FastIron Workgroup X-Series

Highlights

▶ FWS X-series is available in two models: 24-port 10/100/1000-Mbps (RJ-45) with the FWS X424, and 48-port 10/100/1000-Mbps (RJ-45) with the FWS X448. Both include four SFP ports to support SX, LX, LHA, and CWDM GbE fiber optics.

▶ Orderable or field upgradeable to include 1-port or 2-port 10-Gigabit Ethernet (10-GbE) modules that uses hot-pluggable, state-of-the-art, low-cost and removable "10-Gigabit Small Form-Factor Pluggable" to support SR, LR, and ER XFP optics

▶ Includes IronWare™—Foundry's intelligent embedded software—that comes with advanced Layer 2 features such as Metro Ring Protocol and Virtual Switch Redundancy Protocol, with IronShield™ security for wire-speed network protection

▶ Includes sFlow™—an industry standard for network traffic monitoring—to deliver hardware-based and real-time network traffic monitoring, "always-on" fault and performance management, capacity planning, security policing, and precise network traffic accounting on all ports

▶ Load-balanced, hot-swappable, and redundant power supply units that ensure network reliability for Enterprises and Metro Service Providers

▶ Efficient space-saving form factor with front-facing data ports and a built-in temperature monitor sensor

Intelligent Products to Deliver 10-GbE from Edge to Core

Foundry's award–winning FastIron® Workgroup Switch X-series (FWSX) products—the FastIron Workgroup Switch X424 (FWSX424) and the FastIron Workgroup Switch X448 (FWSX448)—provide greater flexibility, higher reliability, enhanced security, extensive redundancy, and a new level of high performance by combining Gigabit Over Copper (GoC) and 10-Gigabit Ethernet, while simplifying network management complexity and reducing on-going training expenses. The FWS X-series increases a network's return on investment (ROI) and decreases total cost of ownership (TCO) by offering improved functionality through a common feature set controlled by industry-standard Command Line Interface (CLI) syntax, all in a compact (1.5 Rack Units) form factor at industry-leading prices. The FWS X-series is an advanced hardware platform that can be installed with 10-Gigabit Ethernet (10-GbE), to provide high speed networking for today's enterprise and service provider networks. The FWS X-series is the ideal networking platform to deliver 10-GbE from the edge to the core.

The Foundry Networks® FWS X-series establishes the next benchmark in delivering high density GoC with 10-Gigabit Ethernet upgradeability for today's enterprise and service provider network. Specifically, the FWS X-series establishes the industry's leading price–performance value for fixed Ethernet solutions with the addition of removable and replaceable 10-Gigabit Ethernet modules in a 1.5 Rack Unit (RU) form factor. The FWS X-series can be initially installed using four "Small Form-Factor Pluggable" (SFP) Gigabit Ethernet ports, and then later upgraded to support one or two "10-Gigabit Small Form Factor Pluggable" (XFP) modules.

To meet existing and emerging network requirements, the FWS X-series delivers a full complement of standards-based and advanced Layer 2 features. These features include hardware and software resilience, complete quality of service (QoS) controls including prioritization and rate limiting, standard and extended ACLs, integrated Gigabit over Copper (GoC) Ethernet ports, and more. The advanced feature sets include Foundry's award–winning Metro Ring Protocol, SuperSpan, and sFlow to support more complex network requirements.

FOUNDRY® NETWORKS

The FWS X-series includes the following configurations:

▶ *Figure 1: FastIron Workgroup X424*

▶ *Figure 2: FastIron Workgroup X448*

▶ *FWSX424: 20 10/100/1000-Mbps ports, 4-port Combo GbE that can be used as 10/100/1000 or SFP ports to support SX, LX, LHA, and CWDM Gigabit Ethernet optics. Orderable or field-upgradeable to include a 1-port or 2-port 10-GbE module that supports 1 or 2 XFP ports for use with SR, LR, and ER 10-GbE optics. Occupies 1.5 RU, and includes one hot-swappable, field replaceable AC power supply. An additional power supply can be added to deliver 1+1 redundancy.*

Includes support for jumbo frames of up to 9,216 bytes. Advanced Layer 2 switching.

