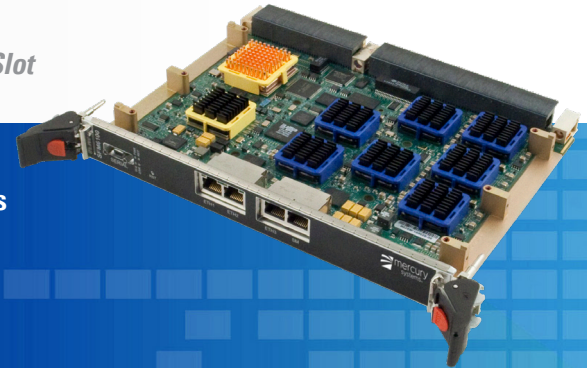


Ensemble 6000 Series OpenVPX SFM6100 Module

Versatile Switching, System Management, and Front Panel I/O in a Single Slot



- High-bandwidth Serial RapidIO® switch fabric at 3.125 Gbaud data rates
- Intelligent system manager / chassis manager
- Control plane Ethernet switching
- Air-cooled and conduction-cooled variants available
- Architected to meet OpenVPX™ design principles

The Ensemble® 6000 Series OpenVPX SFM6100 Module from Mercury is designed as a VITA 46 VPX-compliant module in a 6U form factor, also compatible with OpenVPX™ system architecture design principles. This switch module provides full inter-board serial RapidIO and Gigabit Ethernet connections in a VPX system. The SFM6100 has seven 8-port serial RapidIO crossbars in a two-level hierarchy, providing full connectivity for up to 18 VPX payload modules at up to 1.25 GB/s per link in both directions simultaneously.

The Ensemble SFM6100 module provides Gigabit Ethernet switching for up to 18 VPX payload slots via the on-board Broadcom Level 2 managed switch. Two Gigabit Ethernet ports are available, allowing external Ethernet traffic to access the backplane Ethernet links. The SFM6100 module also implements system management capabilities, allowing the switch module to intelligently manage the entire system from a single point.

Full-Featured Switch Fabric Technology

The Ensemble SFM6100 module utilizes seven Tundra Tsi578™ serial RapidIO crossbars to create a dual-star switching hierarchy among the payload modules. All crossbars provide a full-duplex 4x link on each of their eight ports. The crossbars can be configured to operate at 3.125 Gbaud for enhanced serial RapidIO bandwidth, or 2.5 Gbaud for

backward compatibility. Each Tsi578 crossbar also has its own configuration EEPROM, allowing decreased EEPROM load times and crossbar configuration in parallel. The SFM6100 module implements an inter-switch serial RapidIO link for SFM6100-to-SFM6100 communication.

A single SFM6100 module provides full connectivity for up to 18 payload modules in a VPX chassis. A second SFM6100 module can be configured as an additional full-duplex connection for payload modules.

A variant of the SFM6100 is available that routes 20 4x serial RapidIO interfaces to the backplane, supporting smaller, high-bandwidth configurations with only a single switch card.

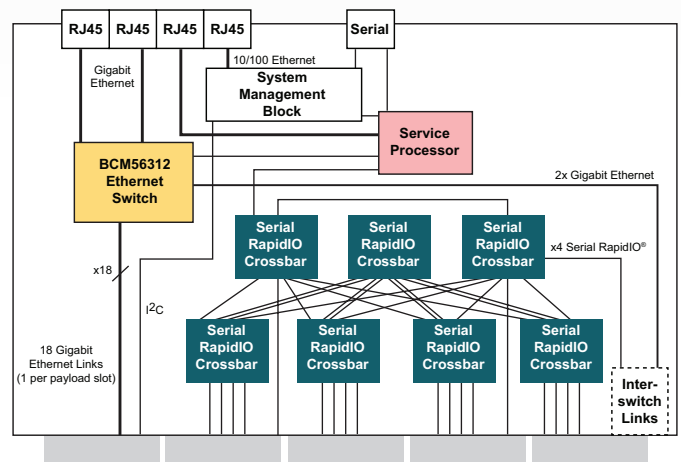


Figure 1. Ensemble 6000 Series OpenVPX Ensemble SFM6100 Module (air-cooled) functional block diagram

Mercury Systems is a leading commercial provider of secure sensor and mission processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.



