

EnsembleSeries™ SFM6105

6U OpenVPX PCIe gen 3 switch with system management

- Full Gen3 PCIe high-bandwidth switching capabilities
- Transparent or non-transparent on a port-by-port basis
- Switching for data plane or expansion/sensor plane
- VITA 46.11 compliant IPMC
- Optional MOTS+ rugged packaging for extreme environmental protection



The EnsembleSeries™ SFM6105 is switch rated for bandwidths of up to a theoretical 32 gigabits per PCIe interfaces across 24 interfaces, to deliver a bisection aggregate of 96 GB/s.

EnsembleSeries SFM6105 targets the open PCIe protocol, allowing customers to utilize PCIe as the primary high-bandwidth, low-latency data plane or sensor ingest platform and switch these data transfers efficiently and effectively. Designed to the VITA 65 OpenVPX™ standard, the SFM6105 is software configurable to support many various data movement architectures across a variety of applications and backplane topologies.

Optional MOTS+

The EnsembleSeries SFM6105 family of switches have options for modified off the shelf plus (MOTS+) packaging for extreme durability. MOTS+ configurations leverage enhanced commercial components, board fabrication rules, and subsystem design techniques for extra ruggedness and to withstand extreme temperature cycles better than other rugged designs. Please contact Mercury directly for MOTS+ configurations.

High Speed Switching

EnsembleSeries SFM6105 switches implements 24 x4 PCIe interfaces to the OpenVPX backplane, each of which defaults to high-speed Gen3 PCIe protocols. These interfaces are switched by a Microsemi PFX8546 PCIe switch component, which provides switching for up to 96 lanes of Gen3 PCIe. Each x4 interface can be configured as transparent or non-transparent as per the PCIe open specification, allowing for the development of complex data movement architectures aligned with customer needs.

Additionally, by virtue of the PCIe protocol, link-level hardware-based retry guarantees data delivery without the latency introduced by software-based QoS mechanisms. Each link is also backwards compatible and can configure to Gen2 or Gen1 PCIe data rates. SFM6105 switches can be utilized to switch a 6U OpenVPX PCIe data plane, or can be used to route and direct incoming sensor data over OpenVPX expansion or sensor planes to intended targets.

System Management

Each EnsembleSeries SFM6105 switch implements the advanced system management functionality inherent to the VITA 46.11 OpenVPX standard to enable remote monitoring, alarm management, and hardware revision and health status.

