FastIron 400, 800, 1500

The FastIron® 400, 800 and 1500 systems are the first in the industry to provide Enterprise customers with a complete end-to-end LAN solution—from the wiring closet to the LAN backbone—based on a single product family. The JetCore®-enabled FastIron systems simplify sparing, network operations and administration for dramatic savings in Total Cost of Ownership (TCO).

Based on Foundry's third-generation JetCore ASIC chipset, the FastIron 400, 800, and 1500 systems deliver incredible port density, advanced Layer 2/3 feature sets, rich Quality of Service (QoS), bandwidth management capabilities for Voice over IP (VoIP) and 10-Gigabit Ethernet interfaces to scale the network backbone with massive bandwidth capacity.

Highlights

▶ *Unparalleled port density maximizes revenue per rack unit by minimizing the environmental requirements such as space, power and cooling. Scale up to 232 Gigabit Ethernet ports, 228 Gigabit over Copper ports, 28 10-Gigabit Ethernet ports, or 672 10/100 ports in a single modular system that occupies up to 17 rack units (RU).*

▶ *Rich QoS features with wire-speed fine-grain bandwidth management and a complete multicast feature set provides a superior foundation for VoIP and next-generation streaming media applications*

▶ *Advanced Layer 2/3 feature set including integrated IP, IPX, AppleTalk, and OSPF protocols*

▶ *State-of-the-art Ternary Content Addressable Memory (TCAM) delivers wire-speed switching and Policy Based Routing (PBR)*

▶ *ASIC based sFlow™ technology (RFC 3176) support provides Enterprises with per-port, wire-speed network monitoring for capacity planning and security analysis*

▶ *Superior high availability with redundant management modules including temperature sensor, hot-swappable, load-sharing power supplies, and hot-swappable interface modules*

▶ *IronShield™ security protects against Denial of Service (DoS) attacks and prevents unauthorized access to networks and server farms*

▶ *Jumbo frame support on both Gigabit and 10-Gigabit Ethernet expands the data payload for network intense data transfer applications such as Storage Area Networks (SANs)*

System Summary

Feature	FastIron 400	FastIron 800	FastIron 1500
Slots	4	8	15
Switching Capacity	128 Gbps	256 Gbps	480 Gbps
Equipped with 10-GbE★	101 Mpps	220 Mpps	429 Mpps
Equipped with Gig E★	83 Mpps	178 Mpps	345 Mpps
Max Ports Per System			
10/100 ports	144	336	672
Gigabit ports	56	120	232
10-Gigabit ports	6	14	28
Height	8.75"	20.75"	29.75"
Power Supply Redundancy	1+1	N+1	N+1

★Million Packets per second (Mpps) numbers are aggregate based on switching capacities of the line cards

Key Features and Benefits

SUPERIOR HIGH AVAILABILITY

▶ *Redundant, hot-swappable management and interface modules—rapid fault detection and failover for increase reliability and expandibility*

▶ *Redundant, hot-swappable load-sharing power supplies—increased system reliability and circuit redundancy with the ability to mix AC and DC power within the same system*

▶ *Superior Layer 2 Redundancy—Rapid Spanning Tree Protocol (RSTP) based on IEEE 802.1w and link aggregation based on IEEE 802.3ad for rapid convergence, minimal network downtime and minimal packet loss*

▶ *Layer 3 Redundancy—VRRP, VRRP-E (Enhanced), and VSRP for router redundancy*

ADVANCED LAYER 2 FEATURES

▶ *Extensive Spanning Tree Protocol Features:*

— *Rapid Spanning Tree Protocol based on IEEE 802.1w—sub-second convergence using a pre-calculated failover link*

— *Fast Uplink Span—faster convergence on uplink ports on wiring closet switches in just four seconds*

— *Single-instance STP—support third-party devices that run a single STP instance in accordance with the 802.1s specification*

— *Per VLAN Spanning Tree (PVST)—multiple spanning trees instances within a single system for VLAN load-sharing and increased network reliability*

▶ *Dynamic VLANs—simplified network address administration with logical assignment of users to virtual communities based on port, protocol or subnet, minimizes broadcast traffic and ensures network security*

