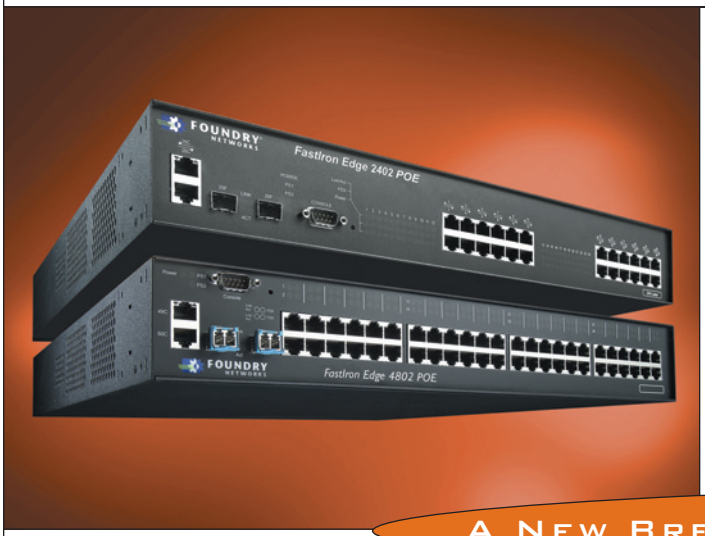
FastIron Edge Power over Ethernet Switch



Highlights

- *Industry-standards based IEEE 802.3af based PoE support, delivering a total of 480 watts on a single power supply (with option for a second, redundant power supply) to ensure power for all ports used for POE devices*
- *Auto-detection provides the ability to mix multiple types of devices (PoE and non-PoE) within a single system, delivering an ideal platform for gradual migration to VoIP, WLAN and IP video surveillance and security*
- *Enhanced PoE management capabilities including per-port indicators (LED) for power consuming devices, the ability to enable/disable PoE per port and comprehensive PoE consumption statistics for each port and total system*
- *Internal, redundant, hot-swappable power supplies for increased PoE reliability*
- *Foundry IronWare™ Switching and Routing Feature Set provides advanced QoS Traffic Control enabling mission critical application policies including VoIP, extensive IronShield™ Security including ACLs, Extended ACLs, SSH, SCP, & 802.1x and Foundry's JetScope™, providing "Always On" Wire-Speed Network Monitoring through industry-standard sFlow (RFC3176) technology*

A New Breed of Intelligent Edge Products

The FastIron® Edge Switch with IEEE 802.3af based Power over Ethernet (FES-PoE) series provides an industry-leading feature set with greater flexibility, higher reliability, enhanced security, and expanded quality of service—while simplifying network management complexity and reducing on-going training expenses. The FES-POE is an ideal platform choice for applications that require advanced high-availability, superior performance and advanced power features, including Voice over IP (VoIP), IP video security/surveillance and Wireless LAN (WLAN) deployment.

FastIron Edge Switch support of the IEEE 802.3af standard ensures interoperability with other IEEE 802.3af compliant devices, providing the ability to deliver electrical power (-48v DC at up to 15.4 watts) across Category 5 (or above) Ethernet cabling infrastructures. This technology allows network administrators to deploy Power over Ethernet (PoE) devices to user locations, without restructuring existing power distribution plant.

The FES product family increases your network's Return on Investment (ROI) and decreases its Total Cost of Ownership (TCO) by using common sparing components and offering improved functionality through a common feature set controlled by de facto standard Command Line Interface (CLI) syntax, all in a compact (1.5 Rack Units) form factor at industry leading prices. With an advanced hardware platform to provide user-selectable Layer 2 switching with software upgradeability to full Layer 3 multiprotocol routing—the FastIron Edge Switch with Power over Ethernet is the ideal networking platform for today's Enterprise wiring closet applications.

The Foundry Networks® FastIron Edge Switch with Power over Ethernet (FES-PoE) family establishes the next benchmark in edge connectivity by delivering the most adaptable feature set combined with the highest amount of power available for PoE device support. A total of 480 watts dedicated to PoE resets the industry high-water mark by offering more power per port based on a single power supply in a fixed configuration system, with option for a second, internal redundant power supply delivering 100% system and PoE redundancy. To meet existing and emerging network requirements, the FES-POE systems delivers a full complement of standards-based, feature-rich layer 2 switching and Layer 3 multiprotocol routing capabilities, comprehensive hardware and software redundancy, complete QoS controls including prioritization and rate limiting, standard and extended ACLs, integrated Copper Gigabit Ethernet ports, and more. The extensive feature set supports network requirements ranging from basic connectivity to multicast-enabled full streaming audio/video applications for converged services including Voice over IP (VoIP).

