Extreme™
Customer-Driven Networking

Data Sheet

Highlights

- Cost effective compact 10-port Gigabit Ethernet switches.
- Enterprise-class features at SME price points with 100+ enterprise class features at price points that fit into tight capital budgets.
- Fanless mode for silent operation in open areas – ideal for classrooms, boardrooms and retail shops.
- PoE/PoE+ models for powered connection of IP Phones and other devices.
- Simplified operations including 1-minute plug-and-play capabilities for IP Phones, automatic QoS provisioning and intuitive management options.

ExtremeSwitching™ Ethernet Routing Switch 3500

Perfectly suited to the unique requirements of Mid-Market and SME customers, as well as enterprise branch offices.

Product Overview

The Extreme Ethernet Routing Switch (ERS) 3500 consists of two 10-port compact Ethernet switches specifically designed for Mid-Market, SMEs, branches and open environments outside the wiring closet.

A cost-effective, feature-rich solution, the ERS 3500 Series provides both standalone and stackable Ethernet switching perfectly suited to the unique requirements of Mid-Market and SME customers, as well as enterprise branch offices.

It can operate in fanless mode to provide silent operation for classrooms, hospitality suites, retail sites or other noise sensitive environments – outside of the wiring closet.

The ERS 3500 Series also supports IEEE 802.3at Power-over-Ethernet Plus (PoE+) which can power IP Phones, Wireless Access Points, surveillance cameras and other devices. PoE+ with its 32-watt power budget ensures investment protection for current as well as future high-powered end-points.

Delivering high performance Layer 2 switching, Layer 3 local and static routing, advanced convergence and a range of security features, the ERS 3500 provides enterprise class features at an SME price. It also can automate many of today's manual processes to simplify operations and reduce costs for the cost conscious enterprise.

Simplified Operations

The ERS 3500 is well suited for smaller environments where there might be little or no local IT staff. It is designed to be simple to install, manage and operate. And when deployed in conjunction with SME-centric Unified Communications systems, the ERS 3500 offers increased operational simplicity over third party switching solutions through features that both simplify the initial deployment as well as ongoing adds, moves, and changes.

Automated Switch Set-Up

For deployment scenarios where there may not be a data networking support specialist on site, the ERS 3500 provides an automated script to enable fast, error-free installation when deployed with UC. An installation script automates the entire set up process on the ERS 3500 switch by utilizing LLDP or ADAC functionality to automatically set up voice and data VLANs, QoS and policies on the IP Phones, meaning that IP Phones are ready to be connected immediately. This helps ensure fast setup and error free deployment according to Extreme best practices and consistency between different locations for large rollouts in multiple Branch Offices.

Certified One-Minute Plug-and-Play for IP Phones

Plug-and-play means that as soon as an IP Phone is plugged into an Extreme Ethernet Switch, the IP Phone is automatically recognized and configured. This feature can dramatically simplify the roll out of IP Phones and simplify ongoing adds, moves and changes; empowering employees to move their own phones without the assistance of an outside contractor. To enable this plug-and-play capability, Extreme offers IEEE 802.1AB Link Layer Discovery Protocol and LLDP-Media Endpoint Discovery (LLDP-MED) as well as the Extreme Auto Discovery and Auto Configuration (ADAC) feature.

With LLDP enabled, the ERS 3500 learns the identification of neighboring devices and provides these details to the network management system. This enables the system to have the most up-to-date physical view of the network. In addition, ERS 3500 can dynamically apply voice VLANs and QoS to both the IP Phone and the attached Edge Switch port. When the IP Phone is moved to another location, the configuration is automatically updated. QoS is also automatically provisioned on the ERS 3500 uplink ensuring voice is given top priority into the Core. With one of the most comprehensive implementations of LLDP in the industry, Extreme offers enhancements for standards based provisioning of Extreme IP Phones via integrated and customizable TLV support.

Figure 1: ERS 3500 empowers IP Phones and Unified Communications

These features not only save network operators time, they can virtually eliminate the likelihood of a provisioning error during a large IP Phone deployment. Third-party testing conducted by Miercom1 validated that when IP Phones were plugged into an Extreme Ethernet Switch, they were operational in just over one minute.

Intuitive Management

ERS 3500 Series offers flexible options for managing, troubleshooting and operating your devices.

