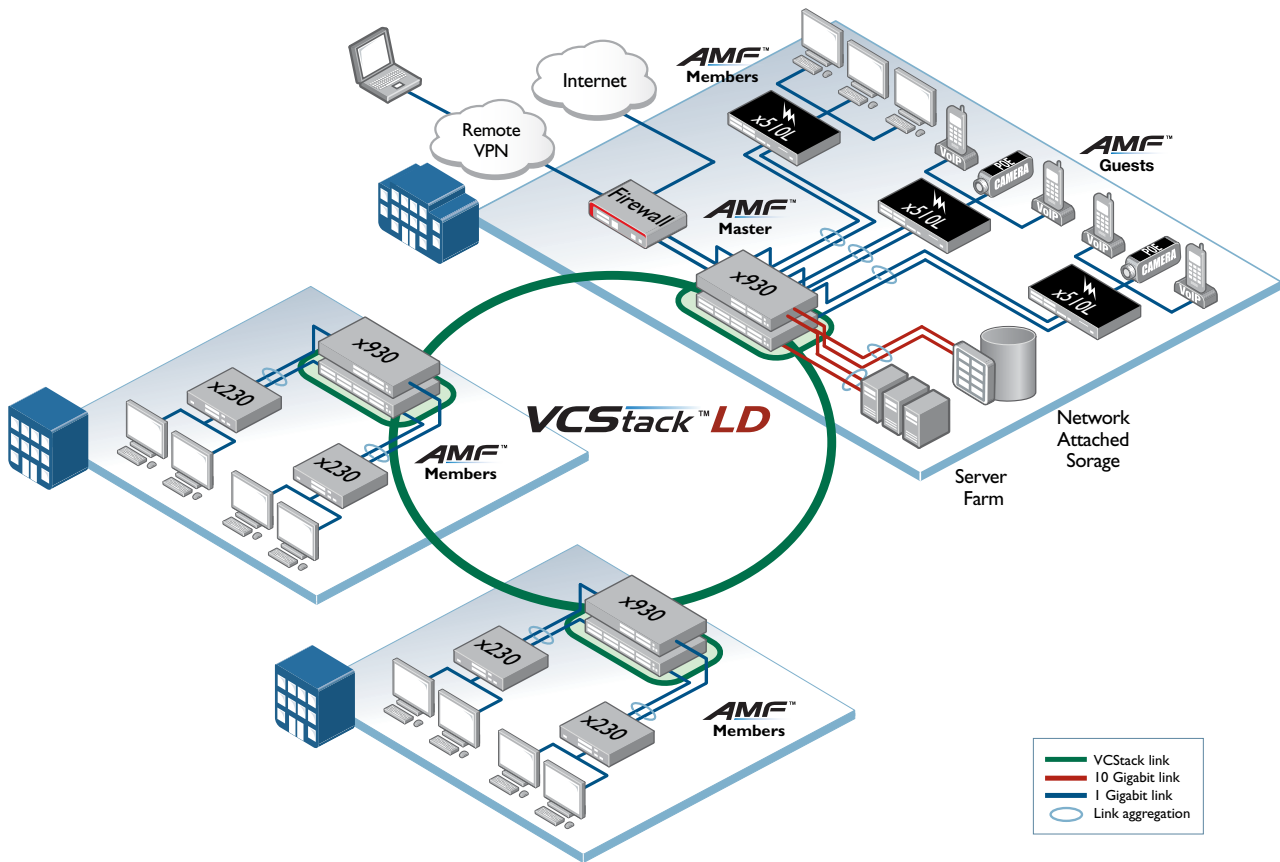
- ▶ Simplify access and traffic control across entire segments of the network. Access Control Lists (ACLs) can be applied to a Virtual LAN (VLAN) as well as a specific port.

### TACACS+ Command Authorization

- ▶ Centralize control of which commands may be issued by a specific user of an AlliedWare Plus device. TACACS+ command authorization complements authentication and accounting services for a complete AAA solution.