FOUNDRY® NETWORKS

The **FES-POE** Intelligent Edge Product family includes the following switches:

- *Figure 1: FastIron Edge 2402-POE*

- ***FES2402-POE:*** *24 ports 10/100Base-TX IEEE 802.3af-based PoE plus 2 ports of media-flexible Gigabit Ethernet, allowing a choice between fixed 1000Base-T (included) or 1000Base-X (mini-GBIC), Full Layer 2 & Base Layer 3 Switching, and one hot-swappable, field replaceable AC power supply with space for a second (redundant) AC power supply; Occupies 1.5 rack units (RU)*
- ***FES2402-PREM:*** *24 ports 10/100Base-TX IEEE 802.3af-based PoE plus 2 ports of media-flexible Gigabit Ethernet, allowing a choice between fixed 1000Base-T (included) or 1000Base-X (mini-GBIC), Full Layer 2 Switching, Full Layer 3 Routing, and one hot-swappable, field replaceable AC power supply with space for a second (redundant) AC power supply; Occupies 1.5 rack units (RU)*

- *Figure 2: FastIron Edge 4802-POE*

- ***FES4802:*** *48 ports 10/100Base-TX IEEE 802.3af-based PoE plus 2 ports of media-flexible Gigabit Ethernet, allowing a choice between fixed 1000Base-T (included) or 1000Base-X (mini-GBIC), Full Layer 2 & Base Layer 3 Switching, and one hot-swappable, field replaceable AC power supply with space for a second (redundant) AC power supply; Occupies 1.5 rack units (RU)*
- ***FES4802-PREM:*** *48 ports 10/100Base-TX IEEE 802.3af-based PoE plus 2 ports of media-flexible Gigabit Ethernet, allowing a choice between fixed 1000Base-T (included) or 1000Base-X (mini-GBIC), Full Layer 2 Switching, Full Layer 3 Routing, and one hot-swappable, field replaceable AC power supply with space for a second (redundant) AC power supply; Occupies 1.5 rack units (RU)*

Power over Ethernet — Support for VoIP, WLAN and IP video security

The FastIron Edge Switch delivers Power over Ethernet (PoE), based the IEEE 802.3af industry standard. With a total of 480 watts dedicated to PoE from a single power supply, the FES-PoE is an ideal platform for mission critical applications that require centralized power supply and management. By consolidating power into the wiring closet (switch port), network managers can deliver increased power reliability with centralized Uninterruptible Power Supplies (UPS), for devices that are deployed at user locations. Advanced PoE features including auto-detection provide the ability to simultaneously support PoE and non-PoE devices without configuration changes, per-port LED indicators to easily identify power-consuming devices, per-port short circuit protection for system protection and software based statistics for power consumption per port and total for the system. By delivering a total of up to 480 watts of dedicated PoE support from a single power supply, Foundry raises the bar in PoE support for a stackable solution, delivering up to the industry standard maximum of 15 watts per port for all ports within the system. With support for a second, internal, redundant, hot-swappable power supply Foundry delivers 100% system and PoE redundancy with increased reliability.

The ability to deliver power over Ethernet makes the FES-PoE an ideal solution for Voice over IP (VoIP) deployment, where the IP phone power can be powered from the wiring closet that can provide comprehensive backup power facilities. This gives users with the highest possible reliability for their voice service, eliminating loss of telephony services in the event of power loss at individual user locations. Along with VoIP, the FES-PoE delivers support for Wireless LAN (WLAN) and IP video security deployment, where deployment of a single Category 5 (or greater) cable can provide substantial cost savings by eliminating the need for deploying power cabling in difficult to reach, or prohibitive locations.

The FastIron Edge Switch can also deliver power for legacy devices shown in Table – 1.

IronShield™ Security — Complete Network Protection

The FastIron Edge Switch supports configurable levels of user-selectable security starting with support for MAC address lockdown. The network administrator can assign a single MAC address or a group of addresses to an individual port in order to prevent unauthorized users from plugging into open RJ45 wall outlets. For more complex networking environments using Remote Authentication Dial-In User Service (RADIUS) authentication servers, the network manager can enable 802.1x port-based authentication—ensuring that the FES first authenticates the user before allowing the port to transmit data onto the network. This also grants users secure mobility while still maintaining the integrity and security of the network against unwarranted breaches.