▶ *FWSX448: 44 10/100/1000-Mbps ports, 4-port Combo GbE that can be used as 10/100/1000 or SFP ports to support SX, LX, LHA, and CWDM Gigabit Ethernet optics. Orderable or field-upgradeable to include a 1-port or a 2-port 10-GbE module that supports 1 or 2 XFP ports for use with SR, LR, and ER 10-GbE optics. Occupies 1.5 RU, and includes one hot-swappable, field replaceable AC power supply. An additional power supply can be added to deliver 1+1 redundancy.*

Includes support for jumbo frames of up to 9,216 bytes. Advanced Layer 2 switching.

Purpose-Built Features for Enterprise and Service Provider

IronShield™ Security—Complete Network Protection

The FWS X-series 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 FWS X-series 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 FWS X-series implements ACL lookups in hardware so that providing security and protection for the network does not adversely affect switching or routing performance.

By deploying the FWS X-series, network managers can provide layered levels of access to the management console. Multilevel access security on the console and web-based management interface prevent 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 unauthorized users from altering network configurations. The FWS X-series also supports Secure Shell and SNMPv3 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 messages and also enable the option to rate limit ICMP and TCP SYN packets. The FWS X-series 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.

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

All versions of the FastIron Workgroup Switch support sFlow™— Foundry's unique solution to simplifying 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. sFlow illuminates the network and grants visibility about what is actually transpiring in real time to the traffic flowing throughout the network. sFlow uses the built-in capability of the FWS X-series ASICs to collect and aggregate details on traffic flows from Layer 2 through Layer 4, 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. sFlow 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 FWS X-series establishes a high-performance platform on which to build converged voice, video, and data services that can easily adapt to changes, and the introduction of future technologies. Deployed in the wiring closet, the FWS X-series product provides the capabilities and functionalities required for supporting robust telephony integration within existing networking infrastructures. Advanced QoS features can also be enabled to deliver the same level of reliability and availability that exist within existing legacy telephone and video systems. Coupling multiple levels of protocol redundancy with advanced QoS ensures a fault-tolerant network design and zero service disruption.

Intelligent Traffic Control to Manage QoS and Bandwidth Consumption

The FWS X-series offer superior QoS features that 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 to prioritize network traffic that eliminates network congestion. The FWS X-series supports Dual-Mode operation to allow for both 802.1Q tagged and untagged data streams, and placement of these streams into assigned virtual LANs (VLANs). Dual-Mode operation enables network managers to properly assign priorities to various 802.1Q tagged packets such as Voice over IP (VoIP) packets to eliminate latency and jitter.

Enhancing QoS to Ensure High Availability and Superior Data Traffic Integrity

The FWS X-series can classify, re-classify, police, and mark traffic prior to delivery. Network administrators can classify traffic, such as VoIP handsets or bandwidth critical applications, to discriminate among various traffic flows and enforce bandwidth policies on Layer 2 and Layer 3 QoS fields. The FWS X-series 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. Queuing of traffic is done in hardware and can be configured to perform Weighted Round Robin (WRR) or Strict Priority (SP). Weighted Round Robin (WRR) ensures that all packets have the ability to be delivered and ensures that lower-priority packets are not starved for bandwidth. Strict Priority (SP) ensures that the highest-priority traffic always gets serviced first, ahead of all other traffic (which could result in lower-priority bandwidth starvation).

The FWS X-series is capable of performing rate-limiting to regulate bandwidth consumptions by network users. 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.

