FastIron GS Series

HIGH PERFORMANCE, INTELLIGENT
COMPACT POE SWITCHES

HIGHLIGHTS

- Compact, high performance 24-port and 48-port 10/100/1000 Mbps base models with field upgradeable Power over Ethernet (PoE) and a two-port 10 Gigabit Ethernet XFP/CX4 module for high-performance networking
- Industry leading IEEE 802.3af PoE Class 3 port capacity in a compact form factor supports a wide variety of environments including wiring closets and gigabit to the desktop deployments
- Advanced IronWare™ Layer 2 Ethernet switching with robust suite of security capabilities including ACLs, MAC filters, TCP SYN and ICMP denial of service protection, Spanning Tree BPDU Guard, Root Guard, unicast, broadcast and multicast rate limiting, 802.1X authentication and enhanced CALEA compliance features
- Base Layer 3 key features: routing for directly connected subnets, ability to announce RIP v1/v2 routes, static routes, virtual and routed interfaces, DHCP relay, VRRP and IPv6 management
- Open and standards-based network access control features multi-host 802.1x access control, multi-device MAC authentication, and policy-controlled MAC-based VLANs
- Packet latency less than 5 microseconds and advanced Quality of Service (QoS) supporting eight priority queues and combined strict priority and weighted round robin scheduling for dependable and high-quality network convergence
- IronShield™ 360 intrusion protection delivers dynamic, real-time protection from network and host-based attacks
- Concurrent port mirroring and sFlow packet sampling enable network-wide traffic monitoring for traffic accounting, intrusion detection, 802.1x identity monitoring, link utilization, and fault isolation

FOUNDRY NETWORKS

Overview

Foundry Networks FastIron GS Series are enterprise-class Layer 2/Base Layer 3 switches that are ideal access layer switches, for medium to large enterprises deploying converged applications with adjustable changing business needs, without compromising performance and reliability.

The FastIron GS Series provides enterprise organizations with a scalable, convergence-ready solution in a compact form that features the benefit of a "pay-as-you-grow" architecture. Featuring high-density power over Ethernet, redundant power, 10-GE upgradeability for high capacity connectivity to the network backbone, the FastIron GS delivers the scalability, quality of service assurance, resilience and VoIP-readiness that are needed to implement a high-value converged solution that can scale to meet future growth at the network edge.

Combining Fast Ethernet, Gigabit Ethernet and Power over Ethernet with a feature rich, secure, high reliability solution and intelligent fault detection, the FastIron GS Series offers maximum productivity and investment protection, while enabling the deployment of new applications such as IP telephony, wireless access, WebTV, video surveillance, building management systems, triple play – voice, video and data, and remote video kiosks in a cost-effective and high-performance compact design.

The FastIron GS Series can also be deployed in metro area networks connecting branch offices with 10GbE uplinks. In this environment, important features include Foundry's Metro Ring Protocol for building resilient ring-based topologies, VLAN stacking, and advance multicast capabilities including IGMP v1/v2/v3 and

MLD v1/v2 snooping for controlling multicast traffic in high-bandwidth content distribution applications.

In addition, the FastIron GS switches are optimized for flexibility with upgradeability for PoE, 10-Gigabit Ethernet, and redundant power in a 1.5 rack unit height. The diverse range of switch configurations includes three PoE-ready base models and three PoE upgradeable base models.

- The 3 PoE-ready models are:
  - **FastIron GS 624P-POE**, 24 x 10/100/1000 Mbps PoE ports
  - **FastIron GS 624XGP-POE**, 24 x 10/100/1000 Mbps PoE ports
  - **FastIron GS 648P-POE**, 48 x 10/100/1000 Mbps PoE ports,
- The 3 PoE upgradeable models are:
  - **FastIron GS 624P**, 24 x 10/100/1000 Mbps ports
  - **FastIron GS 624XGP**, 24 x 10/100/1000 Mbps ports
  - **FastIron GS 648P**, 48 x 10/100/1000 Mbps ports

The three PoE upgradeable models offer customers a future-proof "pay-as-you-go" solution by allowing them to upgrade to PoE after deployment.

TARGET APPLICATIONS

Offering a powerful set of Layer 2 switching and base Layer 3 routing capabilities, extensive security features, bandwidth scalability, and compact design, the FastIron GS Series is well suited to support a broad range of applications including:

- **Enterprise:** High bandwidth network access for desktop applications, PoE endpoints and wireless access point aggregation, VoIP, triple-play and wireless LAN deployment
- **Education:** Secure network access connectivity for K-12 and universities
- **Metro networks:** cost-effective in-building MTU or CPE for unicast and multicast services delivery

Primary Features and Benefits

PERFORMANCE AND SCALABILITY

Today's business and networking applications continue to consume more bandwidth and deploy convergence applications. A future-ready network needs to scale to support the growing and evolving demands of these environments.