Once the port is operational, the network administrator can use both regular and extended ACLs to control access to and through the network, enabling control policies that can permit or deny traffic based on a wide variety of identification characteristics, such as source/destination MAC addresses, source/destination IP addresses, and TCP/UDP ports/sockets or well-known port numbers—further protecting and restricting network access from malicious users. The FES implements ACL lookups in hardware so that providing security and protection for the network does not adversely affect switching or routing performance.

Table 1: Legacy Devices Supported on the FES2402-POE and FES4802-POE

Legacy Device[1]	Firmware Version
Cisco IP Phone 7910, 7940, and 7960 Series	Cisco Call Manager version 3.1
Cisco Aironet 350 and 1200 Series Access Point	EnterpriseAP version 12.0
Intel PRO/Wireless 5000 LAN Access Point and PRO/Wireless 5000 Dual Access Point	Version 1.2
Sony SNC-VL10N Video Network Color Camera	Version 1.4.6

[1]Although Foundry has attempted to provide accurate information in this material, Foundry assumes no legal responsibility for the accuracy or completeness of the information, and this does not guarantee that future software releases from legacy vendors will work with Foundry's POE products

By deploying the FES, network managers can provide layered levels of access to the management console. Multilevel access security on the console and web-based management interface prevents unauthorized users from accessing or changing the switch configuration. By using Terminal Access Controller Access Control Systems (TACACS/TACACS+) as well as RADIUS authentication, the network administrator can enable considerable centralized control and restrict malevolent users from altering network configurations. The FES also supports Secure Shell (SSHv1) and SNPMv3 to further restrict and encrypt communications to the management interface and system, thereby assuring highly secure network management access. For an added level of protection, the network administrator can use ACLs and provide fine-tuned access and control to the system by binding the ACL to TELNET, web-management, and SNMP interfaces.

To protect the network against Denial of Service (DoS) attacks, the network manager can disable the forwarding of ICMP PING messages and also enable the option to rate limit ICMP and TCP SYN packets. The FES can monitor, throttle, and lockout ICMP and TCP SYN traffic both to the management address of the switch and for traffic transiting the system—enabling this feature can secure and protect the network from suffering from or aiding a user-generated DoS attack.

JetScope — "Always-On" Wire-Speed Network Monitoring

All versions of the FastIron Edge Switch support JetScope™—Foundry's unique solution to simplify network management. Deploying switches in a networking infrastructure increases overall network performance but essentially eliminates the network administrator's ability to receive a total picture of network capacity, bandwidth consumption, utilization, and overall network health. JetScope illuminates the network and grants visibility about what is actually transpiring in real time to the traffic flowing throughout the network. JetScope uses the built-in capability of the FES ASICs to collect and aggregate details on traffic flows from Layer 2 through Layer 7 and automatically delivers that information to the IronView Network Management station—a Java-based network configuration and management tool that displays, in detail and graphically, network and application level traffic information. With this insight, the network manager can now quickly and accurately review overall networking operations, zero in on hot spots, quickly diagnose, and troubleshoot difficulties before they develop into widespread problems. JetScope also automatically delivers accurate SNMP/RMON statistics to reduce the administrative burden normally associated with proactive network management, design, and capacity planning.

Increasing Network Value with Converged (Voice, Video, and Data) Deployments

The FastIron Edge Switch series establishes a high performance platform on which to build flexible and converged voice, video, and data services that can easily adapt to changes and the introduction of future technologies. Deployed in the wiring closet, the FES products provide the capabilities and functionalities required for supporting robust telephony integration within existing networking infrastructures. Providing multiple levels of redundancy and topology fault tolerance, IP phone systems and other converged technologies such as desktop video, built using the FES products, deliver advanced QoS features required to ensure the same level of reliability and availability your end users expect from their existing legacy telephone and video systems.

Intelligent Traffic Control to Manage QoS and Bandwidth Consumption

The FastIron Edge Switch offers superior QoS features to enable network administrators to provide and ensure high-quality services throughout the network from end to end. Foundry's QoS implementation uses the most efficient methodology to classify and prioritize network traffic to avoid widespread network congestion. The FES supports Dual-Mode operation—the ability to identify both 802.1Q tagged and untagged data streams, and places these into their appropriately assigned VLANs. The integration of Voice and Data services onto one common structured cabling plant further reduces the network's TCO—a single FES switch port supports both the handset and PC, thereby reducing the number of switch ports needed within a converged networking infrastructure. Dual-Mode operation segments

and prioritizes 802.1Q tagged IP voice packets, while properly assigning untagged data traffic to the appropriate VLAN, isolating the voice from the data traffic for troubleshooting and traffic monitoring purposes.