Industry Leading Layer 2 Features for Metro and Service Providers

By deploying the FWS X-series, Metro and Service Providers can extend high-speed networks at the edge as well as farther into access networks reaching closer to the core. Metro and Service Providers can begin to deliver Ethernet-based services, an alternative to TDM-based services, to support low-cost and high-speed services from 1-Mbps up to 10-Gbps. The following Layer 2 metro features ensure flexible, secure and resilient Ethernet services:

- ► *Metro Ring Protocol (MRP)—Offers an alternative to Spanning Tree based designs and provides sub-second fault detection and fail-over specifically for Metro Ethernet ring topologies. MRP works in conjunction with VSRP and 802.3ad based link aggregation to provide bandwidth scalability and SONET-like resiliency in Metro Ethernet networks.*

- ► *Virtual Switch Redundancy Protocol (VSRP)—Offers an alternative to Spanning Tree based designs and provides sub-second fault detection and fail-over protocol for mesh topologies. VSRP works in conjunction with MRP to provide SONET-like resiliency required for critical Data Center and Metro Ethernet networks and protects against link or switch failures.*

- ► *Rapid Spanning Tree Protocol based on IEEE 802.1w—Dramatically improves the spanning tree convergence time to sub-seconds by automatically renegotiating port roles without relying on timers in case of a link failure*

- ► *Per VLAN Spanning Tree (PVST)—Allows Metro service providers control over STP on an individual VLAN basis to provide traffic engineering*

- ► *Per VLAN Group Spanning Tree (PVGST)—Allows Metro service providers dramatic improvements in STP and VLAN scalability by servicing up to 4,096 VLANs with 2 to 16 STP or Rapid STP instances. PVGST also provides VLAN load balancing for all 4,096 VLANs for efficient utilization of all fiber in a Metro network.*

- ► *Topology Groups—Goes beyond PVGST to scale all supported Layer 2 control protocols including STP, RSTP, MRP and VSRP while providing the ability to isolate the provider from any subscriber-influenced changes*

- ► *Super Aggregated VLANs (SAV)—Allows service providers to decouple the provider VLAN domains from customer VLAN domains. SAV allows the provider to tunnel and preserve the subscriber VLANs by stacking VLAN tags.*

Increasing Network Reliability with Load-Balanced and Redundant Power

The FWS X-series includes power redundancy features, which is only available in a modular chassis. Every FWS X-series ships with a single AC power supply and adding one more power AC power supply enables 1+1 redundancy. These AC power supplies are hot-swappable and load-sharing AC power supplies critical for delivering power redundancy and deployment flexibility.

- ► *Figure 3: FastIron Workgroup Switch Rear View—Redundant Slot for Second Power Supply*

Enhancing Network Resilience with Redundant Uplink Options

The FWS X-series can be ordered or later field-upgraded with a 1-port or 2-port 10-Gigabit Ethernet module that supports one or two "10-Gigabit Small Form Factor Pluggable" (XFP) optics, allowing for a full breadth of networking interconnectivity, including 10GbE-SR, 10GbE-LR, and 10GbE-ER for 10-Gigabit Ethernet links up to 300m over Multimode Fiber (MMF), 10Km over Single Mode Fiber (SMF), and 40Km over Single Mode Fiber (SMF), respectively.

The FWS X-series comes built with 4-port SFPs for use with 1000Base-X Gigabit Ethernet interfaces supporting a wide range of Gigabit Ethernet 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 120km over SMF, respectively.

Higher levels of link resilience can be implemented by deploying dual-homed and redundant 10-GbE uplinks enabled with 802.3ad, Per-VLAN Spanning Tree (PVST/PVST+), Protected-Link, or Load-sharing 802.1Q trunks 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 FWS X-series the ideal intelligent enterprise switch to deliver 10-GbE from the edge to the core.

Enterprise Application

## Low Cost GoC+10-GbE Solution for the Enterprise Campus

Foundry's FWS X-series is ideal for delivering high-density and low-cost Gigabit over Copper (GoC), and 10-GbE solution for the enterprise campus. The FWS X424 and FWS X448 can be fitted with 1-port or 2-port 10-GbE modules, which use the state-of-the-art "10-Gigabit small form factor pluggable" optics (XFP optics). With two ports of 10-GbE, network managers can easily build redundancy in their campus network and take advantage of low cost XFP optics priced much lower than XENPAK optics.