FastIron GS customers will benefit from the systems' wire-speed switching architecture and ability to support high density full Class 3 PoE and multiple 10GbE ports.

Convergence planning and network implementation can occur over an extended period, and budget constraints may require phased deployments. The FastIron GS Series makes it easy to deploy a solution today that can be upgraded later to support PoE and 10-GbE when needed.

Each power supply within a FastIron GS switch has up to 480 watts of PoE power. In a dual power configuration, up to 48 10/100/1000 Mbps PoE ports of 15.4 watts per port can be supported. This scalability enables the network manager to size the installation to meet current needs and have room for future growth.

As network traffic increases, network managers can easily upgrade to 10-GbE to provide high-capacity connectivity to the network backbone and/or high-performance server. The FastIron GS can be upgraded in the field with a two-port 10-GbE XFP/CX4 module.

The optional 10-Gigabit Ethernet (10-GbE) module is offered in three field upgradable models: the FGS-2XG supporting two small form factor pluggable XFP transceivers, the FGS-2XGC supporting two CX4 connectors, and the FGS-1XG1XGC supporting a combination of XFP transceiver and CX4 connector. Supported transceivers include SR, LR, ER, ZR, CX4, 1310-MM, and ZRD optics supporting fiber lengths up to 80Km. Network managers have the flexibility to upgrade to 10-GbE to future-proof the network and protect their network investment.

HIGH AVAILABILITY HARDWARE FEATURES

Convergence solutions such as Voice over IP (VoIP) require high availability, especially for the power supplies that power the PoE interfaces. FastIron GS switches fulfill this requirement with dual, hot-swappable AC or DC power supplies. Redundant power configurations include redundant AC, and redundant DC power configurations.

The FastIron GS Series features 1+1 power redundancy, using hot-swappable and field replaceable power modules, which install into the rear of the unit. The power modules are load-sharing supplies providing full 1+1 redundancy for as many as 48 Class 1 and Class 2 PoE ports and 31 Class 3 (15.4 watts) PoE ports.

Additional design features include intake and exhaust temperature sensors and fan spin detection to aid in rapid detection of abnormal or failed operating conditions to help minimize mean time to repair.

HIGH DENSITY POWER OVER ETHERNET

The FastIron GS Series supports 15.4 watts of power on all ports simultaneously. This capacity is a significant advantage for environments that require higher power for devices such as surveillance cameras, color LCD phones, point-of-service terminals, and other powered endpoints.

The FastIron GS switches' capability to deliver high-density, full-power PoE on all ports reduces the need to purchase additional hardware to support the higher power requirements. For the 24-port FastIron GS 624P-POE model, the system can support full 1+1 redundancy for 24 Class 1, Class 2, or Class 3 PoE ports. The 48-port FastIron GS 648-POE supports up to 48 10/100/1000 Class 3 (15.4 watts) PoE ports, which is one of the highest Class 3 PoE port density in the industry for a compact switch.

EASE OF USE: PLUG AND PLAY

The FastIron GS Series supports the IEEE 802.1AB LLDP and ANSI TIA 1057 LLDP-MED standards enabling organizations to build open convergence, advanced multi-vendor networks. LLDP greatly simplifies and enhances network management, asset management and network troubleshooting. For example it enables discovery of accurate physical network topologies, including those which have multiple VLANs where all subnets may not be known. LLDP-MED addresses the unique needs that voice and video

demand in a converged network by advertising media and IP telephony specific messages that can be exchanged between the network and the endpoint devices. LLDP-MED provides exceptional interoperability, IP telephony troubleshooting and automatic deployment of policies, inventory management, advanced PoE power negotiation and E911 location/emergency call service. These sophisticated features make converged networks services easier to install, manage and upgrade and significantly reduce operations costs.

The FastIron GS Series supports DHCP client-based auto-configuration, simplifying customer deployment and configuration providing true Plug-and-Play. Enterprises can use this feature to automate the IP address and feature configuration of FastIron GS switches without the presence of a highly-trained network engineer on-site. Technicians can simply power up a new FastIron GS and the unit will automatically get its IP address and configuration from DHCP and TFTP servers. Auto-configuration provides an intelligent solution to reduce OPEX while simplifying network management.

COMPREHENSIVE ENTERPRISE-CLASS EDGE SECURITY AND QUALITY OF SERVICE ASSURANCE

FastIron GS switches are powered by Foundry's IronWare operating software, which offers a rich set of Layer 2 switching services, Base Layer 3 functionality, an advanced security suite for network access control (NAC) and denial of service protection, and quality of service (QoS). IronWare security features include protection against TCP SYN and ICMP denial of service (DoS) attacks, Spanning Tree Root Guard and BPDU Guard to protect network spanning tree operation, and broadcast and multicast packet rate limiting.