▶ *Link Aggregation based on IEEE 802.3ad—logical links containing up to four 100 Mbps or eight Gigabit Ethernet or four 10-GbE links to scale bandwidth and protect against link, port, or interface module failure*

▶ *Mirror/Monitor Port—monitoring and troubleshooting of single or multiple switch ports without disruption to existing traffic flows, aiding fault isolation*

COMPLETE LAYER 3 FUNCTIONALITY

▶ *Integrated Switch Routing (ISR)—reduce dependencies on external routers allowing network managers to configure a FastIron switch to route Layer 3 traffic including IP, IPX, AppleTalk, and OSPF protocols*

▶ *Industry Standard Routing Protocol—dynamic IP routing using RIP and OSPF*

— *RIP—simple solution for small to medium size network infrastructures, allowing administrators to assign IP addresses without defining sophisticated route propagation strategies*

— *OSPF—flexible route propagation for medium to large enterprise networks, allowing administrators to pre-determine network paths for specific traffic, define route summarization properties to minimize route table overhead, and take advantage of Equal Cost Multi Path (ECMP) for increased bandwidth utilization and redundancy*

▶ *Policy Based Routing (PBR)—provides customized routing decisions based on source address allowing Metro customers to maintain single configurations while having access to different service offerings such as enhanced security, increased flexibility, and access to preferred ISPs*

▶ *Network Address Translation (NAT)—allows Enterprise networks to translate private IP addresses into public IP addresses when traversing the Internet, conserving IP address space and increase network security*

VoIP Foundation—Advanced QoS and Bandwidth Management

▶ **Advanced QoS**—*enforce or change traffic priority based on port, VLAN, source MAC, ACL, 802.1p, Type of Service (ToS), or DiffServ settings to prioritize business-critical flows*

▶ **Ultra-low Latency**—*industry-leading port-to-port latency of 10 to 20 microseconds for superior call quality when using VoIP and other latency-sensitive traffic such as video*

▶ **Multiple Queuing Methods**—*Strict Priority (SP) or Weighted Fair Queuing (WFQ) provides flexibility for network administrators in enforcing traffic prioritization*

Scalable Multicast Implementation

▶ **Comprehensive Multicast Feature Set**—*hardware-based multicast features allow network managers to efficiently deploy streaming media applications for improved employee collaboration and productivity*

▶ **Diverse Multicast Protocol Support**—*IGMP, DVMRP, MSDP, PIM-SM (Sparse Mode), and PIM-DM (Dense Mode) give administrators the flexibility of supporting a variety of applications with complete interoperability to existing applications*

▶ **Superior Multicast Scalability and Performance**—*Up to 64,000 Layer 2 Multicast groups with sub-second join and leave latency for industry-leading multicast performance and scalability*

Cohesive, Unified and Easy-To-Use Network Management

▶ **Centralized Network Management**—*Foundry's IronView Network Manager™ is a web-based, graphical interface tool (GUI) that empowers network operators to seamlessly control software and configuration updates for any Foundry product from a central station. This dramatically simplifies network provisioning, diagnostics and resolution, thus reducing the operational expenses.*

▶ **MRP**—*Managed Rim Protocol for the Enterprise rapidly reconfigures for network changes that affect the local ring, and with no need for network-wide reconvergence. This results in dramatically improved performance.*

▶ **Command Line Interface (CLI)**—*is an industry-standard configuration interface, consistent and common throughout Foundry's entire product portfolio*

▶ **Web Interface**—*provides easy to use Graphical User Interface for system configuration from standard Web browsers*

▶ **sFLow (RFC 3176)**—*provides scalable, ASIC-based, wire-speed network monitoring and accounting with no impact on network performance. This allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes.*

IronShield™ Security

▶ **Wire-speed Extended Access Control Lists (ACL)**—*control packet forwarding and restrict access to the system management interface, while providing wire-speed switching and routing:*

— **Feature-Rich ACL Implementation**—*identify traffic based on source or destination IP address, IP protocol type, TCP or UDP port, IP precedence, or TOS values*

— **Selective ACL Logging**—*collect statistics for packets matching the deny or permit conditions*

— **ACL Scalability**—*support for up to 4,096 ACLs*

— **Ease of Administration**—*identify an ACL by name or number, or add a comment line for ease of administration*