As shown in figure 4, the FWS X-series can be used to deliver GoC to the desktop, high-density aggregation within the distribution layer, and GoC connectivity for high-performance computing, grid-computing, and network-attached storage. Support for jumbo frames of up to 9,192 bytes ensures faster file transfer between high-end servers within the data center and assists in reducing server CPU load. The 10-GbE uplinks within the FWS X-series ensures that the data center can be easily connected to Foundry's BigIron MG8, enabling concurrent support for low-latency applications such as VoIP, mission-critical applications such as manufacturing resource planning, and high volume network traffic such as remote backup.

High-Capacity 10-GbE Solution for the Enterprise Distribution and Data Center

Enterprise customers that demand high-capacity 10-GbE networking within the collapsed aggregation, distribution and data center can combine the FWS X-series with Foundry's BigIron MG8. The FWS X-series includes IronWare that comes with high-availability features such as Protected-Link or Metro Ring Protocol (MRP) to ensure resiliency from any network outages. In addition, enterprise customers can rely on the FWS X-series to deliver high-availability from any power outages for the collapse aggregation, distribution and the data center.
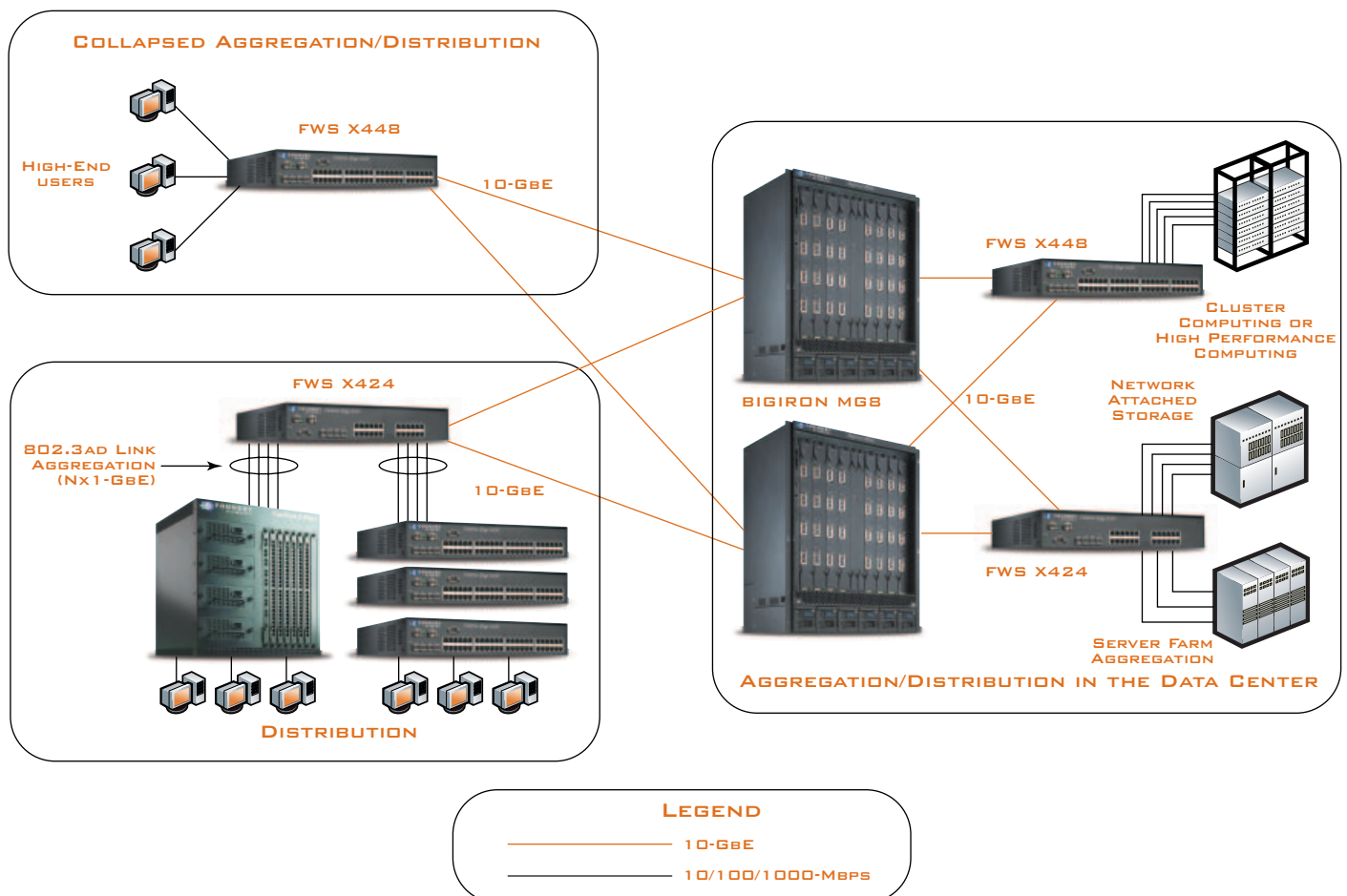
▶ *Figure 4: FWS X-series used to deliver a low-cost and high-speed 10-GbE enterprise campus.*

