SE540L Series

10 Gigabit Stackable Edge Switches

AlliedWare Plus OPERATING SYSTEM

Overview

Allied Telesis CenterCOM SE540L Series switches provide high-speed network access with up to 10G connectivity for a cost-effective network solution. Easily support server connectivity, next generation end devices, and today's high-bandwidth applications.

The SE540L Series fiber models support 1/10G (SFP and SFP+) on all ports, making them ideal for long-distance connections, and for high-capacity devices such as servers. The copper models support Multi-Gigabit (1/2.5/5/10G) for flexible deployment options and the ability to support all end devices.

Key Features

- AlliedWare Plus fully featured OS
- AMF Plus edge node[1]
- Vista Manager compatible
- AMF-Security compatible
- VCStack 2 units at any speed
- 1/2.5/5/10G (Multi-Gigabit) connectivity on copper ports
- 1/10G (SFP and SFP+) connectivity on fiber ports
- EPSR high-speed resilient rings
- Data Center Bridging Capabilities Exchange Protocol (DCBX)
- Enhanced Transmission Selection (ETS)
- Priority-based Flow Control (PFC)
- Active Fiber Monitoring
- Link Monitoring
- VLAN ACLs
- VLAN mirroring (RSPAN)
- NETCONF/RESTCONF with YANG data modelling
- Enhanced Transmission Selection (ETS)

SPECIFICATIONS

Performance

- Up to 32K MAC addresses
- Up to 1,000 static routes
- Up to 64 RIP routes
- 2GB DDR4 SDRAM
- 4094 configurable VLANs
- 256 MB flash memory
- Packet Buffer memory: 3MB
- Supports 9KB L2 jumbo frames
- Wirespeed forwarding

Diagnostic tools

- Active Fiber Monitoring detects tampering on optical links
- Cable fault locator (TDR)
- Find-me device locator
- Link Monitoring
- Automatic link flap detection and port shutdown
- Optical Digital Diagnostic Monitoring (DDM)
- Ping polling for IPv4 and IPv6
- Port and VLAN mirroring (RSPAN)
- TraceRoute for IPv4 and IPv6
- Uni-Directional Link Detection (UDLD

IPv4 Features

- Black hole routing
- DHCPv4 client and relay
- Directed broadcast forwarding
- DNS relay
- Equal Cost Multi Path (ECMP) routing
- Policy-based routing
- Static routing and RIP for IPv4
- UDP broadcast helper (IP helper)

IPv6 Features

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

Management

- Autonomous Management Framework Plus (AMF Plus) enables powerful centralized management, zero-touch device installation and recovery, and the intent-based management features in Vista Manager EX (from v3.10.1)
- Manage the SE540L Series with Vista Manager EX—our graphical single-pane-of-glass monitoring and management tool for AMF Plus networks, which also supports wireless and third party devices
- AMF Security (AMF-Sec) enables a self-defending network - managing the SE540L (or other AMF Plus switches) to automatically block the spread of malware by quarantining suspect end devices
- Console management port on the front panel for ease of access
- NETCONF/RESTCONF northbound interface with YANG data modelling
- Eco-friendly mode allows ports and LEDs to be disabled to save power
- Industry-standard CLI with context-sensitive help
- Powerful CLI scripting engine
- Comprehensive SNMP MIB support for standards-based device management
- Built-in text editor
- Event-based triggers allow user-defined scripts to be executed upon selected system events
- sFlow enables traffic monitoring in switched networks
- USB interface allows software release files, configurations and other files to be stored for backup and distribution to other devices
- Web-based Graphical User Interface (GUI)

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
- Queue scheduling options using strict priority

[1] AMF Plus edge is for products used at the edge of the network, and only support a single AMF Plus link. They cannot use cross links or virtual links.

