

Product Brief

10G Enhanced Ethernet Switch-Router

The FM4000 family of switch devices contain up to 24 10GbE ports and utilize a high performance, low latency Ethernet switch architecture including a comprehensive suite of Layer 3 features along with advanced classification, congestion management and system management capabilities. These switches contain all the features necessary to enable Ethernet as the single, converged datacenter fabric, transporting inter-processor, storage and networking traffic. The FM4000 products provide many advanced features which are listed below.

Features

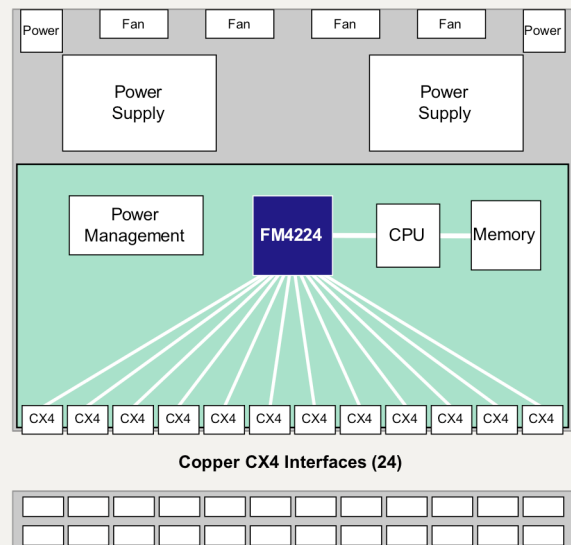
- **Performance**
 - 300ns latency with ACLs and routing enabled
 - Up to 24 XAUI (CX4) interfaces
 - Each interface supports 10/100/1000/2500 SGMII
 - Cut-through and store-and-forward modes
 - 360 million packets per second
- **Layer 3**
 - IPv4, IPv6 lookups
 - Up to 16K IPv4 entries; up to 4K IPv6 entries
 - 16K-entry ARP table
 - Fully-provisioned multicast routing
 - Full VLAN replication with multicast routing
 - ACL support
 - L2/L3/L4 awareness
 - Up to 4K extended ACLs
 - Egress ACLs supported
- **Layer 2**
 - 16K-entry MAC table
 - Jumbo packet support up to 16,376 bytes
 - Fully provisioned multicast
 - Multiple Spanning Tree (802.1D, s, w)
 - Independent and shared VLAN learning
 - Extensive 802.1Q VLAN support
- **Switch virtualization and scaling**
 - Single point of management
 - Remote learning
 - Fat trees, meshes, rings
 - Multi-chip mirroring
 - Multi-chip LAG, 16 ports/group, 256 groups/system
- **Convergence capabilities**
 - Line rate classification
 - L2/L3/L4 traffic classification, metering, and policing
 - 802.1p, IPv4, IPv6 DSCP
 - Advanced IEEE congestion management
 - 802.3x class-based (multi-color) PAUSE flow control
 - 802.3ar rate control
 - Partitionable shared memory ensures traffic separation
 - Flexible, multi-level scheduling
 - 200 ordering queues
- **Security**
 - Port-based security (802.1X)
 - MAC address security
 - DOS prevention
- **Switch management**
 - MDIO, GPIO, I²C, SPI interfaces
 - JTAG, and Serial LED interfaces
 - Unmanaged mode

Benefits

- **Reduces per-port cost of 10G Ethernet**
 - Simplifies and accelerates system design
 - Reduces component count
 - Accelerates the deployment of 10G infrastructure
- **Enables new performance-sensitive applications**
 - Blade computing, with RDMA
 - Computer room clusters and mesh-based systems
 - ATCA chassis architectures
- **Enhances existing applications**
 - Efficient aggregation of enterprise LAN traffic
 - Drives the cost out of stackable Ethernet switches
 - Efficiently mixes voice, video, and data traffic
 - Offers unprecedented multicast performance
- **Enables convergence in the datacenter**
 - Partitioned hardware ensures traffic separation
 - Enhanced flow control provides lossless fabric
 - Storage and compute traffic can safely co-exist
- **Simplifies system-wide management**
 - Extensive monitoring offers clear visibility
 - Single point of management reduces complexity