- For customers more comfortable using the Command Line Interface (CLI), the ERS 3500 offers an industry-aligned CLI that is intuitive and requires little to no formal training for individuals with networking backgrounds.
- For customers who are looking for a simple Graphical User Interface (GUI) for management and provisioning, Extreme's Enterprise Device Manager (EDM) is an embedded web-based element management and configuration tool that enables set-up, configuration and monitoring of a single device using either HTTP or HTTPS (Secure Web). The on-box embedded version of EDM is available at no extra charge with every switch and can be accessed by a standard web browser.
- SNMP-based management (SNMP v1, v2 and v3) provides an alternative standards-based management approach as well as an interface for Configuration and Orchestration Manager.

The Extreme ERS 3500 supports secure management via IPv4 or IPv6 through features such as Secure Shell (SSHv1/2), Secure Sockets Layer (SSL), Simple Network Management Protocol (SNMPv1,2,3), IP Manager Lists, and administrative authentication via RADIUS or TACACS+ when connecting to the switch or stack.

Convergence-Ready for Unified Communications, High-Definition Video and More

For businesses looking to consolidate all forms of communication – voice, video and data – on a single infrastructure, the Extreme ERS 3500 Series delivers functionality that simplifies convergence of these technologies.

Support for IEEE 802.3at PoE+ to Power Your Converged Device

Through support for IEEE 802.3at PoE+ which delivers up to 32 Watts of power per port to end-devices, ERS 3500s are able to power IP Phones, Wireless LAN Access Points, networked high-definition CCTV cameras and other devices. This eliminates the need for separate power supplies for each unit, enabling reduced cabling and management costs for adds, moves, or changes.

The higher power budget delivered by the PoE+ standard ensures that customers have the added flexibility of converging video surveillance traffic over the network, since pan, tilt and zoom cameras are one of the end devices that require the additional power provided by PoE+. It also ensures investment protection for future end points, such as new Wireless LAN Access Points (3x3 802.11n Access Points and emerging 802.11ac Access Points) as well as next-generation video phones.

The 24-port and 48-port PoE+ enabled products (ERS 3526T-PWR+, ERS 3550T-PWR+, 3524GT-PWR+ and ERS 3549GTS-PWR+) support a maximum power budget of 370 Watts. And the 10-port Gigabit Ethernet model (ERS 3510-PWR+) supports a maximum power budget of 170 Watts – dramatically higher than competitive switches in its class – enabling it to deliver a concurrent average of 20 Watts of power to each of the eight PoE+ enabled access ports.

The ERS 3500 Series Models

Model Numbers	Description
ERS 3510GT	8 x 10/100/1000Mbps + 2 SFP ports. Standalone and Fanless.
ERS 3510GT-PWR+	8 x 10/100/1000Mbps PoE+ ports + 2 SFP ports. Standalone. Fanless mode @ 60W PoE budget, Fan operation mode @ 170W PoE budget.

Comprehensive QoS capabilities

The ERS 3500 series delivers unsurpassed control for networks supporting a wide range of different application types. The ERS 3500 classifies, prioritizes and marks LAN IP traffic using up to four hardware queues on every port – including the rear SFP ports.

Classification can be based on MAC address, IP ToS/DSCP marking, IP source/destination address or subnets, TCP/UDP source/destination port/port range, IEEE 802.1p user priority bits, ingress source port, IP Protocol ID (e.g., TCP, UDP, IGMP), EtherType (e.g., IP, IPX) or the IEEE 802.1Q VLAN ID. Comprehensive traffic policing and traffic shaping are also supported.

Increasing Access Security at the Edge

The Ethernet Routing Switch 3500 offers a high level of security with authenticated network access that leverages IEEE 802.1X Extensible Authentication Protocol (EAP) with multiple extensions including support for Multi-Host Multi-Authentication mode (MHMA), Multi-Host Single-Authentication mode (MHSA), non EAP device support (i.e. printers, etc.) and RADIUS based MAC authentication support. Up to 32 host devices per switch port are supported in these modes.

Based on the IEEE 802.1X standard, EAP limits access to the network based on user credentials. A user is required to login to the network using a username/password; the user database is maintained on the authentication server (not the Switch). Additionally MAC-address based security limits access to only network-authorized and trusted personnel, including full tracking of network connections. Network access is granted or denied via proper MAC-address identification (up to a maximum of 448).

Compact Form Factors with Flexible Installation Options

The 10-port ERS 3500 models (3510GT & 3510GT-PWR+), which are 1U tall, 8.75” wide and 8” and 11” deep (44.5mm x 220mm x 200mm and 280mm) respectively, can be installed on a table or shelf using rubber feet (included), or can be wall mounted using the wall mount screws and anchors (also included). Additionally, optional rack accessory kits are available allowing the ERS 3510GT and ERS 3510GT-PWR+ to be mounted either alone or with two units side-by-side in a standard 19” rack.