— **ACL Syntax Compatibility**—*uniform ACL syntax across all Foundry products provides compatibility with syntax of other major vendors*
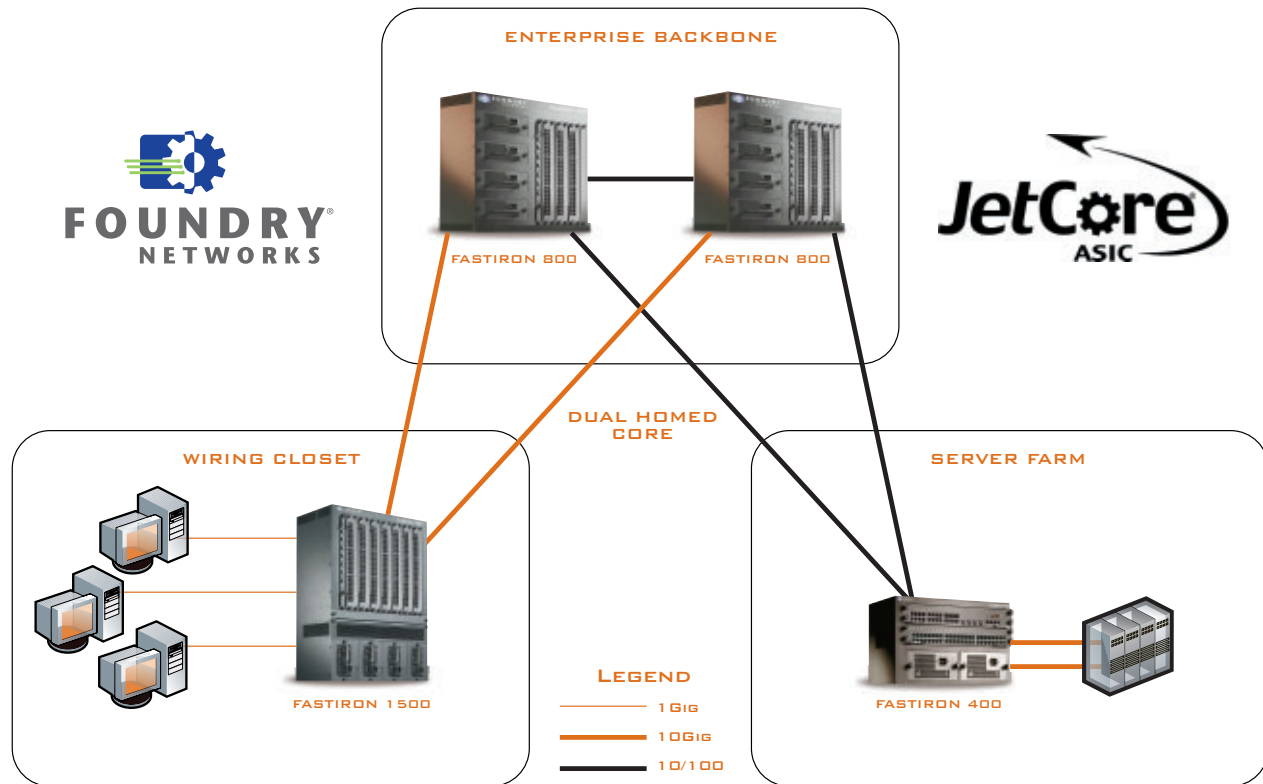
▶ **Wire-speed, fine-grain Bandwidth Management**—*Traffic classification and bandwidth enforcement based on port, port plus priority, or Layer 4 ACLs, from 1 Mbps up to 1 Gbps in increments as small as 256 Kbps*

▶ **MAC access control** *using either MAC registration or IEE802.1x allows for controlling unauthorized or untrusted hosts from accessing the network. Applying dynamically configured VLANs and Layer 2 filters, or Layer 3/4 ACLs further secures the access. Tunneling a link between host client and a centralized policy server over the 802.1x EAP protcol allows for a thorough analysis of the host to ensure it is in a trusted state prior to going access to the network.*

▶ **Secure Shell and Secure Copy**—*provide secure access to the administration and management interface over the network*

▶ **Protection Against Denial Of Service (DoS) Attacks**—*prevents or minimizes network downtime and protects against malicious users by limiting TCP SYN and ICMP traffic and protects against broadcast storms by limiting broadcast traffic*