Foundry's FWS X-series can be installed in an enterprise's distribution layer to aggregate switches with its high-density GoC connections, and its 4-port SFP enables connectivity to upper floors within a building. The FWS X-series can be configured with two load-sharing and redundant AC power supplies—a requirement for network equipment used to aggregate many switches. Most fixed Ethernet solutions offer an external power supply to deliver redundancy, but this solution becomes cumbersome because network managers now have two units to manage and the combined RU size of the two units impacts wiring closet space.

Aside from power supply redundancy to deliver zero network downtime, the FWS X-series comes installed with Foundry's time-tested and proven IronWare software. IronWare software, which has been tested and used by thousands of Foundry customers including the U.S. Department of Defense (DoD), includes IronShield that protects the network and the equipment against any denial of service. In addition, IronWare comes with standard Layer 2 features such as 802.3ad and 802.1w.

Metro Service Provider Application

HIGH-PERFORMANCE, HIGH-AVAILABILITY AND COST-EFFECTIVE METRO ACCESS SOLUTION

Foundry's FWS X-series comes installed with IronWare, which includes metro features like Metro Ring Protocol, Virtual Switch Redundancy Protocol, Super Aggregated VLAN and Protected-Link. The FWS X-series includes support for jumbo frames up to 9,216 bytes, required for metro providers wanting to offer high-speed and high-value Ethernet services for storage and high-performance networking.

As shown in figure 5, the FWS X-series is ideal for 1-GbE service delivery within a 10-GbE metro access infrastructure. The FWS X-series can be equipped with a 2-port 10-GbE module that can be populated with one (1) or two (2) XFP optics capable of reaching distances of up to 40Km, allowing Metro Service Providers to connect various point-of-presence with 10-GbE. This solution optimizes the use of their fiber infrastructure and allow for the delivery of high-speed service offerings such as remote back-up or remote data center facilities.