## Key Solutions



### Distributed network core

Allied Telesis x930 Series switches are ideal for core and distribution solutions, where resiliency and flexibility are required. In the above diagram, long distance Virtual Chassis Stacking (VCStack-LD) is used to create a single virtual unit out of multiple devices. The increased distance provided by fiber stacking connectivity means that members of the virtual chassis do not need to be co-located. Instead, they can be kilometers apart – perfect for a distributed network environment.

When combined with link aggregation to access switches, this provides a solution with no single point of failure that fully utilizes all network bandwidth, and ensures high availability of data for network users.

AMF allows this large distributed network to be managed as a single virtual entity, greatly reducing administration and automating many day to day tasks.

Allied Telesis x930 Series switches support enterprises and their use of business-critical online resources and applications, with a resilient and reliable solution.

## Specifications

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	100/1000X SFP PORTS	1/10 GIGABIT SFP+ PORTS	10 GIGABIT STACKING PORTS	MODULE SLOTS	POE+ ENABLED PORTS	SWITCHING FABRIC	FORWARDING RATE
x930-28GTX	24	-	4 (2 if stacked)	2*	1	-	288Gbps	214.3Mpps
x930-28GPX	24	-	4 (2 if stacked)	2*	1	24	288Gbps	214.3Mpps
x930-28GSTX	24 (combo)	24 (combo)	4 (2 if stacked)	2*	1	-	288Gbps	214.3Mpps
x930-52GTX	48	-	4 (2 if stacked)	2*	1	-	336Gbps	250Mpps
x930-52GPX	48	-	4 (2 if stacked)	2*	1	48	336Gbps	250Mpps

\* Stacking ports can be configured as additional 1G/10G Ethernet ports when unit is not stacked, or if StackQS module is used

### Performance

- ▶ 40Gbps of stacking bandwidth per switch using front panel 10G SFP+ ports
- ▶ 160Gbps of stacking bandwidth per switch using optional AT-StackQS expansion module
- ▶ Supports 13KB jumbo frames
- ▶ Wirespeed multicasting
- ▶ 4094 configurable VLANs
- ▶ Up to 64K MAC addresses
- ▶ Up to 16,000 OSPF routes
- ▶ Up to 2,000 IPv4 multicast entries
- ▶ Up to 2000 OpenFlow v1.3 entries
- ▶ Up to 32 dynamic (LACP) and 96 static channel groups, of up to 8-ports each
- ▶ 2GB DDR SDRAM, 256MB flash memory
- ▶ Packet buffer memory: x930-28 - 2MB, 52 - 4MB

### Reliability

- ▶ Modular AlliedWare Plus operating system
- ▶ Internal 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

### Expandability

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

### Flexibility and Compatibility

- ▶ Gigabit SFP ports on x930-28GSTX will support any combination of Allied Telesis 100Mbps and 1000Mbps SFP modules listed in this document under Ordering Information
- ▶ 10G SFP+ ports will support any combination of Allied Telesis 1000Mbps SFP and 10GbE SFP+ modules and direct attach cables listed in this document under Ordering Information
- ▶ Port speed and duplex (full duplex only) configuration can be set manually or by auto-negotiation
- ▶ Front-panel SFP+ stacking ports can be configured as additional 1G/10G Ethernet ports

### Diagnostic Tools

- ▶ Active Fiber Monitoring detects tampering on optical links
- ▶ Built-In Self Test (BIST)
- ▶ Cable fault locator (TDR)
- ▶ Connectivity Fault Management (CFM) Continuity Check Protocol (CCP) for use with G.8032 ERPS
- ▶ Find-me device locator
- ▶ 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)
- ▶ Uni-Directional Link Detection (UDLD)

### 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)
- ▶ Static unicast and multicast routing for IPv4
- ▶ UDP broadcast helper (IP helper)
- ▶ Up to 64 Virtual Routing and Forwarding (VRF lite) domains (with license)

### IPv6 Features

- ▶ DHCPv6 client and relay
- ▶ DNSv6 client and relay
- ▶ IPv4 and IPv6 dual stack
- ▶ IPv6 aware storm protection, QoS and hardware ACLs
- ▶ Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- ▶ NTPv6 client and server
- ▶ Static unicast and multicast routing for IPv6
- ▶ Log to IPv6 hosts with Syslog v6