IronWare advanced QoS controls include honoring, prioritizing, classifying, and marking Ethernet and IP traffic, enabling the switches to honor VoIP traffic using 802.1p priority and IP Type of Service and DiffServ Codepoints (TOS/DSCP).

In today's heightened security environment there may be a need to set up traffic intercept, for example in the case of the US Communications Assistance for Law Enforcement Act (CALEA) compliance that requires businesses be able to intercept and replicate data traffic directed to a particular user, subnet, port, etc. This is particularly essential with networks implementing IP phones. The FastIron GS provides the capability necessary to support this requirement through ACL-Based Mirroring, MAC filter-Based Mirroring and VLAN-Based Mirroring. Network managers can apply a "mirror ACL" on a port and mirror a traffic stream based on IP source/destination address, TCP/UDP source/destination ports and IP protocols such as ICMP, IGMP, TCP, UDP. A MAC filter can be applied on a port and mirror a traffic stream based on a source/destination MAC address. VLAN-base mirroring is another option for CALEA compliance. Many enterprises have service-specific VLANs, such as voice VLANs. With VLAN mirroring all traffic on an entire VLAN within a switch can be mirrored or specific VLANs can be transferred to a remote server.

FastIron GS Series switches come standard with IronShield security features, including denial of service (DoS) prevention, IEEE 802.1X port security and username export in sFlow for encrypted EAP transaction and clear transactions, user-based dynamic policy deployment using 802.1X, standard and extended access control lists, MAC filters and policy-controlled MAC-based VLAN, and private VLANs.

FastIron GS features IronShield 360, Foundry's unique and powerful closed loop threat mitigation solution. IronShield 360 is a system-side security solution that uses best-of-breed intrusion detection systems to inspect sFlow traffic samples for possible network attacks. In response to a detected attack, IronView Network Manager can apply a security policy to the compromised port. This automated threat detection and mitigation stops network attacks in real time, without human intervention.

Network managers can rely on features such as multi-device and 802.1X authentication with dynamic policy assignment to control network access and perform targeted authorization on a per-user level. Additionally, the FastIron GS supports enhanced static MAC with the ability to deny traffic to and from a MAC address on a per-VLAN basis allowing network managers to control and deploy access policies per endpoint MAC address. This provides network administrators with a powerful tool for controlling access policies per endpoint device.

The FastIron GS Series supports Foundry's IronShield 360 security solution for detecting and mitigating zero-day (i.e., anomaly-based) and known (i.e., signature-based) network attacks. IronShield leverages hardware-based sFlow packet sampling technology embedded in FastIron GS switches. The combination of sFlow packet sampling, Foundry's IronView Network Manager (INM), and Snort intrusion detection protects the enterprise from network attacks. This advanced security capability provides a network-wide security umbrella without the added complexity and cost of ancillary sensors.

Standards-based NAC enables network operators to deploy best-of-breed NAC solutions for authenticating network users and validating the security posture of a connecting device. Support for policy-controlled MAC-based VLANs provides additional control of network access, allowing for policy-controlled assignments of devices to Layer 2 VLANs.

ADVANCED MULTICAST FEATURES

FastIron GS switches support a rich set of Layer 2 multicast snooping features that enable advanced multicast services delivery. Internet Group Management Protocol (IGMP) snooping for IGMP version 1, 2, and 3 is supported. Support for IGMPv3 source-based multicast snooping improves bandwidth utilization and security for multicast services.

To enable multicast service delivery in IPv6 networks, the FastIron GS supports Multicast Listener Discovery (MLD) version 1 and 2 snooping, the multicast protocols used in IPv6 environments.

BUILDING RESILIENT NETWORKS WITH ADVANCED LAYER 2 AND BASE LAYER 3 PROTOCOLS

Software features such as Virtual Switch Redundancy Protocol, Foundry's Metro Ring Protocol, Rapid Spanning Tree Protocol, protected link groups, and 802.3ad Link Aggregation and trunk groups provide alternate paths for traffic in the event of a link failure. Sub-second fault detection utilizing Link Fault Signaling and Remote Fault Notification ensures rapid fault detection and recovery.

Enhanced Spanning Tree features such as Root Guard and BPDU Guard prevent rogue hijacking of Spanning Tree root and maintain a contention and loop free environment especially during dynamic network deployments. FastIron GS software and hardware features provide a robust and resilient infrastructure solution in a cost-effective and compact form.

Base Layer 3 functionality enhances the capability of the FastIron GS as an edge platform. Base Layer 3 allows customers to use simple Layer 3 features such as IPv4 static routes, virtual interfaces (VE), routing between directly connected subnets, RIPv1/v2 announce, VRRP, DHCP Relay and routed interfaces. Network managers can remove complexity from an end- to-end Layer 3 network design and eliminate the cost required for a full Layer 3 edge switch.