Energy Efficiency

New regulations and rising awareness of the ever-increasing cost of electrical power keep energy efficiency top of mind. An innovator in this area, Extreme has built energy efficiency into many of its hardware products. The ERS 3500 is based on highly efficient power supplies – delivering over 80% efficiency. The ERS 3500 also supports dynamic power management where each port can be configured to limit the power delivered to a device and for power priority level—low, high, and critical.

The ERS 3500 also supports Extreme Energy Saver which can further conserve energy by turning down port speeds during designated off-peak hours.

Lifetime Warranty

Extreme includes industry-leading warranty services. The Lifetime Hardware Warranty Offer includes complimentary next-business-day shipment of replacement units for the life of the product (including fans and power supplies) and technical support. Detailed information on Extreme's Lifetime Warranty Offers is available online.

Summary

Extreme is positioned to provide an end-to-end solution for converged networks. The Ethernet Routing Switch 3500 Series, along with other Extreme products, can increase profitability and productivity, streamline business operations, lower costs and help your business gain a competitive edge.

Model Specifications

ERS 3510 Models

ERS 3510GT	
Switch Details	• 8 10/100/1000BASE-T ports with 2 SFP ports • Fanless operation • Standalone • System CPU speed: 400MHz • System memory: 64MB Flash, 256MB DRAM • RJ-45 Console port provides industry standard serial port connectivity • Switch capacity and forwarding rate (64-byte): 20Gbps / 14.9Mpps • MTBF: 892,667 hrs
Dimensions	• Height: 1U or 44.5mm / 1.75" • Width: 220mm / 8.75" • Depth: 200mm / 8"
Weight	1.75 kg / 3.9 lb
Power and Thermal	• Input Voltage: 100 to 240 VAC@ 47 to 63 HZ • Input Current (max): 0.18A@100VAC • Power Consumption: 18 Watts max • Thermal Rating (output): 61 BTU/hr max

ERS 3510GT-PWR+	
Switch Details	• 8 10/100/1000BASE-T ports with support for IEEE 802.3af PoE or IEEE 802.3at PoE+ with 2 SFP ports • Standalone • Dual power modes - fanless operation in Low Power Budget mode @ 60W max PoE budget, or normal fan operation in High Power Budget mode @ 170W max PoE budget. • System CPU speed: 400MHz • System memory: 64MB Flash, 256MB DRAM • RJ-45 Console port provides industry standard serial port connectivity • Switch capacity and forwarding rate (64-byte): 20Gbps / 14.9Mpps • MTBF: 673,452 hrs
Dimensions	• Height: 1U 44.5mm / 1.75” • Width: 220mm / 8.75” • Depth: 280mm / 11”
Weight	2.70kg / 6lb
Power and Thermal	• Input Voltage: 100 to 240 VAC@ 47 to 63 HZ • Input Current (max): 2.1A @ 100VAC • Power Consumption: 210 Watts • Thermal Rating (output): 156 BTU/hr max • Maximum Power Budget: 170 Watts • Power Consumption: 500 Watts max • Thermal Rating (output): 357 BTU/hr max • Maximum Power Budget: 370 Watts

ERS 3500 Series Ordering Information

Order Code	Description
AL3500A04-E6	ERS 3510GT featuring 8 x 10/100/1000 ports, plus 2 SFP ports. Standalone. Fanless.
AL3500A14-E6	ERS 3510GT-PWR+ featuring 8 x 10/100/1000 PoE+ ports, plus 2 SFP ports. Standalone. Fanless mode @ 60W PoE budget, Fan operation mode @ 170W PoE budget.
AL3511002-E6	Optional accrssory kit for joining two ERS 3510GT / ERS 3510GT-PWR+ switches together (side-by-side) to mount in a 19" rack
AL3511003-E6	Optional accessory kit for mounting one ERS 3510GT or ERS 3510GT-PWR+ switch in a 19" rack

Notes

- Each Switch ships with Base software license.
- Power cord is not included and must be ordered separately for all switch models. For a list of available power cords, please refer to "Lifecycle Notification on ERS Power Cord Models" at: http://bit.ly/2Gz2csk