### 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
- ▶ Try AMF for free with the built-in Starter license
- ▶ 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
- ▶ Comprehensive SNMP MIB support for standards-based device management
- ▶ Built-in text editor and powerful CLI scripting engine
- ▶ 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
- ▶ IPv6 QoS support
- ▶ Policy-based QoS based on VLAN, port, MAC and general packet classifiers
- ▶ Policy-based storm protection
- ▶ Extensive remarking capabilities
- ▶ Taildrop for queue congestion control
- ▶ Queue scheduling options for strict priority, weighted round robin or mixed scheduling
- ▶ IP precedence and DiffServ marking based on layer 2, 3 and 4 headers

### Resiliency Features

- ▶ BPDU forwarding
- ▶ 10G and 40G stacking ports can be configured as Ethernet ports
- ▶ 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) and enhanced recovery for extra resiliency
- ▶ Long-Distance VCStack (LD-VCStack) using SFP+ or QSFP+ modules
- ▶ 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 ACLs for management traffic
- ▶ 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



## x930 Series | Advanced Gigabit Layer 3 Stackable Switches

- ▶ 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
- ▶ RADIUS group selection per VLAN or port
- ▶ Secure Copy (SCP) and Secure File Transfer Protocol (SFTP) client
- ▶ Strong password security and encryption
- ▶ TACACS+ command authorisation
- ▶ Tri-authentication: MAC-based, web-based and IEEE 802.1x

### Software Defined Networking (SDN)

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

### Environmental Specifications

- ▶ Operating temperature range:  
0°C to 50°C (32°F to 122°F) AT-x930-GTX models and AT-x930-28GSTX  
0°C to 45°C (32°F to 113°F) AT-x930-GPX models  
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, ICES-003 class A
- ▶ Immunity: EN55024, EN61000-3-levels 2 (Harmonics), and 3 (Flicker) – AC models only

### Power Supply Requirements

- ▶ AC voltage: 90 to 260V (auto-ranging)
- ▶ Frequency: 47 to 63Hz
- ▶ DC voltage: 40 to 60VDC (for PWR250-80 PSU only)

### Safety

- ▶ Standards: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950.1
- ▶ Certification: UL, cUL

### Restrictions on Hazardous Substances (RoHS) Compliance

- ▶ EU RoHS compliant
- ▶ China RoHS compliant

### Country of Origin

- ▶ Indonesia

### Physical Specifications

PRODUCT	WIDTH X DEPTH X HEIGHT	MOUNTING	WEIGHT		PACKAGED DIMENSIONS
			UNPACKAGED	PACKAGED	
x930-28GTX	440 x 420 x 44 mm (17.32 x 16.54 x 1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)	56 x 53 x 15 cm (22.1 x 20.9 x 5.9 in)
x930-28GPX	440 x 420 x 44 mm (17.32 x 16.54 x 1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)	56 x 53 x 15 cm (22.1 x 20.9 x 5.9 in)
x930-28GSTX	440 x 420 x 44 mm (17.32 x 16.54 x 1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)	56 x 53 x 15 cm (22.1 x 20.9 x 5.9 in)
x930-52GTX	440 x 420 x 44 mm (17.32 x 16.54 x 1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)	56 x 53 x 15 cm (22.1 x 20.9 x 5.9 in)
x930-52GPX	440 x 420 x 44 mm (17.32 x 16.54 x 1.73 in)	Rack-mount	5.2 kg (11.5 lb)	7.2 kg (15.9 lb)	56 x 53 x 15 cm (22.1 x 20.9 x 5.9 in)
StackQS	141 x 96.5 x 40.3 mm (5.56 x 3.80 x 1.59 in)	Module	0.2 kg (0.44 lb)	1.2 kg (2.65 lb)	40 x 25 x 10 cm (15.8 x 9.8 x 3.9 in)
x9EM/XT4	141 x 96.5 x 40.3 mm (5.56 x 3.80 x 1.59 in)	Module	0.2 kg (0.44 lb)	1.2 kg (2.65 lb)	40 x 25 x 13 cm (15.8 x 9.8 x 5.1 in)