Enhancing QoS to Ensure High Availability and Superior Data Traffic Integrity

The FastIron Edge Switch can classify, reclassify, police, and mark the traffic prior to delivery. Network administrators can classify traffic generated by different networking characteristics or devices, such as VoIP handsets, executive management, or bandwidth critical applications, to discriminate among various traffic flows and enforce bandwidth policies on Layer 2 and Layer 3 QoS fields. The FES can identify, classify, and reclassify traffic based on specific criteria such as port, source/destination Media Access Control (MAC) address, 802.1p priority bit, source/destination IP address, Type of Service (ToS) or Differentiated Services Control Point (DSCP) fields, or the Transmission Control Protocol/User Datagram Protocol (TCP/UDP) port.

Once classified, the traffic is queued and scheduled for delivery—the network administrator has complete control over how the system services the queues: Weighted, adjustable Round Robin (WRR) queuing ensures that all packets have the ability to be delivered and ensures that lower-priority packets are not starved for bandwidth; Strict Priority (SP) queuing ensures that the highest-priority traffic always gets serviced first, ahead of all other traffic (which could result in lower-priority bandwidth starvation); or combined SP with WRR guarantees highest-priority traffic delivery while equally servicing the lower priority queues.

The FES is capable of performing rate limiting optimization including input-port rate limiting controlled by regular and extended ACLs. Rate limiting gives the network administrator the granular control needed to regulate how end users consume bandwidth. Using rate limiting together with the multiple queuing techniques enables the network manager to fairly balance, fine-tune, and control bandwidth consumption, providing the foundation for end-to-end QoS parameters to regulate traffic flows across the entire network. Voice, video, and high-speed data services can be combined and delivered throughout a unified network without suffering from reduced performance or negatively impacting the end-user experience.

Increasing Network Reliability with Load-Balanced and Redundant Power

▶ *Figure 3: FastIron Edge Switch with Power over Ethernet Rear View — Redundant Slot for Second Power Supply*

Every FastIron Edge Switch ships with a single AC power supply. Each FES supports two hot-swappable, load-sharing AC power supply units for unbeatable power redundancy and deployment flexibility. Both the FES2402-PoE and FES4802-PoE share the same common AC (RPS8) power supply units, further reducing equipment sparing costs and decreasing administrative expenses while, at the same time, increasing overall network serviceability, reliability, and availability. All of the power redundancy features normally available only from a modular chassis are built-in to the FES-PoE—a compact, easy to install and manage, fixed-port device.

Enhancing Network Resilience with Redundant Uplink Options

The 1000Base-X (mini-GBIC) Gigabit Ethernet interfaces support a wide range of mini-GBIC transceivers for the full breadth of networking interconnectivity including 1000Base-SX, 1000Base-LX, and 1000Base-LHA for Gigabit Ethernet links up to 550m over Multimode Fiber (MMF), 10km over Single Mode Fiber (SMF), and 70km over SMF, respectively. Higher levels of link resilience can be implemented by deploying dual-homed and redundant Gigabit Ethernet uplinks enabled with Fast Port/Fast Uplink, Per-VLAN Spanning Tree (PVST/PVST+), Per-VLAN Group Spanning Tree (PVGST), or load-sharing 802.1Q trunks or Equal Cost Multi Path (ECMP) data center connections. This unmatched selection of redundancy, quick recovery, and load balancing options grants the network administrator the widest range of implementation choices, making the FES the ideal intelligent Enterprise edge device to maximize stability and increase network reliability with sub-second failover and recovery. It equally complements the features and functionality available through the rest of Foundry's JetCore™-based modular and fixed-port configuration devices.