The FWS X-series includes sFlow (RFC 3176)—an industry standard to deliver network-wide visibility for management and control. sFlow can be used by Metro Service Providers to deliver scalable end-user network accounting and billing and capacity planning. sFlow coupled with SNORT—a leading, open-source intrusion detection system—delivers an almost zero-cost security solution. Metro Service Providers can make high-end services such as detailed end-user billing and network intrusion prevention available to their customers.
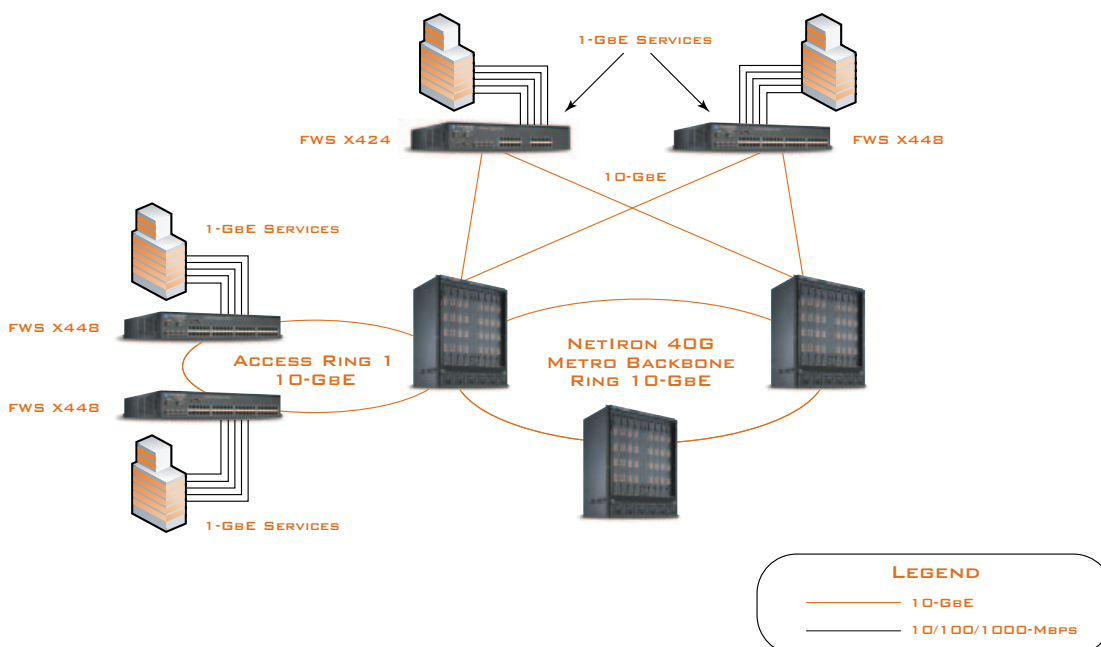
▶ *Figure—5: FWS X4 series for use within a metro service provider's access network.*

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, Dynamic VLAN, ACL, and MAC Filter Group Assignment
- 802.3 10Base-T
- 802.3 Ethernet Like MIB
- 802.3ad Link Aggregation (Dynamic and Static) and Trunk Groups
- 802.3u 100Base-TX
- 802.3z 1000Base-SX/LX/T
- 802.3ae 10-Gigabit Ethernet

LAYER 2 FEATURES

- 4,096 VLANs
- 16,000 MAC Addresses
- Protocol VLAN (802.1v), Private VLAN, Subnet VLAN
- Port Security (MAC Address Locking)
- Layer 2 ACLs
- Dual Mode VLANs
- Fast Port Span
- Protected-link
- Generic VLAN Registration Protocol
- MAC-Layer Filtering
- Mirror/Monitor Ports
- Per VLAN STP (PVST/PVST+)
- VLAN Groups
- Single-instance Spanning Tree
- Metro Ring Protocol (MRP)
- Virtual Switch Redundancy Protocol (VSRP)
- Uni-Directional Link Detection (UDLD)

QUALITY OF SERVICE

- 802.1p Mapping to Priority Queue
- MAC Address Mapping to Priority Queue
- ACL Mapping to Priority Queue
- ACL Mapping to ToS/DSCP
- ACL Mapping and Marking of ToS/DSCP
- DiffServ Support
- QoS Queue Management Using Weighted Round Robin and Strict Priority

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)
- HTTP (RFC 2068)
- 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
- Embedded Web Management

- sFlow (RFC 3176)
- 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)
- SNMP View-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 syslog 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

- **FWSX424:**
  - Switching Capacity 88-Gbps
  - Forwarding Rate 65-Mpps
- **FWSX448:**
  - Switching Capacity 136-Gbps
  - Forwarding Rate 101-Mpps

