ES 3000 Ethernet Switch

**Designed for Enterprise Wireless Networking
Wireless Switch Environments**

Ethernet Switch System

WIRELESS NETWORK INFRASTRUCTURE

The Right Features...at the Right Price

The ES 3000 from Symbol Technologies is the ideal enabler for wireless switching infrastructure environments. This standards-based Fast Ethernet/Gigabit Ethernet switch provides the reliability, security and scalability enterprises demand, while also integrating the features required to achieve optimal performance and operational efficiency in your wireless network. The ES 3000 offers a cost-effective solution with all the features required for a wireless solution, leading to a lower total cost of ownership.

**WS 5000 Wireless Network Environment with
ES 3000 Ethernet Switch**

Designed to Simplify Wireless Networking—and Lower Costs

All wireless infrastructure requires Ethernet connectivity. The ES 3000 offers a single platform with Ethernet connectivity and managed Power-over-Ethernet (PoE), delivering the simplicity and convenience of single vendor sourcing for Ethernet and Wireless switches. PoE greatly reduces the cost of installing power sources for Access Ports/Points, and robust PoE management capabilities simplify troubleshooting and management of PoE devices. The ES 3000 offers remote control and management, allowing hi-tech infrastructure rollout in a low-tech environment without the need for local management, reducing TCO. The ES 3000 features and functionality combine to effectively reduce the capital expenditures and operational costs associated with managing wireless networks.

## The Right Features for a Wireless Switch Network Deployment

Virtual LAN (VLAN) Support
The ES 3000 provides IEEE 802.1Q VLAN support for full implementation of the Virtual AP feature, enabling segmentation, security and manageability for wired and wireless enterprise access. Wired VLANs must first be created on the network to leverage the WS 5000 Wireless Switch's Virtual AP feature, which segregates broadcast and multicast traffic on the air to maximize bandwidth and mobile device battery life.

Quality of Service (QoS)
The ES 3000 offers multilayer Quality of Service features, including the IEEE 802.1p Class of Service (CoS) and Differentiated Services (DiffServ) standards. This functionality ensures appropriate allocation of bandwidth throughout the enterprise to support mission-critical traffic and optimize performance of applications, such as latency sensitive video or Voice-over-IP. QoS features provided include classification, reclassification policing, marking, queuing, and scheduling of incoming packets, as well as queuing and scheduling of outgoing packets.
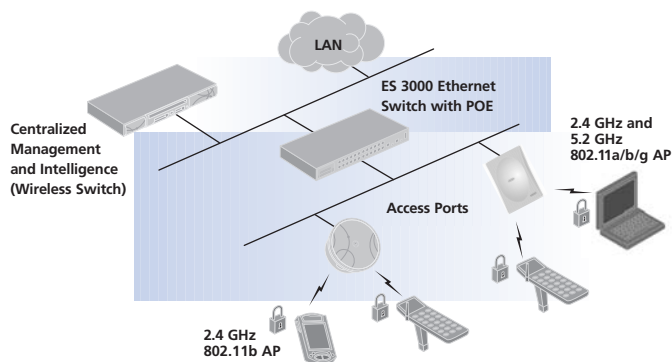
- *Packet Classification*—Packet classification enables distinguish between various traffic flows as based on Layer 2 and Layer 3 QoS fields.

- *QoS Queues*—The ES 3000 supports four egress queues per port, providing the network administrator with additional granularity in assigning priority levels for the various applications on the network. Scheduling and congestion control of these queues are managed via a Weighted Round Robin (WRR) and Strict Priority Queuing algorithm.

- *Rate Limiting/Rate Policing*—Rate limiting enables the proper allocation of bandwidth, based on criteria such as Source MAC address, Destination MAC address, Source IP address, Destination IP address and/or TCP/UDP port number. Rate limiting allows the definition of two rates: a guaranteed minimum bandwidth and a second burst size.

Resilience
Robust features enable the ES 3000 to deliver the high availability and network scalability required in enterprise networks. Support for standards based IEEE 802.1d Spanning-Tree Protocol (STP), IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) and IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) enables redundant links, and fast convergence in case of network failures. Spanning tree protocol dynamically incorporates new paths to destination in case of link failures. Multiple Spanning Tree allows the network administrator to create multiple instances of Spanning Tree while Rapid Spanning tree provides for a faster recovery than ordinary Spanning tree in case of a link failure.

The ES 3000 also provides IEEE 802.3ad (Link Aggregation) which allows bundling of links between two switches. This allows network traffic to use the aggregate link as a fat-pipe. In case of failure of any link in the group, the remaining links continue to transmit traffic.

Network Security
A range of security features is supported by the ES 3000 to ensure that data privacy is protected and network service is uninterrupted. Access Control Lists (ACLs) guard against attacks such as denial-of-service by restricting access to specific portions of the network, while maintaining forwarding performance by performing lookups in hardware. Packets can be denied based on source and/or destination MAC addresses, IP addresses, or TCP/UDP ports. To provide port security, the ES 3000 offers IEEE 802.1x port-based authentication, which limits access to Ethernet ports, effectively reducing the risks of rogue client and network devices, such as wireless access points or hubs.