### Power and Noise Characteristics

PRODUCT	NO POE LOAD			FULL POE+ LOAD (PWR800)			FULL POE+ LOAD (PWR1200)		
	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE
x930-28GTX	84W	285 BTU/h	39.7 dBA	-	-	-	-	-	-
x930-28GPX	84W	286 BTU/h	44.7 dBA	564W	287 BTU/h	45.8 dBA	808W	301 BTU/h	56.0 dBA
x930-28GSTX	97W	329 BTU/h	39.7 dBA	-	-	-	-	-	-
x930-52GTX	95W	323 BTU/h	39.7 dBA	-	-	-	-	-	-
x930-52GPX	97W	330 BTU/h	44.7 dBA	577W	331 BTU/h	45.8 dBA	880W	341 BTU/h	56.0 dBA

Noise: tested to ISO7779; front bystander position

### Latency (microseconds)

PRODUCT	PORT SPEED				
	10MBPS	100MBPS	1GBPS	10GBPS	40GBPS
x930-28GTX/GPX	47.4µs	7.9µs	3.7µs	2.6µs	-
x930-28GSTX	47.4µs	7.6µs (Fiber)	3.6µs (Fiber)	2.6µs	-
x930-52GTX/GPX	47.4µs	7.9µs	3.7µs	2.6µs	-
StackQS	-	-	-	-	2.5µs
x9EM/XT4	-	-	3.7µs	2.6µs	-

### Power over Ethernet Power Supply Combinations

PSU INSTALLED	POE POWER AVAILABLE	MAXIMUM POE PORTS SUPPORTED				MAX REDUNDANT POE POWER
		CLASS 1 (4.0W)	CLASS 2 (7.0W)	CLASS 3 (15.4W)	CLASS 4 (30W)	
PWR800	380W	48	48	24	12	-
PWR800 + PWR800	740W	48	48	48	24	380W
PWR1200	740W	48	48	48	24	-
PWR1200 + PWR1200	1440W	48	48	48	48	740W

## Standards and Protocols

### AlliedWare Plus Operating System

Version 5.4.7-1

### 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 3882 Configuring BGP to block Denial-of-Service (DoS) attacks
RFC 4271 Border Gateway Protocol 4 (BGP-4)
RFC 4360 BGP extended communities
RFC 4456 BGP route reflection - an alternative to full mesh iBGP
RFC 4724 BGP graceful restart
RFC 4893 BGP support for four-octet AS number space
RFC 5065 Autonomous system confederations for BGP

### Cryptographic Algorithms

#### FIPS Approved Algorithms (CAVP Certified\*)

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 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3an10GBASE-T
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3ba40GBASE-X
IEEE 802.3u 100BASE-X
IEEE 802.3x Flow control - full-duplex operation
IEEE 802.3z 1000BASE-X
IEEE 1588v2 Precision clock synchronization protocol v2

### 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 3484 Default address selection for IPv6
RFC 3587 IPv6 global unicast address format
RFC 3596 DNS extensions to support IPv6
RFC 4007 IPv6 scoped address architecture
RFC 4193 Unique local IPv6 unicast addresses
RFC 4213 Transition mechanisms for IPv6 hosts and routers
RFC 4291 IPv6 addressing architecture
RFC 4443 Internet Control Message Protocol (ICMPv6)
RFC 4861 Neighbor discovery for IPv6
RFC 4862 IPv6 Stateless Address Auto-Configuration (SLAAC)
RFC 5014 IPv6 socket API for source address selection
RFC 5095 Deprecation of type 0 routing headers in IPv6
RFC 5175 IPv6 Router Advertisement (RA) flags option
RFC 6105 IPv6 Router Advertisement (RA) guard

