















## x510 Series | Stackable Gigabit Layer 3 Switches

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 2711 IPv6 router alert option  
 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  
 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 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 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 4292 IP forwarding table MIB  
 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 5424 Syslog protocol  
 RFC 6527 Definitions of managed objects for VRRPv3

### Multicast Support

Bootstrap Router (BSR) mechanism for PIM-SM  
 IGMP query solicitation  
 IGMP snooping (v1, v2 and v3)  
 IGMP/MLD multicast forwarding (IGMP/MLD proxy)  
 MLD snooping (v1 and v2)  
 PIM for IPv6 and SSM for IPv6  
 RFC 2236 Internet Group Management Protocol v2 (IGMPv2)  
 RFC 2710 Multicast Listener Discovery (MLD) for IPv6  
 RFC 2818 HTTP over TLS ("HTTPS")  
 RFC 3280 Internet X.509 PKI Certificate and Certificate Revocation List (CRL) profile  
 RFC 3376 IGMPv3  
 RFC 3810 Multicast Listener Discovery v2 (MLDv2) for IPv6  
 RFC 3973 PIM Dense Mode (DM)  
 RFC 4541 IGMP and MLD snooping switches  
 RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM): protocol specification (revised)  
 RFC 4604 Using IGMPv3 and MLDv2 for source-specific multicast  
 RFC 4607 Source-specific multicast for IP

### Open Shortest Path First (OSPF)

OSPF link-local signaling  
 OSPF MD5 authentication  
 OSPF restart signaling  
 Out-of-band LSDB resync  
 RFC 1245 OSPF protocol analysis  
 RFC 1246 Experience with the OSPF protocol  
 RFC 1370 Applicability statement for OSPF  
 RFC 1765 OSPF database overflow  
 RFC 2328 OSPFv2  
 RFC 2370 OSPF opaque LSA option  
 RFC 2740 OSPFv3 for IPv6  
 RFC 3101 OSPF Not-So-Stubby Area (NSSA) option  
 RFC 3509 Alternative implementations of OSPF area border routers  
 RFC 3623 Graceful OSPF restart  
 RFC 3630 Traffic engineering extensions to OSPF  
 RFC 4552 Authentication/confidentiality for OSPFv3  
 RFC 5329 Traffic engineering extensions to OSPFv3  
 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  
 RFC 2698 A two-rate three-color marker  
 RFC 3246 DiffServ Expedited Forwarding (EF)

### Resiliency Features

ITU-T G.8032 / Y.1344 Ethernet Ring Protection Switching (ERPS)  
 IEEE 802.1AXLink 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)  
 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, Authentication, Authorization (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 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 5246 Transport Layer Security (TLS) v1.2  
 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

### Services

RFC 854 Telnet protocol specification  
 RFC 855 Telnet option specifications  
 RFC 857 Telnet echo option  
 RFC 858 Telnet suppress go ahead option  
 RFC 1091 Telnet terminal-type option  
 RFC 1350 Trivial File Transfer Protocol (TFTP)  
 RFC 1985 SMTP service extension  
 RFC 2049 MIME  
 RFC 2131 DHCPv4 (server, relay and client)  
 RFC 2132 DHCP options and BootP vendor extensions  
 RFC 2554 SMTP service extension for authentication  
 RFC 2616 Hypertext Transfer Protocol - HTTP/1.1  
 RFC 2821 Simple Mail Transfer Protocol (SMTP)  
 RFC 2822 Internet message format  
 RFC 3046 DHCP relay agent information option (DHCP option 82)  
 RFC 3315 DHCPv6 (server, relay and client)  
 RFC 3633 IPv6 prefix options for DHCPv6  
 RFC 3646 DNS configuration options for DHCPv6  
 RFC 3993 Subscriber-ID suboption for DHCP relay agent option  
 RFC 4330 Simple Network Time Protocol (SNTP) version 4  
 RFC 5905 Network Time Protocol (NTP) version 4