SPECIFICATIONS

Product Specifications

	100/1000T/2.5/5/10G (RJ-45) copper ports	1/10 gigabit sfp+ ports	Total Ports	Switching Fabric	Forwarding Rate
SE540L-28XTm	24	4	28	560Gbps	416.7Mpps
SE540L-28XS*	-	28	28	560Gbps	416.7Mpps

Physical Specifications

	Width	Depth	Height	Weight
SE540L-28XTm	440 mm (17.32 in)	290 mm (11.41 in)	44 mm (1.73 in)	4.0 kg (8.8 lb)
SE540L-28XS*	440 mm (17.32 in)	290 mm (11.41 in)	44 mm (1.73 in)	3.8 kg (8.3 lb)

Power and Noise Characteristics

	Maximum Power Consumption	Maximum Heat Dissipation	Noise
SE540L-28XTm	160W	540 BTU/h	46 - 63 db
SE540L-28XS*	86W	293BTU/h	39 - 52 db

* See your Allied Telesis sales representative for availability

Noise: tested to ISO7779; front bystander position

Latency (microseconds)

	Port Speed			
	1Gbps	2.5Gbps	5Gbps	10Gbps
SE540L-28XTm	4.48µs	8.43µs	5.72µs	2.73µs
SE540L-28XS*	3.59µs	-	-	1.60µs

- IP precedence and DiffServ marking based on layer 2, 3 and 4 headers
- Data Center Bridging Capabilities Exchange Protocol (DCBX)
- Enhanced Transmission Selection (ETS)
- Priority-based Flow Control (PFC)

Resiliency Features

- Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- Dynamic link failover (host attach)
- EPSR (Ethernet Protection Switched Rings)
- EPSRing SuperLoop Protection (SLP)
- Flexi-stacking - use any port-speed to stack
- Link aggregation (LACP) on LAN ports
- Long-distance stacking using fiber ports (LD-VCStack)
- Loop protection: loop detection and thrash limiting
- PVST+ compatibility mode
- Spanning Tree Protocols (STP, RSTP, MSTP)
- STP root guard
- Virtual Chassis Stacking (VCStack) of up to 2-units for a resilient access solution
- VCStack fast failover minimizes network disruption
- Virtual Router Redundancy Protocol (VRRP)

Security Features

- Access Control Lists (ACLs) based on layer 3 and 4 headers
- Auth fail and guest VLANs
- RADIUS and TACACS+ Authentication, Authorisation and Accounting (AAA)
- Bootloader can be password protected for device security
- BPDU protection
- DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- DoS attack blocking and virus throttling
- Dynamic VLAN assignment
- MAC-based authentication
- MAC address filtering and MAC address lock-down
- Network Access and Control (NAC) features manage endpoint security
- Port-based learn limits (intrusion detection)
- RADIUS group selection per VLAN or port
- RADIUS proxy
- Secure Copy (SCP)
- Secure File Transfer Protocol (SFTP) client
- Strong password security and encryption
- Simple Certificate Enrollment Protocol (SCEP) supports secure management
- Tri-authentication: MAC-based, web-based and IEEE 802.1x
- Web-based authentication

VLAN Support

- Private VLANs provide security and port isolation for multiple customers using the same VLAN
- Voice VLAN

Environmental Specifications

- Operating temperature range:
  0°C to 50°C (32°F to 122°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:
  3,000 meters maximum (9,843 ft)

Electrical approvals and compliances

- EMC: ETSI EN300-386, EN300-132-2, FCC class A, VCCI class A
- Immunity: EN55024, EN61000-3-levels 2 (Harmonics), and 3 (Flicker) – AC models only

Safety

- Standards: UL62368-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950.1
- Certifications: UL, cUL, UL-EU

Restrictions on Hazardous Substances (RoHS) Compliance

- EU RoHS compliant
- China RoHS compliant

STANDARDS & PROTOCOLS

Authentication

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

Cryptographic Algorithms

FIPS Approved Algorithms
Encryption (Block Ciphers):
AES (ECB, CBC, CFB and OFB Modes)
3DES (ECB, CBC, CFB and OFB Modes)
Block Cipher Modes:
CCM
CMAC
GCM
XTS
Digital Signatures & Asymmetric Key Generation:
DSA
ECDSA
RSA
Secure Hashing:
SHA-1
SHA-2 (SHA-224, SHA-256, SHA-384. SHA-512)
Message Authentication:
HMAC (SHA-1, SHA-2(224, 256, 384, 512)
Random Number Generation:
DRBG (Hash, HMAC and Counter)

Non FIPS Approved Algorithms
RNG (AES128/192/256)
DES
MD5

Encryption (management traffic only)