### Management

AT Enterprise MIB including AMF MIB and SNMP traps
Optical DDM MIB
SNMPv1, v2c and v3
IEEE 802.1AB 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 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 MIB for the Transmission Control Protocol (TCP)
RFC 4113 MIB for the User Datagram Protocol (UDP)
RFC 4188 Definitions of managed objects for bridges
RFC 4292 IP forwarding table MIB
RFC 4293 MIB for the Internet Protocol (IP)
RFC 4318 Definitions of managed objects for bridges with RSTP
RFC 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 (IGMPv1, v2 and v3)
IGMP snooping fast-leave
IGMP/MLD multicast forwarding (IGMP/MLD proxy)
MLD snooping (MLDv1 and v2)
PIM-SM and PIM-SSM for IPv6
RFC 1112 Host extensions for IP multicasting (IGMPv1)
RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2715 Interoperability rules for multicast routing protocols
RFC 3306 Unicast-prefix-based IPv6 multicast addresses
RFC 3376 IGMPv3
RFC 3810 Multicast Listener Discovery v2 (MLDv2) for IPv6
RFC 3956 Embedding the Rendezvous Point (RP) address in an IPv6 multicast address
RFC 3973 PIM Dense Mode (DM)
RFC 4541 IGMP and MLD snooping switches
RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM): protocol specification (revised)
RFC 4604 Using IGMPv3 and MLDv2 for source-specific multicast
RFC 4607 Source-specific multicast for IP

### Open Shortest Path First (OSPF)

OSPF link-local signaling
OSPF MD5 authentication
Out-of-band LSDB resync
RFC 1245 OSPF protocol analysis
RFC 1246 Experience with the OSPF protocol
RFC 1370 Applicability statement for OSPF
RFC 1765 OSPF database overflow
RFC 2328 OSPFv2
RFC 2370 OSPF opaque LSA option
RFC 2740 OSPFv3 for IPv6
RFC 3101 OSPF Not-So-Stubby Area (NSSA) option
RFC 3509 Alternative implementations of OSPF area border routers
RFC 3623 Graceful OSPF restart
RFC 3630 Traffic engineering extensions to OSPF
RFC 4552 Authentication/confidentiality for OSPFv3
RFC 5329 Traffic engineering extensions to OSPFv3
RFC 5340 OSPFv3 for IPv6 (partial support)

### Quality of Service (QoS)

IEEE 802.1p Priority tagging
RFC 2211 Specification of the controlled-load network element service
RFC 2474 DiffServ precedence for eight queues/port
RFC 2475 DiffServ architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2697 A single-rate three-color marker

\* Cryptographic Algorithm Validation Program (CAVP) validated by the National Institute of Standards and Technology (NIST)

RFC 2698 A two-rate three-color marker  
 RFC 3246 DiffServ Expedited Forwarding (EF)

## Resiliency Features

ITU-T G.8023 / Y.1344 Ethernet Ring Protection Switching (ERPS)  
 IEEE 802.1AX Link aggregation (static and LACP)  
 IEEE 802.1D MAC bridges  
 IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)  
 IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)  
 IEEE 802.3ad Static and dynamic link aggregation  
 RFC 5798 Virtual Router Redundancy Protocol version 3 (VRRPv3) for IPv4 and IPv6

## Routing Information Protocol (RIP)

RFC 1058 Routing Information Protocol (RIP)  
 RFC 2080 RIPv6 for IPv6  
 RFC 2081 RIPv6 protocol applicability statement  
 RFC 2082 RIPv2 MD5 authentication  
 RFC 2453 RIPv2

## Security Features

SSH remote login  
 SSLv2 and SSLv3  
 TACACS+ Accounting, Authentication and Authorisation (AAA)  
 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 2818 HTTP over TLS ("HTTPS")  
 RFC 2865 RADIUS authentication  
 RFC 2866 RADIUS accounting  
 RFC 2868 RADIUS attributes for tunnel protocol support  
 RFC 3280 Internet X.509 PKI Certificate and Certificate Revocation List (CRL) profile  
 RFC 3546 Transport Layer Security (TLS) extensions  
 RFC 3579 RADIUS support for Extensible Authentication Protocol (EAP)  
 RFC 3580 IEEE 802.1x RADIUS usage guidelines  
 RFC 3748 PPP Extensible Authentication Protocol (EAP)  
 RFC 4251 Secure Shell (SSHv2) protocol architecture  
 RFC 4252 Secure Shell (SSHv2) authentication protocol  
 RFC 4253 Secure Shell (SSHv2) transport layer protocol  
 RFC 4254 Secure Shell (SSHv2) connection protocol  
 RFC 5246 TLS v1.2