Technical Specifications

Standards Compliance

- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.1p Prioritizing
- IEEE 802.1t 802.1D Maintenance
- IEEE 802.1v VLAN Classification by Protocol and Port
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1AB Link Layer Discovery Protocol
- IEEE 802.1X Ethernet Authentication Protocol
- IEEE 802.3 Ethernet
- IEEE 802.3af Power-over-Ethernet
- IEEE 802.3at Power-over-Ethernet Plus
- IEEE 802.3ab Gigabit Ethernet over Copper
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10Gbps Ethernet
- IEEE 802.3i 10Base-T
- IEEE 802.3u Fast Ethernet
- IEEE 802.3x Flow Control
- IEEE 802.3z Gigabit Ethernet
- RFC 768 UDP
- RFC 783 TFTP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 Telnet
- RFC 894 IP over Ethernet
- RFC 903 Reverse ARP
- RFC 950 / RFC 791 IP
- RFC 1112 IGMPv1
- RFC 1122 Requirements for Internet hosts
- RFC 1155 SMI
- RFC 1156 MIB for management of TCP/IP
- RFC 1157 SNMP
- RFC 1212 Concise MIB definitions
- RFC 1213 MIB-II
- RFC 1215 SNMP Traps Definition
- RFC 1340 Assigned Numbers
- RFC 1350 TFTP
- RFC 1354 IP Forwarding Table MIB
- RFC 1398 Ethernet MIB
- RFC 1442 SMI for SNMPv2
- RFC 1450 MIB for SNMPv2
- RFC 1493 Bridge MIB
- RFC 1519 Classless Inter-Domain Routing (CIDR)
- RFC 1542 BootP
- RFC 1591 DNS Client
- RFC 1650 Definitions of Managed Objects for Ethernet-like Interfaces
- RFC 1908 Coexistence between SNMPv1 and v2
- RFC 1945 HTTP v1.0
- RFC 1981 Path MTU Discovery for IPv6
- RFC 2011 SNMP v2 MIB for IP
- RFC 2012 SNMP v2 MIB for TDP
- RFC 2013 SNMP v2 MIB for UDP
- RFC 2096 IP Forwarding Table MIB
- RFC 2131 Dynamic Host Configuration Protocol (DHCP)
- RFC 2132 DHCP Option 6, 43 & 60
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2236 IGMPv2
- RFC 2454 IPv6 UDP MIB
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 packets over Ethernet
- RFC 2474 Differentiated Services (DiffServ)
- RFC 2541 Secure Shell protocol architecture
- RFC 2597 Assured Forwarding PHB Group
- RFC 2598 Expedited Forwarding PHB Group
- RFC 2616 HTTP 1.1
- RFC 2660 HTTPS - Secure Web
- RFC 2665 / RFC 1643 Ethernet MIB
- RFC 2674 Q-BRIDGE-MIB
- RFC 2819 RMON
- RFC 2851 Textual Conventions for Internet network addresses

- RFC 2863 Interfaces Group MIB
- RFC 2865 RADIUS
- RFC 2866 RADIUS Accounting
- RFC 2869 RADIUS Extensions - Interim updates
- RFC 2933 IGMP MIB
- RFC 3046 DHCP Relay Agent Information Option 82
- RFC 3058 RADIUS Authentication
- RFC 3140 Per-Hop Behavior Identification codes
- RFC 3162 IPv6 RADIUS Client
- RFC 3246 Expedited Forwarding Per-Hop Behavior
- RFC 3260 Architecture for Differentiated Services
- RFC 3361 DHCP Option 120 for SIP Servers
- RFC 3289 DiffServ MIBs
- RFC 3410 SNMPv3
- RFC 3411 SNMP Frameworks
- RFC 3412 SNMP Message Processing
- RFC 3413 SNMPv3 Applications
- RFC 3414 SNMPv3 USM
- RFC 3415 SNMPv3 VACM
- RFC 3416 SNMP
- RFC 3417 SNMP Transport Mappings
- RFC 3418 SNMPv2 MIB
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 Addressing Architecture
- RFC 3579 RADIUS support for EAP
- Technical Specifications (cont.)
- RFC 3584 Co-existence of SNMP v1/v2/v3
- RFC 3587 IPv6 Global Unicast Format
- RFC 3596 DNS extensions to support IPv6
- RFC 3621 Power over Ethernet MIB
- RFC 3635 Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 3826 AES for the SNMP User-based Security Model
- RFC 3879 Deprecating Site Local Addresses
- RFC 3993 DHCP Subscriber-ID sub-option
- RFC 4007 Scoped Address Architecture
- RFC 4022 TCP MIB
- RFC 4113 UDP MIB
- RFC 4133 Entity MIB
- RFC 4193 Unique Local IPv6 Unicast Addresses
- RFC 4250 SSH Protocol Assigned Numbers
- RFC 4251 SSH Protocol Architecture
- RFC 4252 SSH Authentication Protocol
- RFC 4253 SSH Transport Layer Protocol
- RFC 4254 SSH Connection Protocol
- RFC 4291 IPv6 Addressing Architecture
- RFC 4293 IPv6 MIB
- RFC 4301 Security Architecture for the Internet Protocol
- RFC 4344 SSH Transport layer Encryption Modes
- RFC 4345 Improved Arcfour Modes for SSH
- RFC 4432 SSHv2 RSA
- RFC 4443 ICMPv6 for IPv6
- RFC 4541 Considerations for IGMP and MLD snooping switches
- RFC 4604 IGMPv3
- RFC 4673 RADIUS Dynamic Authorization Server MIB
- RFC 4675 RADIUS Attributes for VLAN and Priority Support
- RFC 4716 SSH Public Key File Format
- RFC 4789 SNMP over IEEE 802 Networks
- RFC 4861 Neighbor Discovery for IPv6
- RFC 4862 IPv6 Stateless Address Auto-Configuration
- RFC 5010 DHCPv4 Relay Agent Flags Suboption
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- RFC 5176 Dynamic Authorization Extensions to RADIUS
- RFC 5859 TFTP Server DHCP Option