▶ **User Authentication**—*authentication with AAA, 802.1x, RADIUS, TACACS, and TACACS+ to prevent unauthorized network access*

▶ **Wire-speed Rate Limiting**—*enforce bandwidth policies to prevent unauthorized network hogging*

▶ **SFlow (RFC 3176)**—*provides cost-effective, scalable, wire-speed network monitoring to detect unusual network activity*

▶ **SNMPv3**—*Secured SNMP management with RFC 2570 through 2575, provides User-Based Security model (RFC 2574) for authentication and privacy services*

Industry Leading Performance

▶ **Industry's Highest Switching Performance**—*non-blocking, distributed switching architecture with a parallel cross-point switch fabric provides up to 480 Gbps of aggregate switching capacity, and 178 million packets per second switching performance*

▶ **State-of-the-art TCAM**—*provides wire-speed Layer 2/3 switching and policy based routing with industry leading switching capacity and scalability*

▶ **Jumbo Frames**—*support for jumbo frames on Gigabit and 10-Gigabit interfaces allows dramatic scalability in server throughput while minimizing the impact on server processing resources*

Product Deployment Applications

ENTERPRISE BACKBONE

FASTIRON 800   FASTIRON 800

FOUNDRY NETWORKS

JetCore ASIC

DUAL HOMED CORE

WIRING CLOSET

SERVER FARM

FASTIRON 1500

FASTIRON 400

LEGEND

—— 1 GIG
—— 10 GIG
—— 10/100

FASTIRON SYSTEMS FOR END-TO-END ENTERPRISE SOLUTION

The JetCore-based FastIron systems are the first in the industry to provide Enterprise customers with a complete end-to-end LAN solution, ranging from the wiring closet to the LAN backbone, based on a single product family. The single JetCore product family simplifies network operations, administration, and sparing requirements, leading to dramatic savings in TCO.

The JetCore-based FastIron systems include advanced Layer 2/3 feature sets that deliver industry-leading scalability and performance, with embedded support for IP, IPX, and AppleTalk based switching. Integrated fine-grain bandwidth provisioning, sFlow™ (RFC 3176), rich QoS, complete multicast, and jumbo frames provide a foundation for VoIP and next-generation streaming media applications.

Complemented by the JetCore-based FastIron 4802 workgroup switch, the FastIron 400, 800, and 1500 systems empower Enterprise customers to harness network performance into a competitive business advantage and improve productivity by exploiting the efficiencies of intranet, Internet, and extranet applications.

FASTIRON 400, 800, AND 1500 FOR ENTERPRISE WIRING CLOSETS

The FastIron 400, 800, and 1500 modular systems provide an ideal choice for Enterprise wiring closets. These products offer superior port density, serviceability, high availability, security and advanced Layer 2/3 features sets. Redundant management modules providing rapid failover, IEEE 802.1w based Rapid Spanning Tree Protocol (RSTP), and ultra-low latency of 5 microseconds delivers the critical high availability and performance required for mission-critical applications including VoIP.

Shipping with full Layer 2 and base Layer 3 capabilities, the FastIron modular systems can be upgraded to a full Layer 3 feature set. The easy upgrade path provides Enterprise customers with a "future-proof" technology while enabling interoperability with existing infrastructures.

The addition of new JetCore-base interface modules, including a 48-port RJ-21 (Telco) auto-sensing 10/100 interface module and a 16-port Gigabit copper auto-sensing 100/1000 interface module, provide the industry's most compact port density while supporting a smooth migration path for Gigabit-to-the-desktop. You can swap modules to easily adapt to business needs, without costly forklift upgrades.

FastIron 400, 800, and 1500 for Enterprise Server Farm Connectivity

The FastIron 400, 800, and 1500 Layer 2/3 switches are ideal for server farm connectivity, providing cost-effective 100/1000 auto-sensing Gigabit Ethernet over copper interfaces for scaling server bandwidth.

The 16-port 100/1000 auto-sensing Gigabit over Copper (GoC) interface module provides industry leading port density up to 232 Gigabit ports in a single system that could take the full 17 rack units. Jumbo frame support on these cost-effective modules enables Enterprise customers to reduce CPU cycles during server farm backup operations.