### VLAN Support

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

### Voice over IP (VoIP)

LLDP-MED ANSI/TIA-1057  
 Voice VLAN



## x510 Series | Stackable Gigabit Layer 3 Switches

### Ordering Information

#### Feature Licenses

NAME	DESCRIPTION	INCLUDES	STACK LICENSING
AT-FL-x510-01	x510 premium license	<ul style="list-style-type: none"> <li>▶ BGP4 (256 routes)</li> <li>▶ RIP (256 routes)</li> <li>▶ OSPF (256 routes)</li> <li>▶ PIMv4-SM, DM and SSM</li> <li>▶ ESR master</li> <li>▶ VLAN double tagging (Q-in-Q)</li> <li>▶ RIPvng (256 routes)</li> <li>▶ OSPFv3 (256 routes)</li> <li>▶ MLDv1 and v2</li> <li>▶ PIMv6-SM</li> <li>▶ UDLD</li> </ul>	▶ One license per stack member
AT-FL-x510-AM20-1YR	AMF Master license	▶ AMF Master 20 nodes for 1 year	▶ One license per stack
AT-FL-x510-AM20-5YR	AMF Master License	▶ AMF Master 20 nodes for 5 years	▶ One license per stack
AT-FL-x510-OF13-1YR	OpenFlow license	▶ OpenFlow v1.3 for 1 year	▶ Not supported on a stack
AT-FL-x510-OF13-5YR	OpenFlow license	▶ OpenFlow v1.3 for 5 years	▶ Not supported on a stack
AT-FL-x510-8032	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
AT-FL-x510-VLTR	VLAN translation license	▶ VLAN translation	▶ One license per stack

#### Switches

##### AT-x510-28GTX-xx

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

##### AT-x510-28GPX-xx

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

##### AT-x510-28GSX-xx

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

##### AT-x510-28GSX-80

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

##### AT-x510-52GTX-xx

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

##### AT-x510-52GPX-xx

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

##### AT-x510DP-28GTX-00

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

##### AT-x510DP-52GTX-00

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

##### AT-x510L-28GT-xx

24-port 10/100/1000T switch with 4 SFP+ ports and a single fixed PSU

##### AT-x510L-28GP-xx

24-port 10/100/1000T PoE+ switch with 4 SFP+ ports and a single fixed PSU

##### AT-x510L-52GT-xx

48-port 10/100/1000T switch with 4 SFP+ ports and a single fixed PSU

##### AT-x510L-52GP-xx

48-port 10/100/1000T PoE+ switch with 4 SFP+ ports and a single fixed PSU

##### AT-RKMT-SL01

Sliding rack mount kit for x510DP models

#### Power Supplies (for the x510DP Series)

##### AT-PWR100R-xx

100W AC system power supply (reverse airflow)

##### AT-PWR250-xx

250W AC system power supply

##### AT-PWR250R-80

250W DC system power supply (reverse airflow)

Where xx = 10 for US power cord  
20 for no power cord  
30 for UK power cord  
40 for Australian power cord  
50 for European power cord

\* Power supplies ordered separately

## x510 Series | Stackable Gigabit Layer 3 Switches

### 1000Mbps SFP Modules

#### AT-SPTX<sup>1</sup>

10/100/1000T 100 m copper

#### AT-SPSX

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

#### AT-SPSX/I<sup>1</sup>

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-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

<sup>1</sup> Supported on x510-28GSX

### 100Mbps SFP Modules

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

#### 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

### 10GbE SFP+ Modules

(Note that any Allied Telesis 10G SFP+ module or direct attach cable can also be used for stacking)

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

#### AT-SP10ER40/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-SP10T

10GBase-T 20 m copper <sup>2</sup>

#### AT-SP10TW1

1 meter SFP+ direct attach cable

#### AT-SP10TW3

3 meter SFP+ direct attach cable

#### AT-SP10TW7

7 meter SFP+ direct attach cable

\* Power supplies ordered separately

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

<sup>2</sup> Using Cat 6a/7 cabling