General Performance

- Switch Fabric performance: 12.8Gbps to 120Gbps
- Frame forwarding rate: 9.5 to 89.3Mpps
- Latency (64 byte packet LIFO): 2.4 to 3.6 microseconds (all GbE ports) and 7.9 microseconds (FE access ports)
- Frame length: 1522 bytes (including Q-tag)
- Jumbo Frame support: up to 9216 octets
- MLT / 802.3ad LACP: 6 groups with 4 active trunks
- Concurrently configured VLANs: 256
- Egress queues: 4
- Multiple Spanning Tree Groups: 8
- MAC Address: up to 16,000

- DHCP Snooping: up to 512 entries
- 802.1X Clients per port: 32
- ARP Entries: up to 512
- IP Interfaces: up to 32
- RMON entries per port: 4 groups
- ADAC (IP Phones): 32 per port
- QoS filters per precedence: 256
- QoS precedence: 4
- QoS filters per switch: 1024
- Pluggable Interfaces
- 100BASE-FX SFP up to 2km reach over MMF (Duplex LC)
- 1000BASE-T SFP up to 100m over CAT5E or better UTP Cable (RJ-45)
- 1000BASE-SX SFP up to 550m reach on MMF (Duplex LC)
- 1000BASE-LX SFP up to 550m reach on MMF, and up to 10 km on SMF (Duplex LC)
- 1000BASE-XD CDWM SFP up to 40 km reach on SMF (Duplex LC)
- 1000BASE-ZX CDWM SFP up to 70 km reach on SMF (Duplex LC)
- 1000BASE-EX SFP up to 120 km reach on SMF (Duplex LC)
- 1000BASE-BX SFP up to 10 and 40 km reach variants on SMF (LC)
- 10GBASE-SR SFP+ up to 300m reach over MMF (Duplex LC)
- 10GBASE-LRM SFP+ up to 220m over FDDI-grade MMF (Duplex LC)
- 10GBASE-LR SFP+ up to 10km reach over SMF (Duplex LC)
- 10GBASE-ER SFP+ up to 40km reach over SMF (Duplex LC)
- 10GBASE-X SFP+ Direct Attach Cables, in 3, 5, & 10m lengths

Environmental Specifications

- Operating temperature: 32° and 122° F (0° and 50° C)
- Operating altitude: 10,000 ft.
- Storage temperature: -40C to 70C
- Storage altitude: 10,000 ft
- Acoustic noise (dB): up to 58 (0 for Fanless models)
- Operating humidity: 95% RH non-condensing
- Storage humidity: 95% RH non-condensing
- No nearby heat sources such as hot air vents or direct sunlight
- No nearby sources of severe electromagnetic noise
- No excessive dust
- Adequate power source within six feet; one 15-Amp circuit required for each power supply.
- At least 5cm (2”) on each side of the switch unit for ventilation
- Safety Agency Approvals
- IEC 60950 International CB Certification
- EN 60950 European Certification
- UL60950 US certification
- CSA22.2, #60950 Canadian Certification
- NOM Mexican Certification

Electromagnetic Emissions and Immunity

- CISPR22, Class A/CISPR24 International
- EN55022, Class A/EN55024 European
- FCC, Part 15, Class A US Certification
- ICES-003, Class A Canadian Certification
- AN/NZS 3548 Australian/NZ Certification
- BSMI - Taiwan - CNS 13438, Class A
- MIC - Korea - MIC, No. 2001-116
- VCCI Class A Japanese Certification