Expansive Switching and Routing Options

The FES2402-PoE and FES4802-PoE support wire-speed Layer 2 switching and Basic Layer 3 functionality upgradeable to full multiprotocol Layer 3 routing. The PREM version of the FES-PoE supports a more in-depth set of multiprotocol routing features including hardware based IP and IPX routing, AppleTalk, RIPv1, RIPv2, OSPF, multicast routing (including PIM-SM/DM, IGMPv2, and DVMRP), Access Control Lists (ACLs) and Extended ACLs, along with Virtual Router Redundancy Protocol (VRRP) and VRRP-Enhanced (VRRPE). All FastIron Edge Switches are upgradeable from complete Layer 2/Basic Layer 3 to Full Layer 3 capability—providing a "pay as you go" strategy, enabling the built-in advanced Full Layer 3 feature set only to those portions of the network that require it.

Finally, the FES allows up to two software code images to be stored in memory, an advanced capability found across Foundry's entire product line. The second storage location provides the network administrator an additional level of assurance in the event the primary image becomes corrupted during an upgrade cycle.

With this outstanding suite of features, functions, and capabilities, an infrastructure built using Foundry's FastIron Edge Switch with Power over Ethernet is a highly available, fully redundant, easily manageable, and secure networking environment that delivers the highest ROI unified with the lowest TCO available today and for well into the future.

Technical Specifications:

Standards Compliance

- 802.1d Bridging
- 802.1D-1998
- 802.1q/p VLAN Tagging and Priority
- 802.1w Rapid Spanning Tree
- 802.1x Port-based Authentication
- 802.3 10Base-T
- 802.3 Ethernet Like MIB
- 802.3ad Link Aggregation
- 802.3af Power over Ethernet
- 802.3u 100Base-TX
- 802.3x Flow Control
- 802.3z 1000Base-SX/LX/TX

Protocol Support

- AppleTalk
- DNS Client
- IP (RFC 1812)
- IPX RIP/SAP
- OPSF NSSA (RFC 1587)
- OSPF (RFC 1583)
- OSPF Database Overflow (RFC 1765)
- OSPF Traps (RFC 1850)
- OSPFv2 (RFC 2328v2)
- RIPv1 (RFC 1058)
- RIPv2 (RFC 1723)
- VRRP (RFC 2338)

IP Multicast

- DVMRP Host Requirements (RFC 1122)
- DVMRPv2
- IGMP Snooping
- IGMPv1 (RFC 1112)
- IGMPv2 (RFC 2236)
- PIM-DM (draft-ietf-v2-dm-03)
- PIM-SM (RFC 2362)

Layer 2 Enhancements

- 4,096 VLANs
- 64,000 MAC Addresses
- Address Lock Filtering
- Dual Mode VLANs
- Fast Port Span
- Fast Uplink Span
- Generic VLAN Registration Protocol
- MAC-Layer Filtering
- Mirror/Monitor Ports
- Per VLAN Group Spanning Tree (PVGST)
- Per VLAN STP (PVST/PVST+)
- Server Trunk Groups
- Single-instance Spanning Tree

Layer 3 Enhancements

- 64,000 IP Routes
- DiffServ Support
- ToS/DSCP Control via ACLs

Management and Control

- 802.3 MAU MIB (RFC 2239)
- Architecture for Describing SNMP Framework (RFC 2571)
- BootP (RFC 951 & RFC 1542)
- BootP/DHCP Relay (RFC 2131)
- Bridge MIB (RFC 1493)
- Configuration Logging
- Ethernet Interface MIB (RFC 1643)
- Ethernet MIB (RFC 1643)
- Embedded HTTP
- ICMP Router Discovery Protocol (RFC 1256)
- Industry Standard Command Line Interface (CLI)
- Integration with HP OpenView for Sun Solaris, HP-UX, IBM's AIX, and Windows NT Standalone Windows NT
- IP Forwarding Table MIB (RFC 1354)
- IronView Network Manager (INM) Web based graphical user interface
- JetScope/ sFlow (RFC3176)
- MIB-II (RFC 1213)
- Repeater MIB (RFC 1516)
- RIPv2 MIB (RFC 1724)
- RMON MIB (RFC 1757)
- SNMP Message Processing and Dispatching (RFC 2572)
- SNMP MIB II (RFC 1573)
- SNMPView-based Access Control Model SNMP (RFC 2575)
- SNMPv1/v2c (RFC 1157)
- SNMPv3 Applications (RFC 2573)
- SNMPv3 Intro to Framework (RFC 2570)
- SNMPv3 User-based Security Model (RFC 2574)
- Support for Multiple SysLogD Servers
- TELNET (RFC 854)
- TFTP (RFC 783)