Performance
The ES 3000 provides line rate throughput at minimum packet sizes (4.4 Gbps/6.6 Mpps throughput).

Intelligent, Managed Power-over-Ethernet
The ES 3000 provides standards based IEEE 802.3af Power-over-Ethernet (PoE), driving network and operational costs down by eliminating the need to run power to every WLAN Access Port/Point. And the ability to remotely control and manage PoE further reduces operational costs as well as delivers a higher level of control over the wireless network.

PoE management capabilities include the ability to configure power prioritization per Ethernet port, ensuring the adequate allocation of power to devices that provide critical services. In addition, the ability to remotely reset PoE devices simplifies troubleshooting, eliminates the need for technical experts at every location, and enables network administrators to remotely schedule the power down of wireless access points/ports after normal operating hours or according to enterprise policy to ensure complete security.

Dynamic power allocation enables optimal power budgeting. The ES 3000 calculates the exact amount of power each PoE device is utilizing, dynamically allocating the remaining available power in a more efficient manner than the power ranges utilized in traditional PoE classification, which rely on information provided by each PoE device.

The ES 3000 also provides full PoE visibility. Any change in the status of the power budget and PoE devices triggers a trap or message that can be sent to management tools, ensuring an always-available and accurate view of all PoE devices.

One Complete Management Solution for Wireless Infrastructure

Comprehensive Wireless Network Management

Symbol Enterprise Mobility Manager (SEMM) software provides a consolidated view of the entire wireless infrastructure, enabling deployment, monitoring, enhanced configuration and management of all elements—ES 3000 Ethernet Switches, WS 5000 Wireless Switches, and all associated Access Ports (AP 100s and AP 300s)— from a single central location such as a Data Center or Network Operations Center.

SNMP-based Network Management

A comprehensive set of Management Information Bases (MIBs) for layer two switches enables the ES 3000 to support SNMP, enabling standard enterprise network management tools such as HP OpenView, IBM NetTivoli and CA Unicenter to perform basic monitoring, configuration and fault detection.

Web and Command Line Interface (CLI) Management

The ES 3000 offers a variety of means for configuration and deployment. A simple Web based GUI interface steps the network administrator quickly and easily through the tasks of configuring and monitoring the ES 3000. The CLI provides another standard intuitive interface to the switch. In addition, rollout of configuration to multiple Ethernet switches is simplified with a DHCP boot option, which ensures consistent configuration across all switches in the enterprise network.

Simple and Convenient Management of all Power-over-Ethernet Ports
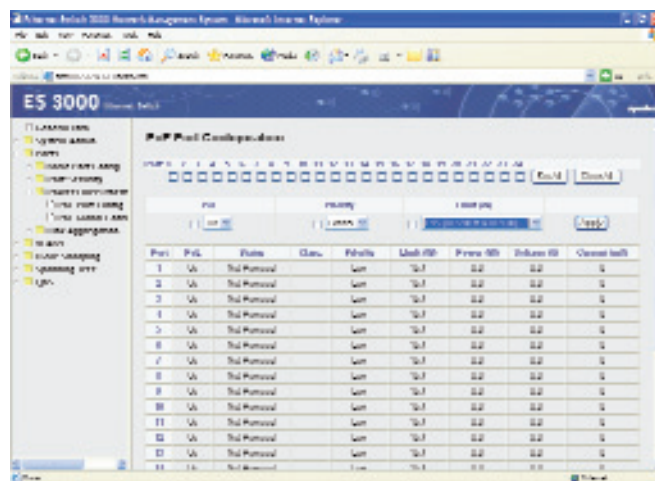
Designed specifically for WS 5000 wireless LAN environments, the ES 3000 provides complete interoperability with the WS 5000 as well as all the critical features and functionality required to support robust wireless networking and achieve peak wireless network performance.