UNIFIED AND SECURE ELEMENT MANAGEMENT

Foundry's IronView Network Manager (INM) provides unified network management for the FastIron GS Series. INM greatly simplifies network operations, provisioning, troubleshooting and alarm reporting. INM offers multilevel access security on the console and secure Web management interface that prevents unauthorized users from accessing or changing the switch configuration.

INM employs a Java-based network configuration and management tool that displays, in graphical detail, network and application level traffic information. This allows network managers to accurately monitor overall networking operation, zero in on hot spots, and quickly diagnose and troubleshoot difficulties before they develop into widespread network problems.

The FastIron GS Series includes Secure Shell (SSHv2), Secure Copy, and SNMPv3 to restrict and encrypt management communications to the system. Additionally, support for Terminal Access Controller Access Control System (TACACS/TACACS+) and RADIUS authentication ensure secure operator access.

FAULT DETECTION

The FastIron GS switches provide both logical fault detection and physical fault isolation capability. Logical fault detection is supported through software features such as Link Fault Signaling (LFS), Remote Fault Notification (RFN), Protected Link Groups and Uni-directional Link Detection (UDLD).

- Link Fault Signaling (LFS) is a physical layer protocol that enables communication on a link between two 10 Gigabit Ethernet switches. When configured on a 10 Gigabit Ethernet port, the port can detect and report fault conditions on transmit and receive ports.
- Remote Fault Notification (RFN) enabled on 1Gb transmit ports notifies the remote port whenever the fiber cable is either physically disconnected or has failed. When this occurs the device disables the link and turns OFF both LEDs associated with the ports.
- Protected Link Groups minimize disruption to the network by protecting critical links from loss of data and power. In a protected link group, one port in the group acts as the primary or active link, and the other ports act as secondary or standby links. The active link carries the traffic. If the active link goes down, one of the standby links takes over.
- UDLD monitors a link between two FastIron GS switches and brings the ports on both ends of the link down if the link goes down at any point between the two devices.

Physical fault isolation on the FastIron GS switches is supported through ***Virtual Cable Test*** (VCT) technology. VCT technology enables diagnosing a conductor (wire or cable) by sending a pulsed signal into the conductor, then examining the reflection of that pulse. By examining the reflection, the FastIron GS switches can detect and report cable statistics such as local and remote link pair, cable length, and link status.

The FastIron GS also supports enhanced Digital Optical Monitoring of Foundry XFP optics providing real time detection resulting in reduced down time. Network managers can use the enhanced Digital Optical Monitoring capability to monitor the health and strength of the transceivers. Key optic parameters that can be monitored include TX/RX power, temperature and bias current. The switch will generate alarms when any of these parameters go beyond the normal range.

In addition, the FastIron GS supports network loop detection and stability features such as Port Flap Dampening, single link LACP and Port Loop Detection. Port Flap Dampening feature increases the resilience and availability of the network by limiting the number of port state transitions on an interface. This reduces the protocol overhead and network inefficiencies caused by frequent state transitions occurring on misbehaving ports. Single Link LACP can be used as a bi-directional link detection protocol. This solution appeals to customers because it is standards-based and works with other switch vendors. The Port Loop Detection feature enables network managers to detect and prevent Layer 1 and Layer 2 loops without using STP. Customers that do not enable a Layer 2 Protocol, such as STP to detect physical loops at the edge, can use Port Loop detection. Port Loop detection can be used to detect loops occurring on a port and within an entire network.