Element Security Options

- Authentication, Authorization, & Accounting (AAA)
- Bi-level Access Mode (Standard and EXEC Level)
- Protection for Denial of Service attacks
- RADIUS
- Secure Copy (SCP)
- Secure Shell
- TACACS/TACACS+
- Username/Password

Performance

- **FES2402-POE:**
  - Switching Capacity 38.4 Gbps
  - Forwarding Rate 6.6 Mpps
- **FES4802-POE:**
  - Switching Capacity 38.4 Gbps
  - Forwarding Rate 10.2 Mpps

Physical Dimensions

- **FES2402-POE:**
  2.63" (H) x 17.5" (W) x 19.6" (D)
  6.68cm (H) x 44.45cm (W) x 49.78cm (D)
- **FES4802-POE:**
  2.63" (H) x 17.5" (W) x 19.6" (D)
  6.68cm (H) x 44.45cm (W) x 49.78cm (D)

Weight

- **FES2402:**
  - 29 lbs (13.15 kg) Fully Loaded including dual redundant power
  - 17.5 lbs (7.95 kg) Empty
- **FES4802:**
  - 9 lbs (13.15 kg) Fully Loaded including dual redundant power
  - 17.5 lbs (7.95 kg) Empty
- **RPS8:**
  - 5.75 lbs (2.61 kg)

Environmental Ranges

- Operating temperature: 32° to 104°F (0° to 40°C)
- Relative Humidity: 5% to 90%, non-condensing
- Storage temperature: -23° to 158°F (-25° to 70°C)
- Storage altitude: 10,000ft (3,000m) maximum
- **FES2402POE**
  - Maximum BTUs: 316 BTU/Hr (150W)
- **FES4802POE**
  - Maximum BTUs: 462 BTU/Hr (150W)

Power Requirements

- AC input voltage: 100vAC @ 3.5A MAX, 240vAC @ 1.5A MAX, 50-60Hz per auto-sensing, auto-switching power supply

Safety Certifications

- EN 60950
- IEC 950
- UL 1950
- CSA 950

Electromagnetic Emission Certifications

- FCC Class A
- EN 55022
- CISPR-22 Class A
- VCCI Class A

Immunity

- Generic: EN 50082-1

Warranty

- 5-year Limited Lifetime Hardware Warranty
- 90-days Software

Ordering Information

Order Number	Description
FES2402-POE	24-port 10/100Base-TX IEEE 803.2af-based PoE plus 2-ports Gigabit (X or 1000Base-T) Layer 2 & Base Layer 3 and AC Power
FES4802-POE	48-port 10/100Base-TX IEEE 803.2af-based PoE plus 2-ports Gigabit (X or 1000Base-T) Layer 2 & Base Layer 3 and AC Power
FES2402-POE-PREM	24-port 10/100Base-TX IEEE 803.2af-based PoE plus 2-ports Gigabit (X or 1000Base-T) Full Layer 3 and AC Power
FES4802-POE-PREM	48-port 10/100Base-TX IEEE 803.2af-based PoE plus 2-ports Gigabit (X or 1000Base-T) Full Layer 3 and AC Power

Accessories and Options

FES3LU-2	Layer 3 Upgrade for FES2402-POE
FES3LU-4	Layer 3 Upgrade for FES4802-POE (also supports FES2402-POE)
E1MG-SX	1000Base-SX mini-GBIC optic, MMF, LC connector
E1MTG-SX	1000Base-SX mini-GBIC optic, MMF, MTRJ connector
E1MG-LX	1000Base-LX mini-GBIC optic, SMF, LC connector
E1MG-LHA	1000Base-LHA mini-GBIC optic, SMF, LC connector, 70km reach
E1MG-LHB	1000Base-LHB mini-GBIC optic, SMF, LC connector, 150km reach
RPS8	Redundant auto-switching 90-240v AC Power Supply Unit for FES2402-POE and FES4802-POE

Support

BRONZE-FES24POE	TechNET BRONZE Support, FastIron Edge 2402 POE systems
SILVER-FES24POE	TechNET SILVER Support, FastIron Edge 2402 POE systems
GOLD-FES24POE	TechNET GOLD Support, FastIron Edge 2402 POE systems
BRONZE-FES48POE	TechNET BRONZE Support, FastIron Edge 4802 POE systems
SILVER-FES48POE	TechNET SILVER Support, FastIron Edge 4802 POE systems
GOLD-FES48POE	TechNET GOLD Support, FastIron Edge 4802 POE systems

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FOUNDRY NETWORKS

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