Systemwide Gigabit Ethernet Switching

The Ensemble SFM6100 module leads the industry in offering the first VPX switch module to provide Gigabit Ethernet switching in addition to RapidIO switching. The SFM6100 module implements the Broadcom BCM56312 switch to provide Gigabit Ethernet connectivity over the backplane to each payload module. System designers can avoid the need for an external Gigabit Ethernet switch and cabling in their configurations. The SFM6100 module embeds this functionality within the system.

With the assistance of the SFM6100 module's on-board service processor, the switch can be configured as a Level 2 managed switch, enabling such features as link aggregation, multicast support via IGMP, Rapid Spanning Tree Protocol (RSTP) support, and support for Jumbo packets. The SFM6100 module enhances interoperability by providing an inter-switch Gigabit Ethernet connection, allowing it to communicate seamlessly via standard TCP/IP to either another SFM6100 module, or another switch module with a similar Ethernet connection.

Front-Panel Gigabit Ethernet Ports

The Ensemble SFM6100 module provides two Gigabit Ethernet ports to the front panel (air-cooled variants only – conduction-cooled variants supply a single Gigabit Ethernet port to the backplane). This allows users to direct TCP/IP traffic directly into the on-board Gigabit Ethernet switch for dispersal among the payload modules. It also enables easy integration of the VPX system into the network backbone of the deployed platform.

System Management Capabilities

An on-board system management block allows the Ensemble SFM6100 module to manage the entire system. The on-board shelf manager can query sensor values across the system, reset and power up/down modules, set sensor thresholds, and manage firmware updates. Remote network access to the management subsystem is provided via a front-panel (air-cooled only) or backplane 10/100 BASE-T Ethernet port.

Flexible, Modular System Configurations

VPX systems from Mercury are designed to the system level, with a rich set of fully integrated modules that can be flexibly scaled and combined in a variety of configurations to meet a broad range of embedded application requirements. Many board types are available for end-to-end solutions, including a variety of digital receiver solutions, single-board computers (SBCs), and high compute density (HCD) modules.

A fully loaded VPX system that balances processing power with flexible I/O capabilities consists of 18 HCD6220 modules and two Ensemble SFM6100 modules, although not all chassis can support this maximum

configuration. This configuration supports up to 36 MPC864xD dual-core processing devices (72 cores) in a single chassis, for up to 768 GFLOPS of processing (assuming 1.33 GHz processor clock speed), with over 45 GB/s of both aggregate and bisection bandwidth via the RapidIO switch fabric. The equivalence of the aggregate bandwidth and bisection bandwidth figures indicates that locality of processing within the system is not a factor when mapping an algorithm to the multicomputer. The processing resources are, in essence, position independent, simplifying software design.

SFM6100 modules are available in both air-cooled (at various levels of ruggedization) and conduction-cooled variants.

VPX-REDI

The VPX (VITA 46) standard defines 6U and 3U board formats with a modern high-performance connector set that is capable of supporting today's high-speed fabric interfaces, such as RapidIO. VPX is most attractive when paired with the Ruggedized Enhanced Design Implementation standard – REDI (VITA 48). The Ensemble SFM6100 module is implemented as a 6U conduction-cooled implementation of VPX-REDI, with air-cooled variants in the same VPX form factor available for less rugged environments. Targeted primarily for harsh-environment embedded applications, VPX-REDI offers extended mechanical configurations supporting higher functional density, such as two-level maintenance (ZLM).

Specifications

Module

Supports up to 18 VPX payload modules

Data plane (per VITA 46.20)

18 4x serial RapidIO links at either 3.125 or 2.5 Gbaud to payload slots

1 inter-switch serial RapidIO link

Control plane

18 Gigabit Ethernet links to payload slots

2x Gigabit Ethernet inter-switch link

Management Plane

I²C bus between all switch and payload slots

Front panel I/O via two Gigabit Ethernet ports (air-cooled configurations)

Single port routed to backplane on conduction-cooled assemblies

Dual-sided PCB assembly

Designed for installation in VITA 46-compliant chassis

Dimensions

Standard 6U VPX 0.8" or 1.0" pitch

Double-height 6U form factor

160 mm x 233.3 mm

Power Requirements

Input voltage 12V from backplane

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