The JetCore-based FastIron systems also support the new 10-Gigabit Ethernet interface module to scale backbone connectivity. In addition, Foundry's IronSheild™ security features protect the server farm against Denial of Service (DoS) attacks and provide administration security. These security features eliminate unnecessary network downtime caused by malicious hacker attacks.

FastIron 400, 800, and 1500 for Enterprise LAN Backbone

The JetCore-based FastIron systems feature industry-leading Gigabit and 10-Gigabit port density including fiber and copper Gigabit and fiber 10-Gigabit Ethernet interfaces, a critical requirement in the LAN backbone.

Continuing Foundry's technology leadership, the new FastIron systems offer wire-speed, non-blocking Layer 3 switching, delivering the industry's highest switching capacity of up to 480 Gbps. TCAM technology, an enhancement to Foundry's hardware forwarding technology, is a feature of the JetCore ASIC chipset, which provides superior performance and scalability in the LAN backbone and data center.

Advanced multicast capabilities, wire-speed Access Control Lists, and complete integrated OSPF routing capabilities provide robust routing and filtering, while 10-Gigabit Ethernet interfaces or IEEE 802.3ad-based trunk groups enable Enterprise customers to immediately scale inter-switch connections in the LAN backbone to meet increasing bandwidth requirements.

Foundry Voice over IP Solutions

Today's networks are providing services thought impossible just a few years ago. Internet, e-mail, voice, and video conferencing are just a few of the business applications that are placing higher demands upon the network Infrastructure. The standards and demands for the network infrastructure have never been higher. Delivering voice solutions requires more than just connectivity. Issues such as call quality, reliability, availability, security, and manageability are paramount in the complete voice solution.

Most of all, the solutions should be able to deliver answers to these issues all while saving scarce budget dollars or enabling new business possibilities. Foundry Networks believes that the customer should be able to choose the tools that are right for their business and strives to build solutions that will enable any telephony vendor's solutions to interoperate with Foundry's superior network infrastructure equipment.

Foundry Power over Ethernet Solutions

Whether your Voice over IP requirements are large or small, Foundry Networks has the right solution for your business. Layer 2 and Layer 3—802.3af compliant powered Ethernet switches are available in a variety of form factors including 24 and 48 port stackable switches as well as in chassis form factors for maximum flexibility. Foundry is well known for building solutions that enable performance in every aspect. Fully featured quality of service functionality guarantees that the most important traffic gets through in the LAN, MAN, and WAN. Foundry has enabled the ability to recognize and prioritize Voice traffic without sacrificing the performance or best in class low latency.

Network managers do not want any complexity surrounding the delivery of power in the network and to that end, Foundry has engineered specific features that reduce complexity of powering remote equipment.

► *802.3af compliant powered ports*

► *Power support for legacy non-802.3af compliant devices*

► *Configurable power on a per-port basis*

► *"Smart" ports that delivers the proper wattage even if manually mis-configured*

► *Redundant power supplies even with a fully powered chassis*

► *Full 15.4 watts per port on a fully populated chassis*

► *Three RU high Power Shelf for up to 14 fully POE powered modules*

► *Power across modules in one or multiple chassis in a rack*

Technical Specifications

IEEE Compliance

- 802.3, 10BaseT
- 802.3u 100BaseTX, 100BaseFX
- 802.3z 1000BaseSX
- 802.3z 1000BaseLX
- 802.3ab 1000BaseT
- 802.3ae 10-Gigabit Ethernet
- 802.3x Flow Control
- 802.3ad Link Aggregation
- 802.3af Power over Ethernet
- 802.1d Bridging
- 802.1p/qVLAN Tagging
- 802.1w Rapid STP
- 802.1x user authentication
- 802.3 Ethernet Like MIB
- Repeater MIB
- Ethernet Interface MIB
- SNMPV1, V2c and V3
- SNMP MIB II

