

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

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EMINATE

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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