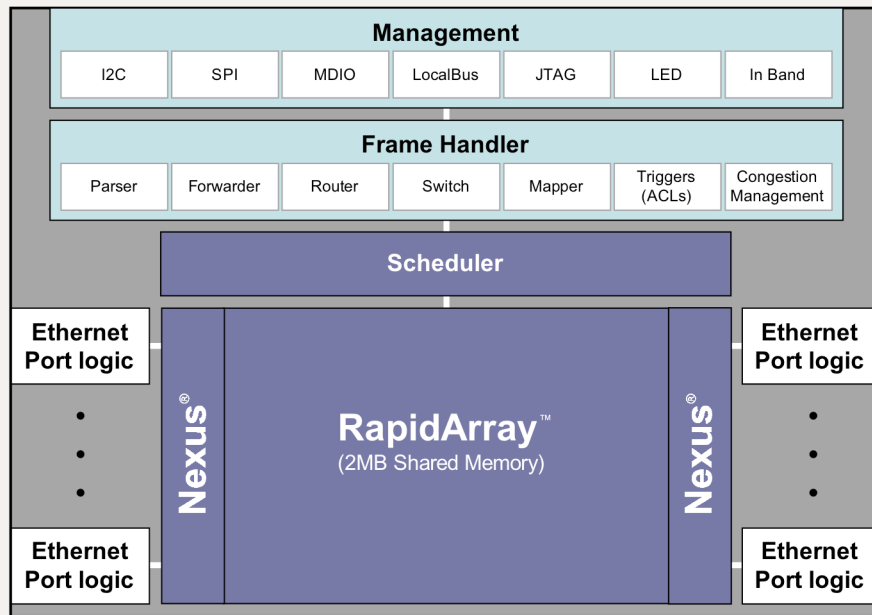
Sample Application

10G Ethernet Aggregation Switch



The FM4000 Series devices offer unparalleled performance and cost efficiency for full-speed 10G Ethernet datacenter connectivity. The devices are well suited to a number of tasks in the datacenter, one of which is the core aggregator of 10 Gigabit Ethernet uplinks from an array of workgroup switches.

FM4000 Block Diagram



Leveraging the unique capabilities of Fulcrum’s Nexus System Interconnect and ultra-fast RapidArray packet storage, the FM4000 Series delivers vast throughput with negligible delays, enabling a new class of performance-optimized applications never before imagined for Ethernet.

FM4000 Series Advances Datacenter Switching

The industry is beginning a migration to blade and modular computing architectures. System designers are attracted to the proposition of leveraging ubiquitous Ethernet to interconnect devices, thus enabling them to create high-performance computing and communications systems while reducing complexity and cost. This demand was initially met with the FocalPoint FM2000 Series switches and now the pin-compatible FM4000 Series, with enhanced Layer 2 and new Layer 3/4 features, provides designers new tools to address a broader range of data center networking demands.

The FM4000 Series continues to deliver an unprecedented level of performance and integration while performing Layer 3 tasks. The Layer 2 and Layer 3 latencies are held to extremely low values promoting effective congestion management. Cost effective aggregation of a very large number of servers is made feasible through the use of the devices’ stacking and fat tree capabilities. A comprehensive set of queue management features enables highly flexible QoS implementations and security policies can be implemented and enforced through extensive Access Control List (ACL) capabilities.

FM4000 Series Eases System Design

The FM4000 Series devices are offered in a variety of port speed combinations to match a wide range of connectivity requirements. For added flexibility, all 10G interfaces may be operated in lower-speed modes.

FM4000	10G XAUI, 10/100/1000/2500 SGMII	10/100/1000/2500 SGMII
FM4103	2	4
FM4104	2	8
FM4112	8	16
FM4410	8	10
FM4208	8	-
FM4212	12	-
FM4224	24	-

Process and Power

The FM4000 Series devices are implemented in TSMC’s 130nm FSG process and consume less than 1.5 Watt per active 10G interface with typical traffic activity. Unused interfaces that are disabled consume no power, and power scales directly with the level of activity.



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