Key Features and Benefits

FEATURES	BENEFITS
Flexible and High-Capacity Architecture	▶ 24- and 48-port 10/100/1000-Mbps (RJ-45) Power over Ethernet (PoE) models ▶ 24- and 48-port 10/100/1000-Mbps (RJ-45) PoE upgradeable models ▶ Field upgradeable 2-port 10-GbE XFP/CX4 module that supports SR, LR, ER, ZR, CX4, 1310-MM and ZRD XFP optics ▶ Up to two redundant, removable, and load-sharing power supplies ▶ Efficient space-saving form factor with front-facing data ports and a built-in temperature monitor sensor
Robust Power over Ethernet	▶ Standards-based IEEE 802.3af PoE support ▶ Up to 48 ports of 10/100/1000 Mbps PoE, 15.4 watts per port using the 48-port model configured with two power supplies ▶ Fully redundant 1+1 power configurations: – 24-port PoE model with two power supplies supports up to 15.4W for each port – 48-port PoE model with two power supplies supports up to 10W for each port ▶ PoE auto-detection enables support for PoE and non-PoE devices without configuration changes ▶ Per-port LED indicators to easily identify power-consuming devices ▶ Per-port short circuit protection to supply system protection ▶ Software accessible system and per port power consumption ▶ Power redundancy for increased reliability ▶ Interoperability with popular VoIP equipment, including legacy IP phones ▶ Advanced QoS capabilities ensure high quality VoIP support ▶ LLDP-MED and voice VLAN
IronShield Advanced Security	▶ Multilevel access security for console access ▶ IronShield 360—System-wide, automated closed-loop threat detection and mitigation solution ▶ Secure, Web-based management ▶ Secure Shell and SNMPv3 restrict and encrypt communications to the management interface and system ▶ Terminal Access Controller Access Control Systems (TACACS/TACACS+) and RADIUS operator authentication ▶ Secure Shell (SSHv2), SCP, and SNMPv3 secure remote management access and communications ▶ MAC filters, Layer 3/Layer 4 ACLs and binding the ACL to TELNET, Web management and SNMP interface for secure management access ▶ IEEE 802.1x authentication including multiple device authentication and dynamic VLAN, ACL, and MAC filter assignment for authenticated clients ▶ Private VLANs provide security and isolation between switch ports to help ensure that users cannot snoop on other users' traffic ▶ Denial of Service Protection—Monitoring, throttling, and locking out of ICMP and TCP SYN traffic both to the management address of the switch and for transit traffic ▶ Port Security and MAC Address Locking limits the number MAC addresses learnt on a port. Using Port Security network managers can allow specific MAC addresses access to the network for specific time periods. ▶ MAC address authentication including multiple device authentication and dynamic policy configuration ▶ Policy-controlled MAC-based VLANs provides additional control of network access, allowing for policy-controlled assignments of devices to Layer 2 VLANs.
Advanced Quality of Service	▶ Packet classification, reclassification, policing, marking, and re-marking ▶ Identification, classification, and reclassification of traffic based on specific criteria such as port, source/destination MAC address, 802.1p priority bit, source/destination IP address, Type of Service (ToS), Differentiated Services Codepoints (DSCP), or TCP/UDP port ▶ Flexible queue servicing utilizing configurable Weighted Round Robin (WRR), Strict Priority (SP), or hybrid SP/WRR ▶ 8 hardware queues for flexible QoS management ▶ Ingress rate limiting—standard and extended ACL control ▶ ACLs configured on a per-port per VLAN basis ▶ Egress rate limiting—per port, per queue ▶ Support for up to 256 wire-speed ingress traffic policers with each policer supporting configurable metering with maximum and burst size settings, color aware and out-of- profile packet remarking or dropping ▶ sFlow and port mirroring on the same port
System and Network Resilience	▶ Internal, redundant, hot-swappable, load sharing power supplies for increased PoE reliability ▶ Advanced Layer 2 service protection features: Metro Ring Protocol, Virtual Switch Redundancy Protocol, Rapid Spanning Tree, Multiple Spanning Tree, Per VLAN Spanning Tree (PVST, PVST+), Protected Link groups, Link Fault Signaling (LFS), Remote Fault Notification (RFN) ▶ Port range with port speed downshift and selective auto negotiation ▶ Port loop detection to detect Layer 1/Layer 2 loops ▶ Image checksum verification ▶ Next boot information ▶ Port flap dampening ▶ Single link LACP as a standards-based bi-directional link detection protocol ▶ Auto-configuration