PHYSICAL DIMENSIONS

- **FWSX424:**
  - 2.63" (H) x 17.5" (W) x 19.6" (D)
  - 6.68cm (H) x 44.45cm (W) x 49.78cm (D)
- **FWSX448:**
  - 2.63" (H) x 17.5" (W) x 19.6" (D)
  - 6.68cm (H) x 44.45cm (W) x 49.78cm (D)

WEIGHT

- **FWSX424:**
  - 25 lbs (11.36 kg) Fully Loaded including dual redundant power
  - 17.5 lbs (7.95 kg) Empty
- **FWSX448:**
  - 29 lbs (11.36 kg) Fully Loaded including dual redundant power
  - 17.5 lbs (7.95 kg) Empty

ENVIRONMENTAL RANGES

- Acoustic: 47dB
- 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)
- Maximum Watts: 220W (750 BTU/Hr) per supply for the FWSX424 and 600W (2,047 BTU/Hr) per supply for the FWSX448
- Storage altitude: 10,000ft (3,000m) maximum

POWER REQUIREMENTS

- FWSX424 AC input voltage: 100vAC @ 3.5A MAX, 240vAC @ 1.5A MAX, 50-60Hz per auto-sensing, auto-switching power supply
- FWSX424 DC input voltage -40 to -60 vDC @ 8A MAX
- FWSX448 AC input voltage: 100vAC @ 9A MAX, 240vAC @ 2.5A MAX, 50-60Hz per auto-sensing, auto-switching power supply

SAFETY CERTIFICATIONS

- EN 60950
  - CAN/CS-C22.2 No. 60950-00
  - EN 60825-1 Safety of Laser Products—Part 1
  - EN 60825-2 Safety of Laser Products—Part 2
- IEC 950
- UL 1950 Third Edition
- CSA 950

ELECTROMAGNETIC EMISSION CERTIFICATIONS

- FCC Class A (Part 15)
- 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

Part Number	Description
FWSX424	FastIron Workgroup X424. Includes 20 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), and one AC power supply
FWSX424+1XG	FastIron Workgroup X424 . Includes 24 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 1-slot XFP 10-GbE module and one AC power supply
FWSX424+2XG	FastIron Workgroup X424. Includes 24 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 2-slot XFP 10-GbE module and one AC power supply
FWSX424-DC	FastIron Workgroup X424. Includes 24 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), and one DC power supply
FWSX424+1XG-DC	FastIron Workgroup X424. Includes 24 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 1-slot XFP 10-GbE module and one DC power supply
FWSX424+2XG-DC	FastIron Workgroup X424. Includes 24 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 2-slot XFP 10-GbE module and one DC power supply
FWSX448	FastIron Workgroup X448. Includes 48 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), and one DC power supply
FWSX448+1XG	FastIron Workgroup X448. Includes 48 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 1-slot XFP 10-GbE module, and one DC power supply
FWSX448+2XG	FastIron Workgroup X448. Includes 48 10/100/1000 ports (RJ-45), 4-port Combo GbE that can be used as 10/100/1000 (RJ-45) or SFP for fiber optics (SX, LX, LHA, and CWDM), 2-slot XFP 10-GbE module, and one DC power supply
X4-1XG	Field upgradeable 1-port 10-GbE XFP expansion module. Requires 10-GbE XFP optics
X4-2XG	Field upgradeable 2-port 10-GbE XFP expansion module. Requires 10-GbE XFP optics
10G-XFP-SR	10-GbE SR XFP optic, MMF, LC connector
10G-XFP-LR	10-GbE LR XFP optic, SMF, LC connector
10G-XFP-ER	10-GbE ER XFP optic, SMF, LC connector
RPS-X424	Redundant power supply (220W) for the FWS X424
RPSDC-X424	Redundant power supply (220W) for the FWS X424
RPS-X448	Redundant power supply (600W) for the FWS X448

FOUNDRY®
N E T W O R K S

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