FIPS 180-1 Secure Hash standard (SHA-1)
FIPS 186 Digital signature standard (RSA)
FIPS 46-3 Data Encryption Standard (DES and 3DES)

Ethernet Standards

IEEE 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3an10GBASE-T
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3bz2.5GBASE-T and 5GBASE-T ("multi-gigabit")
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
RFC 3021 Using 31-Bit Prefixes on IPv4 Point-to-Point Links

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 Plus MIB and SNMP traps
SNMP support SNMPv1, v2c and v3
ANSI/TIA-1057 LLDP-Media Endpoint Detection
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
RFC 2741 Agent extensibility (AgentX) protocol
RFC 2787 Definitions of managed objects for VRRP
RFC 2819 RMON MIB (groups 1,2,3 and 9)
RFC 2863 Interfaces group MIB
RFC 3176 sFlow: a method for monitoring traffic in switched and routed networks
RFC 3411 An architecture for describing SNMP management frameworks
RFC 3412 Message processing and dispatching for the SNMP
RFC 3413 SNMP applications
RFC 3414 User-based Security Model (USM) for SNMPv3
RFC 3415 View-based Access Control Model (VACM) for SNMP
RFC 3416 Version 2 of the protocol operations for the SNMP
RFC 3417 Transport mappings for the SNMP
RFC 3418 MIB for SNMP
RFC 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 5424 The Syslog protocol
RFC 6527 Definitions of managed objects for VRRPv3

Multicast Support

IGMP snooping (IGMPv1, v2 and v3)
IGMP snooping fast-leave
MLD snooping (MLDv1 and v2)
PIM and PIM SSM for IPv6
RFC 1112 Host extensions for IP multicasting (IGMPv1)
RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
RFC 3306 Unicast-prefix-based IPv6 multicast addresses
RFC 3376 IGMPv3
RFC 4541 IGMP and MLD snooping switches

Quality of Service (QoS)

IEEE 802.1p Priority tagging
IEEE 802.1Qaz Data Center Bridging Capabilities Exchange Protocol (DCBX)
IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
IEEE 802.1Qbb Priority-based Flow Control (PFC)
RFC 2211 Specification of the controlled-load network element service
RFC 2474 DiffServ precedence for eight queues/port
RFC 2475 DiffServ architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2697 A single-rate three-color marker
RFC 2698 A two-rate three-color marker
RFC 3246 DiffServ Expedited Forwarding (EF)

Resiliency Features

IEEE 802.1AX 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 2082 RIP-2 MD5 authentication
RFC 2453 RIPv2

Security Features

SSH remote login
SSLv2 and SSLv3
IEEE 802.1X authentication protocols (TLS, TTLS, PEAP and MD5)
IEEE 802.1X multi-supplicant authentication
IEEE 802.1X port-based network access control
RFC 2560 X.509 Online Certificate Status Protocol (OCSP)
RFC 2818 HTTP over TLS ("HTTPS")
RFC 2865 RADIUS authentication
RFC 2866 RADIUS accounting
RFC 2868 RADIUS attributes for tunnel protocol support
RFC 2986 PKCS #10: certification request syntax specification v1.7
RFC 3546 Transport Layer Security (TLS) extensions
RFC 3579 RADIUS support for Extensible Authentication Protocol (EAP)
RFC 3580 IEEE 802.1x RADIUS usage guidelines
RFC 3748 PPP Extensible Authentication Protocol (EAP)
RFC 4251 Secure Shell (SSHv2) protocol architecture
RFC 4252 Secure Shell (SSHv2) authentication protocol
RFC 4253 Secure Shell (SSHv2) transport layer protocol
RFC 4254 Secure Shell (SSHv2) connection protocol
RFC 5176 RADIUS Change of Authorization (CoA)
RFC 5280 X.509 certificate and Certificate Revocation List (CRL) profile
RFC 5425 Transport Layer Security (TLS) transport mapping for Syslog
RFC 5656 Elliptic curve algorithm integration for SSH
RFC 6125 Domain-based application service identity within PKI using X.509 certificates with TLS
RFC 6614 Transport Layer Security (TLS) encryption for RADIUS
RFC 6668 SHA-2 data integrity verification for SSH
RFC 8446 Transport Layer Security (TLS) v1.3
RFC 8894 Simple Certificate Enrollment Protocol (SCEP)