## Services

RFC 854 Telnet protocol specification  
 RFC 855 Telnet option specifications  
 RFC 857 Telnet echo option  
 RFC 858 Telnet suppress go ahead option  
 RFC 1091 Telnet terminal-type option  
 RFC 1350 Trivial File Transfer Protocol (TFTP)  
 RFC 1985 SMTP service extension  
 RFC 2049 MIME  
 RFC 2131 DHCPv4 (server, relay and client)  
 RFC 2132 DHCP options and BootP vendor extensions  
 RFC 2616 Hypertext Transfer Protocol - HTTP/1.1  
 RFC 2821 Simple Mail Transfer Protocol (SMTP)  
 RFC 2822 Internet message format  
 RFC 3046 DHCP relay agent information option (DHCP option 82)  
 RFC 3315 DHCPv6 (server, relay and client)  
 RFC 3633 IPv6 prefix options for DHCPv6  
 RFC 3646 DNS configuration options for DHCPv6  
 RFC 3993 Subscriber-ID suboption for DHCP relay agent option  
 RFC 4330 Simple Network Time Protocol (SNTP) version 4  
 RFC 5905 Network Time Protocol (NTP) version 4

## VLAN Support

Generic VLAN Registration Protocol (GVRP)  
 IEEE 802.1ad Provider bridges (VLAN stacking, Q-in-Q)  
 IEEE 802.1Q Virtual LAN (VLAN) bridges  
 IEEE 802.1v VLAN classification by protocol and port  
 IEEE 802.3ac VLAN tagging

## Voice over IP (VoIP)

LLDP-MED ANSI/TIA-1057  
 Voice VLAN

## Ordering Information

### Switches

- AT-x930-28GTX-00**  
24-port 10/100/1000T stackable switch with 4 SFP+ ports and dual hotswap PSU bays
- AT-x930-28GPX-00**  
24-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and dual hotswap PSU bays
- AT-x930-28GSTX-00**  
24-port 10/100/1000T and 100/1000 SFP stackable switch with 4 SFP+ ports and dual hotswap PSU bays
- AT-x930-52GTX-00**  
48-port 10/100/1000T stackable switch with 4 SFP+ ports and dual hotswap PSU bays
- AT-x930-52GPX-00**  
48-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and dual hotswap PSU bays
- AT-RKMT-SL01**  
Sliding rack mount kit

### Expansion Module

- AT-StackQS**  
2 x QSFP+ expansion module
- AT-x9EM/XT4**  
4 x 10GBASE-T expansion module

### Power Supplies (for all models)

- AT-PWR150-xx\***  
150W system power supply
- AT-PWR250-80\***  
250W DC system power supply
- AT-PWR800-xx\***  
800W PoE+ power supply
- AT-PWR1200-xx\***  
1200W PoE+ power supply

### Fan accessories

- AT-FAN09**  
Spare x930 fan module
- AT-FAN09ADP**  
Spare x930 fan adaptor board

### 40G QSFP+ Modules

- AT-QSFP1CU (use with AT-StackQS module)**  
1 meter QSFP+ direct attach stacking cable
- AT-QSFPLR4**  
40GLR4 1310 nm medium-haul, 10 km with SMF
- AT-QSFPSR**  
40GSR 850nm short-haul up to 150 m with MMF
- AT-MTP12-1**  
1 meter MTP optical cable for AT-QSFPSR
- AT-MTP12-5**  
5 meter MTP optical cable for AT-QSFPSR



StackQS module

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 must be ordered separately

## x930 Series | Advanced Gigabit Layer 3 Stackable Switches

### Breakout Cables For 4 x 10G connections

**AT-QSFP-4SFP10G-3CU**  
QSFP to 4 x SFP+ breakout direct attach cable (3 m)

**AT-QSFP-4SFP10G-5CU**  
QSFP to 4 x SFP+ breakout direct attach cable (5 m)

**10G SFP+ Modules**  
(Note that any Allied Telesis 10G SFP+ module can be used for stacking with the front panel 10G ports)