RFC Compliance

OSPF

- RFC 1583 and 2328 OSPF v2
- RFC 1587 OSPF NSSA
- RFC 1745 OSPF Interactions
- RFC 1765 OSPF Database Overflow
- RFC 1850 OSPF Traps
- RFC 1850 OSPF v2 MIB
- RFC 1997 Communities Attributes
- RFC 2154 OSPF w/Digital Signatures (Password, MD-5)
- RFC 2178 OSPF
- RFC 2328 OSPF v2
- RFC 2370 OSPF Opaque LSA Option
- RFC 2385 TCP MD5
- RFC 2439 Route Flap Damping
- RFC 2842 Capabilities Advertisement
- RFC 2918 Route Refresh Capability

RIP

- RFC 1058 RIP v1
- RFC 1723 RIP v2
- RFC 1812 RIP Requirements

IP Multicast

- DVMRP v3-07
- PIM-DM v1
- RFC 1112 IGMP
- RFC 1122 DVMRP Host Requirements
- RFC 1122 Host Extensions
- RFC 1256 ICMP Router Discovery Protocol
- RFC 2236 IGMP v2
- RFC 2283 MBGP
- RFC 2362 PIM-SM
- RFC 3618 MSDP

General Routing Protocols

- RFC 768 UDP
- RFC 783 TFTP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 894 IP over Ethernet
- RFC 903 RARP
- RFC 906 TFTP Bootstrap
- RFC 951 BootP
- RFC 1027 Proxy ARP
- RFC 1122 Host Requirements
- RFC 1256 IRDP
- RFC 1519 CIDR
- RFC 1541, 1542 & 2131 BootP/DHCP Helper
- RFC 1542 BootP Extensions
- RFC 1591 DNS (client)
- RFC 1812 General Routing
- RFC 2338 VRRP

Others

- RFC 1157 SNMPv1
- RFC 1191 Path MTU discovery
- RFC 1215 SNMP generic traps
- RFC 1354 IP Forwarding MIB
- RFC 1573 SNMP MIB II
- RFC 1757 RMON Groups 1,2,3,9
- RFC 1905, 1906 SNMPv2c
- RFC 2030 SNTP
- RFC 2068 HTTP
- RFC 2138 RADIUS
- RFC 3176 sFlow
- RFC 3411 SNMPv3 framework
- RFC 3412 SNMPv3 processing
- RFC 3414 SNMPv3 USM
- RFC 3415 SNMPv3 VACM
- TACACS+ v1.78

Network Management

- IronView Network Manager (INM) Web based graphical user interface
- Integrated Standard based Command Line Interface (CLI)
- sFlow (RFC 3176)
- Telnet and SSHv1
- SNMP
- HTTP and HTTPS
- RMON HP OpenView for Sun Solaris, HP-UX, IBM's AIX, and Windows NT

Element Security Options

- AAA
- RADIUS
- Secure Shell (SSH v2.0)
- Secure Copy (SCP)
- TACACS/TACACS+
- Username/Password (Challenge and Response)
- FI-level Access Mode (Standard and EXEC Level)
- Protection for Denial of Service attacks, such as TCP SYN or Smurf Attacks

Environmental

- Operating Temperature: 0 °C to 40 °C (32 °F to 104 °F)
- Relative Humidity: 5 to 90%, @ 40 °C (104 °F), non-condensing
- Operating Altitude: 10,000 ft (3,000 m) maximum
- Storage Temperature: -25 °C to 70 °C (-9 °F to 158 °F)
- Storage Altitude: 15,000 ft (4,500 m) maximum
- Storage Humidity: 95% maximum relative humidity, non-condensing

Safety Agency Approvals

- CAN/CSA C22.2 No. 60950-1-03/UL60950-1 First Edition, Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products—Part 1: Equipment of Classification, Requirments and User's Guide
- EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems
- EN 60950-1/IEC 60950-1 Safety of Information Technology Equipment

Emissions

- Canada Interference Causing Equipment Regulations
- FCC Class A
- EN 55022/CISPR-22 Class A/VCCI Class A

Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 61000-4-11 Voltage Dips and Sags
- Generic: EN 50082-1
- ESD: IEC 61000-4-2; 4 kV CD, 8 kV AD
- Radiated: IEC61000-4-3; 3V/m
- EFT/Burst: IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal Line)
- Conducted: IEC 61000-4-6; 3V