Features	Benefits
24 port 10/100 Base-T + 2 GE (Copper standard/Fiber optional)	Provides ports for wired and wireless devices in addition to GE uplink ports
IEEE 802.3 af standards-based PoE	• Ensures that no damage occurs to end-equipment • Dynamically manages power budgets • Reduces operational expenditure with remote management of hard to reach PoE devices such as access points/ports • Single power inlet into wiring closet allows a single UPS connection to power the Ethernet switch
IEEE 802.1Q VLANs	Provides segmentation of Layer 2 broadcast domains, leading to networks with better security, performance, and manageability
Quality of Service with	Provides classification, marking, rate policing, and IEEE 802.1p and Diffserv queuing based on IEEE 802.1p bits or Diffserv markings in the packet
IEEE 802.1d Spanning Tree	Ensures that no loops exist in a meshed network without the need for extensive configuration
Multiple Spanning Tree IEEE 802.1s	Allows the existence of a spanning tree instance for a defined set ports, enabling several instances to exist in a single network
Rapid Spanning Tree IEEE 802.1w	Ensures much faster network convergence in the event of a change in network topology through the improvement of Spanning Tree convergence time
GARP VLAN Registration Protocol (GVRP)	Enables dynamic exchange of VLAN configuration information with other GVRP switches and dynamically creation and management of VLANs on switches connected through 802.1Q trunk ports
Link Aggregation IEEE 802.3ad	Provides the ability to aggregate bandwidth across multiple physical links of the same type (FE or GE), forming a Link Aggregated Group; in case of link failure(s) within the group, remaining links can continue to carry traffic, providing a resilient bandwidth between two sites
IGMP Snooping	Enables the monitoring of Layer 3 multicast traffic even though the ES 3000 is a layer 2 switch; enables the switch to forward multicast traffic to only those ports that contain members for the intended multicast group, resulting in much better switch performance
IEEE 802.1x	Enables only authenticated clients to transmit data traffic, ensuring that rogue devices cannot log on to the network
Port Mirroring	Provides a mechanism to monitor or snoop "interesting traffic" flowing through the switch
Security Filtering or Access Control Lists	Enables filtering of traffic flowing through the switch based on user policy, including MAC address, source IP address, destination IP address and protocol type; user can chose to permit or deny any traffic flowing through the switch
SNMP ver 2	Enables SNMP based management tools to monitor, troubleshoot and configure the switch through comprehensive support for a standard set of Layer 2 switch MIBs
Flow control IEEE 802.3x	Sends pause frames when switch congestion occurs
CLI/Web/Menu based	Provides a variety of mechanisms to interface with the switch including a detailed yet simple to use Web based interface and context based intuitive CLI support
DHCP client/Bootp, TFTP, Telnet	Provides standard tools for addressing and management of the switch

ES 3000 Specification Highlights

Physical Characteristics

Dimensions:	**With mounting brackets:** **1.73 in. H x 19 in. W x 10.08 in. D** **44 mm (1RU) H x 482.6 mm W x 256 mm D** **Without mounting brackets:** **1.73 in. H x 17.3 in. W x 10.08 in. D** **440.0 mm W x 44 mm (1RU) H x 256 mm D**
Weight:	**POE version 8.95 lbs./4.06 kg (with rack brackets)** **POE version 8.80 lbs./3.99 kg (without rack brackets)** **Non-POE version 7.90 lbs./3.58 kg (with rack brackets)** **Non-POE version 7.75 lbs./3.52 kg (without rack brackets)**

Performance Characteristics

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Throughput:	**4.4Gbps**
Packet Rate:	**6.6Mpps based on 64 byte packets**
Performance:	**Line rate packet forwarding**
Part number and MTBF:	**ES-3000-PWR-10-WW 140,000 hours** **ES-3000-10-WW 355,000 hours** **FIBER-3000-1S-WW 1,125,00 hours**

User Environment

Operating Temperature:	**32° to 104°F/0°C to 40°C**
Operating Humidity:	**10%-85% (w/o condensation)**
MAC Addresses:	**8000 MAC addresses**
LED:	**Status indicator for Power; Per-port status LEDs link, activity, POE**
Mounting:	**Racking mounting brackets for 19-inch rack**
Management:	**SNMP v1/v2; MIB II; Traps; CLI; HTTP GUI based**
Max. Power Consumption:	**100 VAC-240VAC, 50Hz/60Hz, 3.5A (PoE)** **100 VAC-240VAC, 50 Hz/60Hz, 1.5A (non POE)**

Regulatory

Electrical Safety:	**UL 60950, Canada CSA C22.2 no. 60950, EU EN 60950, International IEC 50950, Japan DENAN, FCC part 15**

Warranty

5 year limited lifetime warranty

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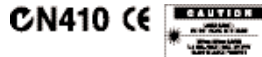
About Symbol Technologies

Symbol Technologies, Inc., The Enterprise Mobility Company™, delivers solutions that capture, move and manage information in real time, from the point of activity to the point of decision. Symbol solutions integrate advanced data capture technology, ruggedized mobile computers, wireless infrastructure, enabling software and high-ROI applications from our business partners and Symbol Enterprise Mobility Services. Symbol enterprise mobility solutions increase business productivity and velocity, reduce costs and realize competitive advantage for the world's leading retailers, transportation and logistics companies and manufacturers as well as government agencies and providers of healthcare, hospitality and security. More information is available at **www.symbol.com**

Symbol Enterprise Mobility Services

Symbol Enterprise Mobility Services provide comprehensive support and technical expertise for designing, deploying and maintaining successful mobility solutions. Our diverse service offerings enhance your business operations, so you receive the highest value and uptime across the entire lifecycle of your mobility solution.

Our **Mobility Services** give you access to Symbol's expertise in designing and deploying global mobility solutions. Our extensive knowledge base and experience of successful mobility implementations enables early adopters to gain competitive advantage. **SymbolCertified Professional Services** providers apply best practices that integrate established mobility systems, devices and applications into your business environment. As a seamless extension of Symbol, certified partners provide services ranging from design and implementation to training and project management to help ensure a smooth transition from implementation to operations. Symbol **Customer Services** deliver the experience, expertise and global repair capabilities for maximum uptime of your business operations. A flexible and comprehensive portfolio of support services ensures that your mobility infrastructure, systems and solutions operate at peak performance.

For system, product or services availability and specific information within your country, please contact your local Symbol Technologies office or Business Partner.

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