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

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

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

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

**AT-SP10T**  
10GBase-T 20 m copper

**AT-SP10TW1**  
1 meter SFP+ direct attach cable

**AT-SP10TW3**  
3 meter SFP+ direct attach cable

**AT-SP10TW7**  
7 meter SFP+ direct attach cable

**100Mbps SFP Modules**  
100Mbps SFP modules are only compatible with the SFP ports on the AT-x930-28GSTX switch)

**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

\* These modules support dual-rate 1G/10G operation

<sup>1</sup> The standard switch software supports 64 OSPF and BGP routes

**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

**1000Mbps SFP Modules**  
**AT-SPTX**  
1000T 100 m copper

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

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

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

**AT-SPZX80**  
1000ZX GbE single-mode 1550 nm fiber up to 80 km

**AT-SPBD20-13/I**  
1000BX GbE Bi-Di (1310 nm Tx, 1550 nm Rx) fiber up to 20 km

**AT-SPBD20-14/I**  
1000BX GbE Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 20 km

### Feature Licenses

NAME	DESCRIPTION	INCLUDES	STACK LICENSING
<b>AT-FL-x930-01</b>	x930 premium license	<ul style="list-style-type: none"> <li>▶ OSPF<sup>1</sup> (16,000 routes)</li> <li>▶ BGP<sup>4</sup> (5,000 routes)</li> <li>▶ PIMv4-SM, DM and SSM (2,000 entries)</li> <li>▶ VLAN double tagging (Q-in-Q)</li> <li>▶ RIPvng (5,000 routes)</li> <li>▶ OSPFv3 (8,000 routes)</li> <li>▶ BGP4+ (5,000 routes)</li> <li>▶ MLDv1 and v2</li> <li>▶ PIMv6-SM and SSM (1,000 entries)</li> <li>▶ VRF lite (64 domains)</li> <li>▶ RADIUS Full</li> <li>▶ UDLD</li> <li>▶ PTP Transparent Mode</li> </ul>	▶ One license per stack member
<b>AT-FL-x930-AM40-1YR</b>	AMF Master license	▶ AMF Master 40 nodes for 1 year	▶ One license per stack
<b>AT-FL-x930-AM40-5YR</b>	AMF Master license	▶ AMF Master 40 nodes for 5 years	▶ One license per stack
<b>AT-FL-x930-AM80-1YR</b>	AMF Master license	▶ AMF Master 80 nodes for 1 year	▶ One license per stack
<b>AT-FL-x930-AM80-5YR</b>	AMF Master license	▶ AMF Master 80 nodes for 5 years	▶ One license per stack
<b>AT-FL-x930-AM120-1YR</b>	AMF Master license	▶ AMF Master 120 nodes for 1 year	▶ One license per stack
<b>AT-FL-x930-AM120-5YR</b>	AMF Master license	▶ AMF Master 120 nodes for 5 years	▶ One license per stack
<b>AT-FL-x930-OF13-1YR</b>	OpenFlow license	▶ OpenFlow v1.3 (2,000 entries) for 1 year	▶ Not supported on a stack
<b>AT-FL-x930-OF13-5YR</b>	OpenFlow license	▶ OpenFlow v1.3 (2,000 entries) for 5 years	▶ Not supported on a stack
<b>AT-FL-x930-8032</b>	ITU-T G.8032 license	<ul style="list-style-type: none"> <li>▶ G.8032 ring protection</li> <li>▶ Ethernet CFM</li> </ul>	▶ One license per stack member
<b>AT-FL-x930-CPOE</b>	Continuous PoE license	▶ Continuous PoE power for GPX models only	▶ One license per stack member



NETWORK SMARTER

**North America Headquarters** | 19800 North Creek Parkway | Suite 100 | Bothell | WA 98011 | USA | T: +1 800 424 4284 | F: +1 425 481 3895

**Asia-Pacific Headquarters** | 11 Tai Seng Link | Singapore | 534182 | T: +65 6383 3832 | F: +65 6383 3830

**EMEA & CSA Operations** | Incheonweg 7 | 1437 EK Rozenburg | The Netherlands | T: +31 20 7950020 | F: +31 20 7950021

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