Warranty

- 1-year hardware
- 90-day software

Mounting Options

- 19" Universal EIA (Telco) Rack or Tabletop

FastIron System Power Specifications

Platform	FastIron 400	FastIron 800	FastIron 800	FastIron 1500
Power Supply(s)	1	1	2	2
–40 to –60VDC Consumption (Amps)	17A	17A	33A	58A
100-120VAC Consumption (Amps)	8A	8A	15A	30A
200-240VAC Consumption (Amps)	4A	4A	7.5A	15A
AC frequency	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz
Max BTUs (fully populated)	1,877	1,877	3,753	7,508
Max Watts (fully populated)	550	550	1100	2200

FastIron System Physical Specifications

Platform	FastIron 400	FastIron 800	FastIron 1500
Dimensions	9"h x 17.5"w x 15"d (22.86 x 44.5 x 38.1 cm)	23"h x 17.5"w x 15"d (58.4 x 44.5 x 38.1 cm)	29.75"h x 17.5"w x 15"d (75.68 x 44.5 x 38.1 cm)
Weight (fully loaded)	47.7 lbs (21.5kg)	69.1 lbs (31.1 kg)	170 lbs (76.5 kg)

Ordering Information

Part Number	Description
FI400	4–slot FastIron 400 Chassis
FI800	8–slot FastIron 800 Chassis
FI1500	15–slot FastIron 1500 Chassis
RPS3	90-220VAC Power Supply for FastIron 400 & FastIron 800
RPS3DC	48VDC Power Supply for FastIron 400 & FastIron 800
RPS4	90-220VAC Power Supply for FastIron 1500 only
RPS4DC	48VDC Power Supply for FastIron 1500 only
RPS6	90-220VAC Power Supply for RPS-POE Shelf
J–F2404GMR4	24–port 10/100Base-TX (RJ-45) & 4–port 1000Base-X mini-GBIC or 1000Base-T (RJ-45) management module (double-wide module)
J–FxGMR4	8-port mini-GBIC based Gigabit management module
J–F2GMR4	2-port mini-GBIC based Gigabit management module
J–F48E–A	48-port 10/100BaseT RJ-45 interface module (double-wide module)
J–F48T–A	48-port 10/100BaseT RJ-21 Telco interface module
J–F24FX	24-port 100Base-FX (MTRJ) for 50 or 62.5μm MMF interface module
J–F24FX–SR	24-port 100Base-FX (MTRJ) for 9 or 10μm SMF interface module (15km)
J–F24FX–IR	24-port 100Base-FX (MTRJ) for 9 or 10μm SMF interface module (40km)
J–FxG	8-port mini-GBIC based Gigabit interface module
J–F16Gx	16-port mini-GBIC based Gigabit interface module
J–F16GC	16-port 100/1000BaseT interface module
J–F24E–POE	24–port 10/100Base-T 802.3af POE compliant interface module
RPS-POE Shelf	POE Power Supply Shelf, supports 14 POE cards with n+1 Power redundancy
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
E1MG-LHB	1000Base-LHB mini-GBIC optic, SMF, LC connector 150 km maximum reach
E1MG-TX	1000Base-TX mini-GBIC Copper, RJ-45 connector
E1MG-CWDM80-xxxx	CWDM mini-GBIC optics, 80 km SMF, LC connector where xxxx corresponds to the nm wavelengths of the optics, values are 1470, 1490, 1510, 1530, 1550, 1570, 1590 and 1610
10–GbE	
F10Gx1	1–port 10-Gigabit Ethernet module with 850nm LAN Optics (up to 300 meters on MMF)
F10Gx2	2-port 10-Gigabit Ethernet Base module – requires optics: select 10G-XNPK-LR or 10G-XNPK-ER
10G-XNPK-LR	1310nm serial pluggable Xenpak optic only (SC) for up to 10km over SMF
10G-XNPK-ER	1550nm serial pluggable Xenpak optic only (SC) for up to 40km over SMF
10G-XNPK-SR	850nm serial pluggable Xenpak optic only (SC) for up to 300 m over MMF
10G-XNPK-LX4	1310nm parallel pluggable Xenpak optic for 300m over FDDI-grade MMF or 10km over SMF
10G-XNPK-CX4	Copper parallel pluggable Xenpak media for 15m over Infiniband cable
10G-XNPK-LW	1310nm WAN PHY pluggable Xenpak optic for OC-192 SONET connection of 10 km over SMF