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



ACQUIRE



DIGITIZE



PROCESS



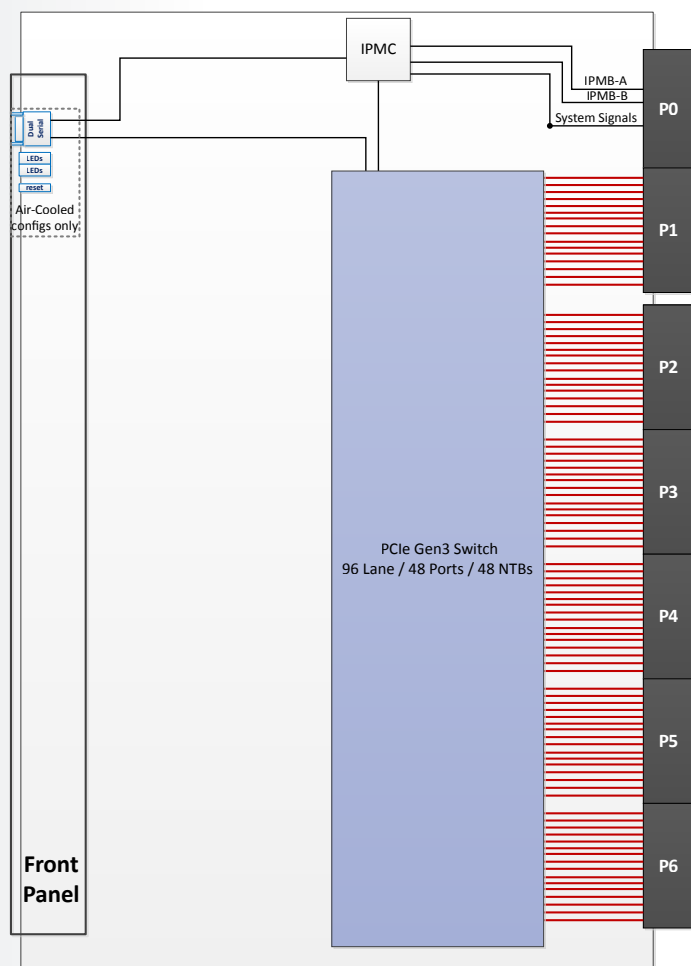
STORAGE



EXPLOIT



DISSEMINATE



EnsembleSeries SFM6105 functional block diagram

Using the standard IPMI-A and IPMI-B bus, the EnsembleSeries SFM6105 implements a full IPMC on board system-management block. This IPMC is designed to comply with VITA 46.11 and allows the SFM6105 module to:

- Read sensor values
- Read and write sensor thresholds, allowing an application to react to thermal, voltage, or current variations that exceed those thresholds
- Reset the entire switch
- Power up/down the entire switch
- Retrieve module field replaceable unit (FRU) information
- Interface with and be managed remotely by a VITA 46.11-compliant chassis manager

VPX-REDI

The VPX (VITA 46) standard defines 6U and 3U board formats with a modern high-performance connector, set capable of supporting today's high-speed fabric interfaces. VPX is most attractive when paired with the ruggedized enhanced design implementation standard – REDI (VITA 48). The EnsembleSeries SFM6105 switch is a 6U implementation of VPX-REDI, with air and conduction-cooled and Air and Liquid Flow-By™ 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 (2LM). 2LM allows maintenance personnel to replace a failed module and restore the system to an operational state in a limited time period, minimizing potential damage to the module

Rugged air cooling, Air Flow-By™

Air- and conduction-cooled subsystems rely on filtration to remove contaminants from their cooling air streams. Mercury's Air Flow-By technology eliminates filtration with the most elegant cooling solution available within a sealed and rugged package. Fully compliant to VITA standards (including VITA 48.7), Air Flow-By maintains OpenVPX's 1-inch pitch requirement, is highly resilient to liquid and particle contamination, boosts SWaP, reduces operating temperature, extends MTBF by an order of magnitude, and enables embedded deployment of the most powerful and reliable processing solutions.

Mercury Sensor Processing Ecosystem

Modern sensor compute subassemblies are customized assemblies of interoperable building blocks built to open standards. Mercury's hardware and software portfolio of building blocks are physically and electrically interoperable as defined by international industrial standards, including VITA's OpenVPX standards. Our subsystems are designed from a suite of sophisticated open architecture building blocks that are combined and scaled to meet a broad range of advanced sensor chain processing requirements.

Mercury subsystems may include analog, digital and mixed-signal receiver modules, single-board computers and signal processing payload modules. Payloads may have acquisition, digitization, processing, and exploitation and dissemination elements and include FPGA, CPU, GPU or ADC/DAC technology, and be made up of multiple subsystems developed to multiple standards, including OpenVPX and others such as ATCA, ATX/E-ATX, or VME/VXS.

Specifications

OpenVPX Slot Profile

VITA 65 Slot Profile: SLT6-SWH-24F-10.4.3

VITA 65 Module Profile: SLT6-SWH-24H-10.4.3-X, where X can vary based on PCIe generation/data rate

Module

Supports 24 Gen3 PCIe x4 interfaces to the backplane

Each link configurable to Gen2 or Gen1 data rates

Supports OpenVPX management plane

Dual IPMB interfaces per VITA 65

Front panel serial interface to on-board VITA 46.11 IPMC

Routed to backplane in conduction-cooled or Air-Flow-By configurations

Dual-sided PCB assembly

Designed for installation into VITA 46/VITA 65 compliant chassis

Dimensions

Standard 6U OpenVPX 1.0" pitch

6U form factor 160mm x 233.33mm

Power Requirements

Input voltages 12V payload power

3.3V_AUX management power

Environmental

See [Environmental Protections for Operation at the Tactical Edge](#) for specific ruggedness levels and cooling options.

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CORPORATE HEADQUARTERS

50 Minuteman Road • Andover, MA 01810 USA
(978) 967-1401 • (866) 627-6951 • Fax (978) 256-3599

EUROPE MERCURY SYSTEMS, LTD

Unit 1 - Easter Park, Benyon Road, Silchester, Reading
RG7 2PQ United Kingdom
+ 44 0 1189 702050 • Fax + 44 0 1189 702321