System Summary




FEATURE	FGS624P FGS624XGP	FGS648P	FGS624P-POE FGS624XGP-POE	FGS648P-POE
Switching Performance	108 Gbps	136 Gbps	108 Gbps	136 Gbps
Forwarding Performance	85 Mpps	106 Mpps	85 Mpps	106 Mpps
10/100/1000 Port Density	20 plus 4-port Combo	44 plus 4-port Combo	20 plus 4-port Combo	44 plus 4-port Combo
10/100/1000 Mbps PoE Density with 15.4W each	24 (optional)	48 (optional)	24 (1 PSU)	48 (2 PSU)
10/100/1000 Mbps PoE Density with 10W each	24 (optional)	48 (optional)	24 (1 PSU)	48 (1 PSU)
100/1000 Mbps SFP Density	4 Combo Ports	4 Combo Ports	4 Combo Ports	4 Combo Ports
10-Gigabit Ethernet	2 (FGS624P) 3 (FGS624XGP)	2	2 (FGS624P-POE) 3 (FGS624XGP-POE)	2
100 Mbps Optics	100FX and 100Base-BX	100FX and 100Base-BX	100FX and 100Base-BX	100FX and 100Base-BX
Gigabit Ethernet Optics	SX, SX2, LX, LHA, LHB, 1000Base-BX, and CWDM			
10 Gigabit Ethernet Optics	CX4, 1310-MM[1],SR, LR, ER, ZR, and ZRD			
AC and DC Power Supply	Yes	Yes	Yes	Yes
Power Supply Redundancy	1+1 Load Sharing	1+1 Load Sharing	1+1 Load Sharing	1+1 Load Sharing
Maximum Number of MAC addresses	16,000	16,000	16,000	16,000
Maximum Number of VLANs	4,096	4,096	4,096	4,096
Maximum Number of STP	255	255	255	255
IGMP Snooping	v1,v2 and v3	v1,v2 and v3	v1,v2 and v3	v1,v2 and v3
MLD Snooping	v1 and v2	v1 and v2	v1 and v2	v1 and v2
PIM-SM Snooping	Yes	Yes	Yes	Yes
IGMP Proxy for Static Groups	Yes	Yes	Yes	Yes
Rate Limiting	Inbound and Outbound	Inbound and Outbound	Inbound and Outbound	Inbound and Outbound
L3/L4 Extended Access Control List	Yes	Yes	Yes	Yes
Stability Features	BPDU and Root Guard, Single Link LACP, Port Loop Detection, Port Flap Dampening, Trunk Threshold			
Maximum Number of Ports per Trunk	8	8	8	8
Number of Trunk Groups	13 (FGS624P) 13 (FGS624XGP)	25 (FGS648P)	13 (FGS624-POE) 13 (FGS624XGP-POE)	25 (FGS648P-POE)
Multi-device Authentication and Dynamic VLAN Assignment	Yes	Yes	Yes	Yes
802.1X Authentication and Dynamic VLAN Assignment	Yes	Yes	Yes	Yes
MAC-based VLANs	Yes	Yes	Yes	Yes
Metro Features	Metro Ring Protocol, Virtual Switch Redundancy Protocol, VLAN Stacking (Q-in-Q)[2] and Topology Groups			

[1] Foundry's 10G-XFP-1310-MM transceivers support 10-GbE operation on up to 200 meters of FDDI-grade MM fiber. This transceiver is compatible with 10GBase-LRM optics.
[2] Q-in-Q is supported on the FGS648P and FGS648P-POE only.

Technical Specifications

STANDARDS COMPLIANCE

- IEEE 802.1D-1998 MAC Bridging
- IEEE 802.1q/p VLAN Tagging
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.1X Port-based Network Access
- IEEE 802.3 10Base-T
- IEEE 802.3ak CX4
- IEEE 802.3ad Link Aggregation (Dynamic and Static)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3u 100Base-TX
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000Base-SX/LX
- IEEE 802.3ab 1000baseT
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3 MAU MIB (RFC 2239)
- IEEE 802.3AB LLDP/LLDP-MED
- IEEE 802.1p Mapping to Priority Queue

LAYER 2 FEATURES

- 4,096 VLANs
- 16,000 MAC Addresses
- 802.1s Multiple Spanning Tree
- Per VLAN spanning tree (PVST/PVST+/PVRST)
- Foundry's Protocol VLAN
- Private VLAN
- Protocol VLAN (802.1v), Subnet VLAN
- Policy controlled MAC-based VLANs
- MAC Learning Disable
- Port Security
- MAC Address Locking
- Port-based Access Control Lists
- Dual Mode VLANs
- Fast Port Span
- BPDU Guard, Root Guard
- GARP VLAN Registration Protocol
- MAC-Layer Filtering
- Port-based, ACL-based, MAC filter-based, and VLAN-based Mirroring
- VLAN Groups
- Single-instance Spanning Tree
- Trunk groups
- Trunk threshold
- Single link LACP
- Uni-Directional Link Detection (UDLD)
- Auto MDI/MDIX
- Port speed downshift and selective auto-negotiation
- Dynamic Voice VLAN Assignment
- Jumbo Frames up to 10,240 bytes for 10/100/1000 and 10GbE ports
- IGMP Snooping (v1/v2/v3)[1]
- MLD Snooping (v1/v2)
- PIM–SM Snooping
- Private VLANs and uplink-switch
- Protected Link Groups
- Port Loop Detection
- VLAN based Static MAC Denial
- Flexible static MAC address configuration

LAYER 2 METRO FEATURES

- VLAN stacking/Q-in-Q[2]
- Metro Ring Protocol (MRP I)
- Virtual Switch Redundancy Protocol
- Topology Groups
- Super Aggregated VLANs (SAV)

BASE LAYER 3 FEATURES

- Virtual Interfaces (VE)
- Routed Interfaces
- IPv4 Static Routes
- Routing between directly connected subnets
- RIP v1/v2 announce
- Virtual Route Redundancy Protocol
- DHCP Relay

QUALITY OF SERVICE

- MAC Address Mapping to Priority Queue
- ACL Mapping to Priority Queue
- ACL Mapping to ToS/DSCP
- Honoring DSCP and 802.1p
- ACL Mapping and Marking of ToS/DSCP
- DiffServ Support
- Classifying and Limiting Flows based on TCP flags
- DHCP Relay
- QoS Queue Management Using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP

TRAFFIC MANAGEMENT

- Inbound Rate Limiting per port
- ACL-based inbound rate limiting and traffic policies
- Outbound Rate Limiting per port and per queue
- Broadcast, Multicast and unknown Unicast Rate Limiting

MANAGEMENT AND CONTROL

- Virtual Cable Tester
- RFC 2571 Architecture for Describing SNMP Framework
- RFC 2131 DHCP Relay
- RFC 1493 Bridge MIB
- Configuration Logging
- RFC 1643 Ethernet Interface MIB
- RFC 1643 Ethernet MIB
- Foundry Discovery Protocol (FDP)
- RFC 2068 Embedded HTTP
- RFC 2818 Embedded HTTPS
- Industry Standard Command Line Interface (CLI)
- Integration with HP OpenView for Sun Solaris, HP-UX, IBM's AIX, and Windows NT Standalone Windows NT
- IronView Network Manager (INM) Web-based graphical user interface
- Embedded Web Management
- RFC 3176 sFlow
- RFC 1213 MIB-II
- RFC 1516 Repeater MIB
- RFC 1724 RIP v1/v2 MIB
- RFC 1757 RMON MIB
- RFC 2572 SNMP Message Processing and Dispatching
- RFC 1573 SNMP MIB II
- RFC 2575 SNMP View-based Access Control Model SNMP
- RFC 1157 SNMPv1/v2c
- RFC 2573 SNMPv3 Applications
- RFC 2570 SNMPv3 Intro to Framework
- RFC 2574 SNMPv3 User-based Security Model
- SNTP Simple Network Time Protocol
- Support for Multiple syslog Servers
- RFC 854 TELNET Client and Server
- RFC 783 TFTP
- MIB support for MRP, Port Security, MAC authentication and MAC-based VLANs
- IPv6 Management (for Layer 2 and Base Layer 3)
- Display log messages on multiple terminals
- Auto-configuration

PERFORMANCE

FastIron GS 624P/624P-POE

- Switching Capacity 108 Gbps
- Forwarding Performance 161 Mpps

FastIron GS 648P/648P-POE

- Switching Capacity 216 Gbps
- Forwarding Performance 202 Mpps

ELEMENT SECURITY OPTIONS

- IEEE 802.1X username export in sflow
- Authentication, Authorization, and Accounting (AAA)
- Bi-level Access Mode (Standard and EXEC Level)
- Protection for Denial of Service attacks
- RADIUS/TACACS/TACACS+
- Secure Copy (SCP)
- Secure Shell (SSHv2)
- Username/Password
- Advanced Encryption Standard (AES) with SSHv2

PHYSICAL DIMENSIONS

All FastIron GS models:

- 2.63" (H) x 17.5" (W) x 19.6" (D)
- 6.68 cm (H) x 44.45 cm (W) x 49.78 cm (D)

WEIGHT

FastIron GS 624 models:

- 25 lbs (11.36 kg)—Fully Loaded including dual redundant power
- 17.5 lbs (7.95 kg) Empty

FastIron GS 648 models:

- 29 lbs (11.36 kg)—Fully Loaded including dual redundant power
- 17.5 lbs (7.95 kg) Empty

ENVIRONMENTAL RANGES

- Acoustic: 51 dB
- Operating temperature: 32° to 104°F (0° to 40°C)
- Relative humidity: 5% to 95%, non-condensing
- Storage temperature: -23° to 158°F (-25° to 70°C)
- Maximum watts: 600W (2,047 BTU/Hr) per supply
- Storage altitude: 10,000ft (3,000m) maximum

MTBF

- FastIron GS 624P with 4 SFP, 2-port 10GbE, and 2 RPS-FGS—267,411 hours
- FastIron GS 648P with 4 SFP, 2-port 10GbE, and 2 RPS-FGS—218,140 hours
- FGS-2XG with 2 XFP (LRs)—1,597,580 hours
- RPS-FGS—346,230 hours

POWER REQUIREMENTS

RPS-FGS, RPS-X448, RPS-X424-POE or RPS8

- Operating 85VAC to 254VAC input, universal/wide input
- Rated 100 to 240VAC ~ 50/60 Hz @ 8amp to 3.2amp
- 600 watts of total output power

RPSDC-FGS, RPSDC-X448, RPSDC-X424-POE or RPS8DC

- Operating 40VDC to 60VDC input, universal/wide input
- Rated -48 to 60VDC @ 18amp to 14.3 amp
- 600 watts of total output power

SAFETY CERTIFICATIONS

- EN 60950-1
- CAN/CS-C22.2 No. 60950-1-03
- EN 60825-1 Safety of Laser Products—Part 1
- EN 60825-2 Safety of Laser Products—Part 2
- IEC 950
- UL 1950 Third Edition
- UL 60950-1
- CSA 950