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 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 3396 Encoding long options in DHCPv4
RFC 3993 Subscriber-ID suboption for DHCP relay agent option
RFC 4330 Simple Network Time Protocol (SNTP) version 4
RFC 4954 SMTP service extension for authentication
RFC 5905 Network Time Protocol (NTP) version 4

VLAN Support

IEEE 802.1Q Virtual LAN (VLAN) bridges
IEEE 802.1v VLAN classification by protocol and port
IEEE 802.3acVLAN tagging

ORDERING INFORMATION

AT-SE540L-28XTm	24-port 100M/1/2.5/5/10G stackable copper switch with 4 x SFP/SFP+ports, and a single fixed PSU
AT-SE540L-28XS*	28-port SFP/SFP+ stackable fiber switch, with a single fixed PSU

Accessories

10GbE SFP+ Modules

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

AT-SP10SR	10GSR 850 nm short-haul, 300 m with MMF
AT-SP10SR/I	10GSR 850 nm short-haul, 300 m with MMF industrial temperature
AT-SP10LRa/I	10GLR 1310 nm medium-haul, 10 km with SMF industrial temperature, TAA[2]
AT-SP10ER40a/I	10GER 1310 nm long-haul, 40 km with SMF industrial temperature
AT-SP10ZR80/I	10GER 1550 nm long-haul, 80 km with SMF industrial temperature
AT-SP10TM	1G/2.5G/5G/10G, 100 m copper, Trade Act Agreement compliant (note that 2.5G/5G speeds are not supported)
AT-SP10BD10/I-12	10 GbE Bi-Di (1270 nm Tx, 1330 nm Rx) fiber up to 10 km industrial temperature, TAA[2]
AT-SP10BD10/I-13	10 GbE Bi-Di (1330 nm Tx, 1270 nm Rx) fiber up to 10 km industrial temperature, TAA[2]
AT-SP10BD20-12	10 GbE Bi-Di (1270 nm Tx, 1330 nm Rx) fiber up to 20 km, TAA[2]
AT-SP10BD20-13	10 GbE Bi-Di (1330 nm Tx, 1270 nm Rx) fiber up to 20 km, TAA[2]
AT-SP10BD40/I-12	10 GbE Bi-Di (1270 nm Tx, 1330 nm Rx) fiber up to 40 km industrial temperature, TAA[2]
AT-SP10BD40/I-13	10 GbE Bi-Di (1330 nm Tx, 1270 nm Rx) fiber up to 40 km industrial temperature, TAA[2]
AT-SP10BD80/I-14	10 GbE Bi-Di (1490 nm Tx, 1550 nm Rx) fiber up to 80 km industrial temperature, TAA[2]
AT-SP10BD80/I-15	10 GbE Bi-Di (1550nm Tx, 1490 nm Rx) fiber up to 80 km industrial temperature, TAA[2]

10GbE SFP+ Cables

AT-SP10TW1	1 meter SFP+ direct attach cable
AT-SP10TW3	3 meter SFP+ direct attach cable

1000Mbps SFP Modules

AT-SPSX	1000SX GbE multi-mode 850 nm fiber up to 550 m
AT-SPLX10a	1000LX GbE single-mode 1310 nm fiber up to 10 km
AT-SPLX10/I	1000LX GbE single-mode 1310 nm fiber up to 10 km industrial temperature
AT-SPBD10-13	1000LX 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-SPBD20-13/I	1000BX GbE Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 20 km industrial temperature
AT-SPBD20-14/I	1000BX GbE Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 20 km industrial temperature
AT-SPBD40-13/I	1000LX GbE single-mode Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 40 km, industrial temperature
AT-SPBD40-14/I	1000LX GbE single-mode Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 40 km, industrial temperature
AT-SPLX40	1000LX GbE single-mode 1310 nm fiber up to 40 km
AT-SPZX80	1000ZX GbE single-mode 1550 nm fiber up to 80 km
AT-SPTXc	10/100/1000 TX (RJ45), up to 100 m

* Please contact your sales representative for availabilty in your region

[2] Trade Act Agreement compliant