ELECTROMAGNETIC EMISSION CERTIFICATIONS

- FCC Class A (Part 15)
- EN 55022/CISPR-22 Class A
- VCCI Class A

IMMUNITY

- Generic: EN 50082-1

ENVIRONMENTAL REGULATORY COMPLIANCE

- RoHS Compliant (5 of 6)
- WEEE compliant

WARRANTY

- 5-year Limited Lifetime Hardware Warranty
  - Foundry warrants that, excluding the power supply, fan, removable optics and LED, the product hardware will be free from defects in material and workmanship that result in a material deviation from the applicable published Foundry technical specifications.
- 90-days Limited Software Warranty
  - Foundry warrants that software, when used in accordance with the terms of the Foundry license, will operate substantially as set forth in the applicable Foundry Documentation following delivery of the software to licensee.

[1] (S,G) for Layer 2 and (*,G) for Base Layer 3
[2] Q-in-Q is supported on the FGS648P and FGS648P-POE only.

Ordering Information

PART NUMBER	DESCRIPTION
FGS624P	FastIron GS 624P with 20-port 10/100/1000 Mbps (RJ-45), 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS624P-DC	FastIron GS 624P-DC with 20-port 10/100/1000 Mbps (RJ-45), 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 DC power supply
FGS624P-POE	FastIron GS 624P-POE with 20-port 10/100/1000 802.3af, 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS624P-POE-DC	FastIron GS 624P-POE with 20-port 10/100/1000 802.3af, 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 DC power supply
FGS624XGP	FastIron GS 624XGP with 20-port 10/100/1000 Mbps (RJ-45), 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, 1-port XFP 10 Gigabit Ethernet, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS624XGP-DC	FastIron GS 624XGP with 20-port 10/100/1000 802.3af, 4-port Combo copper/fiber Gigabit Ethernet ports for use with 10/100/1000 Mbps (RJ45) or 100/1000 Ethernet Fiber (SFP), 1-port XFP 10 Gigabit Ethernet, and one removable, redundant DC power supply. Unit includes a slot for use with a 2-port 10 Gigabit Ethernet module.
FGS624XGP-POE	FastIron GS 624P-POE with 20-port 10/100/1000 802.3af, 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, 1-port XFP 10 Gigabit Ethernet, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS624XGP-POE-DC	FastIron GS 624XGP-POE with 20-port 10/100/1000 802.3af, 4-port Combo copper/fiber Gigabit Ethernet ports for use with 10/100/1000 Mbps (RJ45) or 100/1000 Ethernet Fiber (SFP), 1-port XFP 10 Gigabit Ethernet, and one removable, redundant DC power supply. Unit includes a slot for use with a 2-port 10 Gigabit Ethernet module.
FGS648P	FastIron GS 648P with 44-port 10/100/1000 Mbps (RJ-45), 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS648P-DC	FastIron GS 648P-DC with 44-port 10/100/1000 Mbps (RJ-45), 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 DC power supply
FGS648P-POE	FastIron GS 648P-POE with 44-port 10/100/1000 802.3af, 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, 1-port XFP 10 Gigabit Ethernet, optional 1- or 2-port 10-GbE Expansion slot, and 1 AC power supply
FGS648P-POE-DC	FastIron GS 648P-POE with 44-port 10/100/1000 802.3af, 4-port Combo to support 10/100/1000 Mbps (RJ-45) or 100/1000 SFP, optional 1- or 2-port 10-GbE Expansion slot, and 1 DC power supply
FGS-2XG	Field Upgradeable 2-port XFP 10 Gigabit Ethernet Module
FGS-2XGC	Field Upgradeable 2-port CX4 10 Gigabit Ethernet Module
FGS-1XG1XGC	Field Upgradeable 1-port XFP and 1-port CX4 10 Gigabit Ethernet Module
FGS-24GCPOE	PoE DIMM module to deliver PoE for 24 ports of 10/100/1000. Used for the FGS624P and the FGS648P models. The FGS648P needs 2 PoE DIMM modules to enable all 48-ports for PoE.
RPS-FGS	Redundant power supply (W)
RPSDC-FGS	Redundant DC power supply (W)

FOUNDRY NETWORKS

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Foundry Networks, Inc. (NASDAQ: FDRY) is a leading provider of high-performance enterprise and service provider switching, routing, security and Web traffic management solutions, including Layer 2/3 LAN switches, Layer 3 Backbone switches, Layer 4-7 application switches, wireless LAN and access points, metro and core routers. Foundry's customers include the world's premier ISPs, metro service providers, and enterprises, including e-commerce sites, universities, entertainment, health and wellness, government, financial and manufacturing companies. For more information about the company and its products, call 1.888.TURBOLAN or visit www.foundrynet.com.

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